

Journal of

NOBEL



ISSN: 2091-2331 (Print) 2091-234X (Online)
(JoNMC) - A Peer Reviewed And Indexed Journal



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MEDICAL COLLEGE

(JoNMC)

(An Official Journal of Nobel Medical College)



VOL. 06
No. 01
Issue 10



Regd. No.
25161/060/61

January-June, 2017

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(JoNMC)

JOURNAL OF NOBEL MEDICAL COLLEGE

Vol. 06 No. 01 Issue 10

Journal of Nobel Medical College

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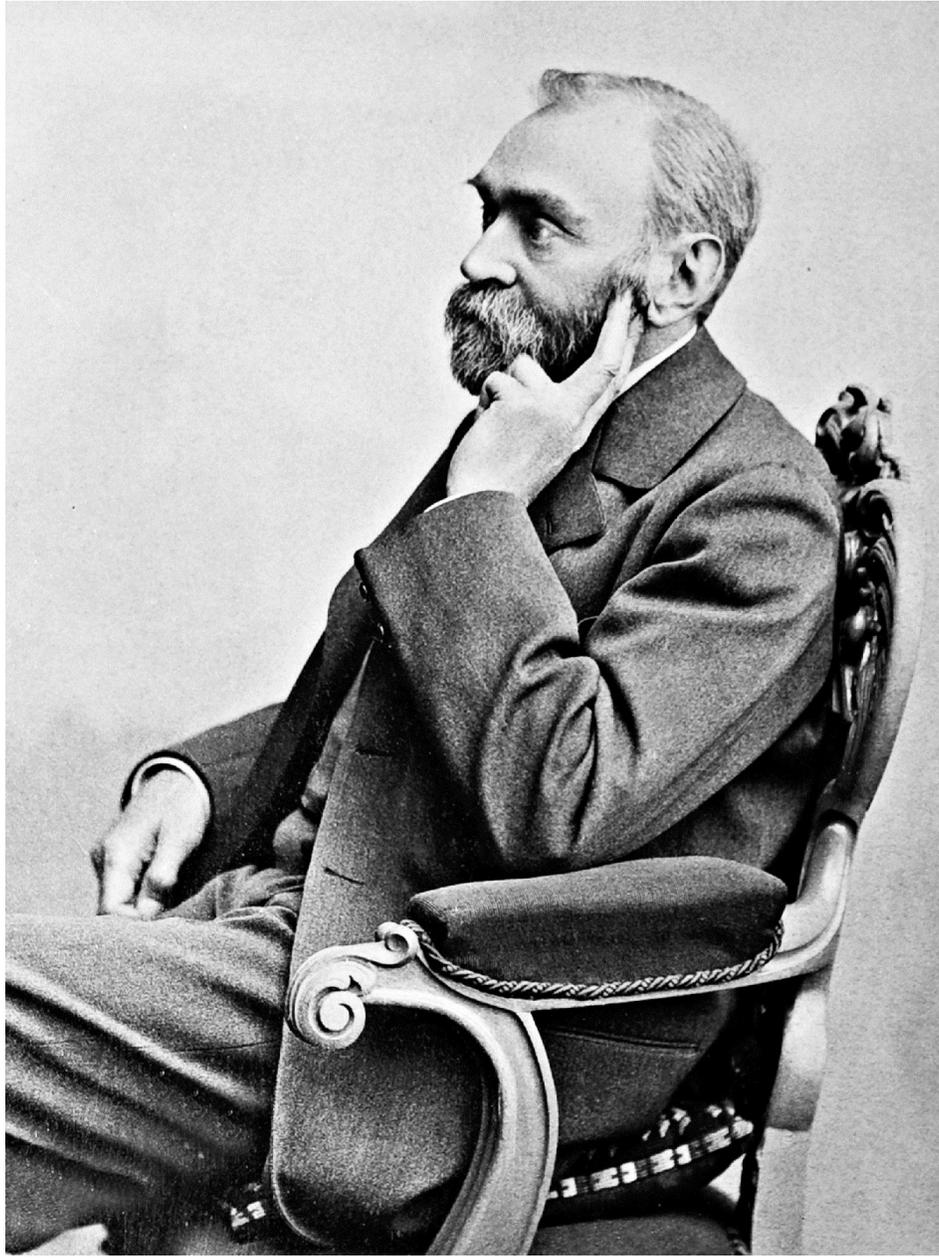
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ALFRED BERNHARD NOBEL

Alfred Bernhard Nobel was a Swedish chemist, engineer, innovator, and armaments manufacturer. He was the inventor of dynamite.

Born: October 21, 1833, Stockholm

Died: December 10, 1896, Sanremo

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Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np

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Editorial

Discovery of "Nobody", a Microprotein, Versus Human Genome Project

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Proteins are the key players for the whole show of a body as living. If we look into the real mechanism of the events going on in a living system one by one, we will always find the involvement of one protein or may be many playing vital roles in each event. To justify this statement, we can insert a summary of the functions of proteins already documented.

As **structural component**, proteins like collagen, elastin, keratin etc are taking vital role in the making and supporting of our body tissues. **Enzymes** belong to a family of proteins produced by our own cell as biocatalyst just to enable all the biolecular transformations to proceed in a finely regulated manner. **Antibodies** are the specialized proteins produced by our immune system for defence of our body against foreign bodies and infection. For movement, actin, myosin, troponins and tropomyosin are the proteins involved in muscle contraction and relaxation. Opsins are light sensitive proteins working in our photoreceptor cells of retina for **vision**. Different metabolites, vitamins, hormones metal ions etc. can be transported from one site to another with the help of specific protein as **transporters**. Hormones and neurotransmitters can transmit their signal only, when they are received and fixed by proteins as **receptors** at their target organs. **Hormones** are chemical messengers coordinating the metabolic pathway, they are mostly proteins or peptides. **Disposal of unwanted proteins**, if it is foreign origin, liposomal proteolytic enzymes will do the necessary digestion and disposal but for those endogenously expressed proteins, when their assigned duties are over, a molecular labeling will be given by fixing with a protein known as ubiquitin. The labeled proteins are then fed into a protein complex known as proteasome, where they are chopped into pieces and disposed.

Now, as a most recent discovery, Proteins for **disposal of unwanted genetic materials** has started pouring in. RNAS transcribed by DNAS for synthesis of proteins, when their functions are over, they are to be cleared from inside the cells for a better cell health. For this, a microprotein, named "**NoBody**" (the full form being a nonannotated P. body dissociating polypeptide) has been discovered as a molecular work horse for sweeping out of unneeded. RNAS. Experiments conducted by yale university researchers, showed that "**NoBody**" interacts with another group of proteins involved in RNA recycling process known to form P. body granules When the intracellular level of "**NoBody**" increases, the disappearance of P. body granules also increases. When there is any fluctuation in

maintaining "**NoBody**" level, the recycling process gets distributed indicating the role of this microprotein as a crucial one and also to be a potential target for future therapeutics related to RNA dysfunction. But, for confirmation as a member of the group listed above, it is yet to be identified and change the name by deleting the term "nonannotated".

Alan sanghatalian of salk institute reported as saying that researchers can sequence the whole human genome but they never knew a protein like "**NoBody**" as it was too short and fall below the usual length requirement for gene assignment algorithm [1]. Gisela store et al., reported as saying that the activities and structure of hundreds and thousands of proteins have been studied in detail but, one class of proteins has largely been ignored. These are microproteins encoded directly by small open reading frames (**smORFs**) [2]. Juan Pablo also reported the existence of DNA sequences coding small reading frames (**smORFS**) having fewer than 100 codons in each eukaryotic genome in numbers much higher than the corresponding annotated protein coding genes. Due to difficulties with bioinformatic detection and experimental analysis, **smORFS** have been ignored most of the time [3]. We all know, that the proteins listed above including '**NOBODY**' are to be synthesized in our own cells after being expressed by their own respective genes. As such, after the completion of human genome project, all the proteins so far isolated have already been characterized and annotated but, for the microprotein, we are focusing now "**NoBody**" it is yet to be completed. Almost all the parts of the human genome had been sequenced, mapped, the resulted data used worldwide in biomedical sciences, anthropology, forensic science etc. but still, many more are yet to be known.

Considering all the above mentioned facts, like discovery of '**NOBODY**' as an established housekeeping protein yet to be annotated, detection of many more microproteins having potential of becoming biologically functional proteins, discovery of small open reading frames (**smORFs**) as the main sources or many of the microproteins so far detected, we can very well expect beginning of a fresh project by giving more emphasis towards sequencing of **smORFs** which was neglected by the workers of human genome project, to be followed by repeated characterization of the microproteins so far isolated. After the completion of this second genome project, if sanctioned, the recovery of the protein coding genes may come up nearer to the earlier expected level of 50,000-1, 00,000 and many of the microproteins including "**NOBODY**" may get their proper recognition with their own assigned genes.

Lastly, I just want to share the following lines with our researchers that human genome is like a book of life. Buried in this large volume, are our genes, which are scattered as small DNA fragments and smaller fragments as small open reading frames, the total still being a small percentage of the total text (genome). Till now, only 1.5% of the human genome has been identified as protein coding genes, 98.5% is still opening for exploration of genes for those proteins still hiding undetected".

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Journal of Nobel Medical College

Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np
Volume 6, Number 1, Issue 10, January-June 2017, 1-5

Original Article

Laparoscopic Cholecystectomy, A single Surgeon experience at Teaching Hospital Biratnagar, Nepal

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Received: 5th January, 2017; Revised after peer-review: 8th February, 2017; Accepted: 16th March, 2017

Abstract

Background

Laparoscopic cholecystectomy (LC) is a treatment of choice for symptomatic gall stone disease and is commonly done all over the country in general surgical practice. The aim of this study is to show the results of LC in our medical college.

Material and Methods

A retrospective analysis of the patients underwent laparoscopic cholecystectomy from July 2015 to September 2016 was carried out in NMCTH, Biratnagar. A total of 391 patients admitted through OPD of our Hospital underwent laparoscopic cholecystectomy were studied. All age groups and both sex were included.

Results

Out of 391 patients with symptomatic cholelithiasis, 385(98.46%) patients underwent successful laparoscopic cholecystectomy. Age range of patients in the study varied between 12-84 years and maximum patients (30.69%) were found in the age group of 31-40 years. There were 333(82.58%) female and 58(17.41%) male patients. Mean age of the patients was 39.61 years. Indication for surgery was symptomatic cholelithiasis. Conversion was done in 6(1.53%) cases due to unclear anatomy. A rare congenital anomaly, Accessory right hepatic duct with cystic duct continuous with it was encountered in 12-year boy; LC was done safely without injuring biliary tree. As postoperative complications, one patient developed biliary peritonitis which was managed by drainage tube.

Conclusion

Laparoscopic cholecystectomy is successfully being done for last 5 years in our institute. The results are comparable with those of published series. Anatomical variations and complications may present, for which care must be taken.

Key Words:

Congenital Anomaly, Laparoscopic cholecystectomy, Symptomatic Cholelithiasis

Introduction

Symptomatic gall stone is a common disease affecting human beings. The first open cholecystectomy was done by Langenbach in 1892[1]. Now laparoscopic

cholecystectomy has become the procedure of choice for symptomatic cholelithiasis and considered the gold standard [2]. In 1987 Philip Mouret performed the first LC in France [3]. The

advantages of LC over open cholecystectomy are a less postoperative pain, early discharge from hospital, faster recovery and better cosmesis [2]. This minimally invasive procedure started in Nepal around 1994 and now successfully being performed all over the country. LC is being performed at Nobel Medical College since last five years. Therefore, the aim of this study is to highlight the results of LC recently in our institute.

Materials and Methods

A retrospective study regarding the patients underwent laparoscopic cholecystectomy was conducted in Department of General and minimally invasive surgery, Nobel Medical college and Teaching Hospital, Biratnagar, from July 2015 to September 2016, after taking ethical clearance from Institutional Review Committee, Nobel Medical College & Teaching Hospital, Biratnagar. Among the total 391 patients admitted through surgical out door, 385 underwent successful LC. All the age groups and both sex were included. All the patients having symptomatic cholelithiasis diagnosed on the basis of history, clinical examinations and confirmed by ultrasonography of abdomen were included. All the patients with diagnosis of symptomatic cholelithiasis underwent standard four or three port Hasson's technique LC. Parameters included in the study were demographic data, incidence, age groups, duration of symptoms, length of hospital stay, complications and follow ups. Data were analyzed with SPSS software version 20.

Results

A total of 391 patients, 385 (98.46%) had undergone successful laparoscopic cholecystectomy. Out of them 333 (82.58%) were female and 58 (17.41%)

were male [Figure 1]. Therefore, female to male ratio was 5.74:1.

Age range of the patients included in the study varied between 12-84 years and maximum patients (30.69%) were in age group of 31-40 years [Table 1]. Higher numbers of female patients are seen in age groups 31 to 40 and 21 to 30 whereas higher number of males are seen in age groups 31 to 40 and 51 to 60 [Figure 2]. Mean age of the patients was 39.61 years and standard deviation is 3.02. Durations of symptoms of patients was greatly varied over weeks to years. Overall length of hospital stay varied between 3-5 days, with an average of 4 days. Conversion was done in 6 cases (1.53%) because of unclear anatomy due to dense inflammatory adhesions [Figure 3].

As a congenital anomaly, accessory right hepatic duct with cystic duct continuous with it was encountered in 12 year boy; LC was done safely without injuring biliary tree [Picture 1&2]. A female patient landed in emergency department on fifth postoperative day with features suggestive of biliary peritonitis, ultrasonography of abdomen revealed bilioma. She was managed conservatively with IV fluids, IV antibiotics and insertion of drainage tube inside peritoneal cavity, through which bile was drained out and gradually the output decreased over a week, drain removed and then patient was discharged.

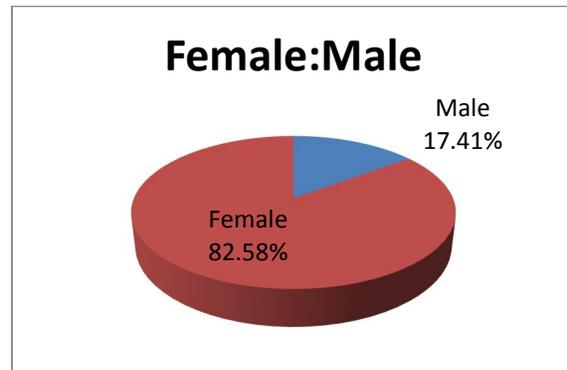


Figure 1: Female to Male ratio.

Age Group	Number	%
11 to 20	15	3.83
21 to 30	97	24.8
31 to 40	120	30.69
41 to 50	72	18.41
51 to 60	63	16.11
61 to 70	17	4.34
71 to 80	6	1.53
81 to 90	1	0.25
Total	391	100

Table 1: Distribution of the patients according to age group

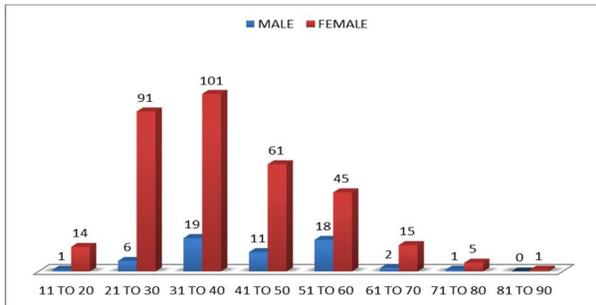


Figure 2: Female to male ratio according to age

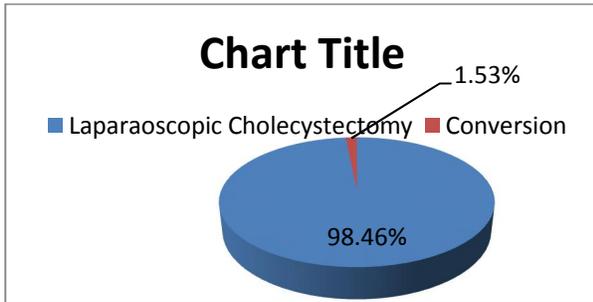
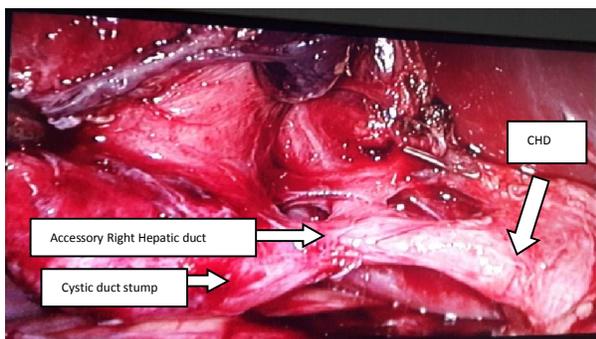
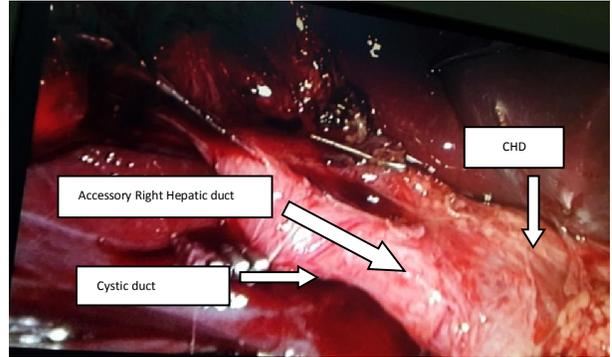


Figure3: Conversion rate of LC to open cholecystectomy



Picture 1: Accessory right hepatic duct continuous with cystic duct before clipping cystic duct.



Picture 2: Accessory right hepatic duct draining in CBD after clipping Cystic duct

Discussion

Laparoscopic cholecystectomy is very common surgical procedure in general surgical practice for symptomatic cholelithiasis. We are performing this minimal invasive technique at Nobel Medical College for last 5 years. So, here our experience and results of LC is being shared and compared with other published reports of LC.

In the present study, laparoscopic cholecystectomy was performed in 333 (82.58%) female, which is little bit higher but comparable with other study in which the incidence was 78.4% [4]. Age range of patients varied between 12-84 years with maximum patients in the age groups of 31-40 years which is comparable to Shrestha et al which also showed the maximum patients in age group 30-39 years[5]. Mean age of the patients was 39.61 years which is comparable to the study conducted by Shrestha et al which was 41 (18-75) years[5]. Indications for surgery in different studies were symptomatic cholelithiasis; history of biliary colic, dyspepsia, biliary pancreatitis, chronic calculous cholecystitis that is similar to this study. The patients were discharged on 1st or 2nd postoperative day which is comparable with other study [5]. Conversion was done in 6 patients (1.53%). which is low as compared to other studies [6-10]. Conversion rate in

studies conducted by Sakpal et al, Livingstone et al and Abdul Hussain was found to be 4.9%, 5-10% and 3.5% respectively [4,11,12]. The incidence is found to be low reason might be the growing experience of surgeons.

In a 12 year boy with history of repeated attack of biliary colic, accessory right hepatic duct continuous with cystic duct was found, gall bladder was inflamed with adhesions. LC was performed safely without injuring the right hepatic duct. This is a rare congenital anomaly [13]. Joo et al have stated that the anomaly has been found in upto 4% of necropsies [14]. A study conducted by Yu J et al showed 7.4% of this anomaly [13]. In studies conducted by Kullman et al and by Devi et al (2013) they found that accessory hepatic ducts are the most common EHBT abnormalities. Khayat et al found accessory hepatic ducts in only 3.33% [15].

A female patient landed on 5th postoperative day with features suggestive of biliary peritonitis, may be leakage from accessory bile duct of Luschka or minor duct injury at operation which was unnoticed. She was managed with drainage tube with good recovery. Accessory minor bile ducts may get injured at the time of LC which is also seen in other studies [16]. Recent studies suggest that clinically relevant bile leaks complicate approximately 0.4–1.2% of cholecystectomies. Injury to a subvesical duct is one of the most common causes of Cholecystectomy associated bile leak [17]. Other studies have shown that the chance of major bile duct injury is higher in laparoscopic cholecystectomy than open cholecystectomy i.e. 0.3–0.7% and 0.1–0.2% respectively [7,18].

Conclusion

It can be concluded that Laparoscopic cholecystectomy can be successfully performed, however, anatomical variations may present, for which knowledge and

care is necessary and a few complications may arise which may need immediate surgical attentions. With adequate exposure to LC, it can be performed safely. Although there were few limitations of this study that has to be considered for future as the study is conducted in a single center with small sample size.

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Journal of Nobel Medical College

Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np
 Volume 6, Number 1, Issue 10, January-June 2017, 6-11

Original Article

Immunoglobulin A (IgA) Nephropathy in Protocol Graft Kidney Biopsy done at six months Post Transplantation in a Tertiary Care Center Hospital of Nepal

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Received: 10th July, 2016; Revised after peer-review: 12th August, 2016; Accepted: 27th September, 2016

Abstract**Background**

Renal transplantation is the treatment of choice for end stage renal disease. The focus of interest has been to increase the life of the transplanted graft. Recurrence of native kidney disease or occurrence of denovo glomerulonephritis has adverse effects in graft survival. Protocol graft biopsy done at fixed time interval after transplantation aids in early identification of post-transplant glomerulonephritis before development of clinical signs and symptoms. This study describes the incidence of post-transplant IgA Nephropathy in protocol renal graft biopsies done at six months post- transplantation.

Materials and Methods

This is a hospital based observational descriptive study, done in Tribhuvan University Teaching Hospital, Kathmandu, Nepal, a tertiary medical referral center in the capital. Protocol biopsy of the graft kidney was performed at six months post-transplantation in all recipients who underwent kidney transplantation in this hospital between 2071 Kartik and 2072 Ashwin.

Results

Protocol biopsy was performed in total 47 recipients. Mean age of the recipients was 33.7 years \pm 10.83 years. The study population consisted of 33 (70.2%) male and 14 (29.8%) female recipients. IgA Nephropathy was present in 6 (12.8%) recipients.

Conclusion

Our study demonstrates that IgA Nephropathy does occur in patients with stable GFR and without any clinical or laboratory abnormalities. Protocol biopsy is valuable in detection of early histologic abnormalities before onset of clinical manifestations, thus helping in prompt management with aim to prolong the graft survival.

Key words

IgA nephropathy, Post-transplant glomerulonephritis, Protocol biopsy, Recurrent disease

Introduction

Protocol biopsy is the biopsy that is performed at pre-determined time points after renal transplantation in patients with stable allograft function.

It aims to detect subclinical insults to the allograft so that the appropriate early

intervention can be done to prolong allograft survival.

Recurrence of native disease is common after transplantation. IgA Nephropathy also recurs, with reportedly great variation in the incidence. The variation may be because of difference in duration of follow

up and biopsy policy of different transplant centers. Most centers perform biopsy only when patients present proteinuria, hematuria or decline in renal function. This may potentially underestimate the true rate of recurrence. The patients who are clinically asymptomatic but have histological changes in the graft kidneys would remain undiagnosed. For centers which perform routine protocol biopsies, histological recurrence with mesangial IgA deposits and mesangial hypercellularity have been reported in 50–60% of patients. [1,2] In the presence of clinical symptoms, the recurrence rate has been reported from 13–50%. [3,4]

Graft loss from histologic recurrence have been reported between 1.3% and 16% when there were features of diffuse mesangial proliferative expansion and glomerular sclerosis[5]. One of the latest registry report containing possibly the largest number of IgAN patients has shown the estimated 10-year incidence of graft loss due to recurrence to be 9.7% (CI = 4.7–19.5 %). [5]

We performed protocol graft biopsy in all transplant recipients to find out the histological occurrence of IgA nephropathy in asymptomatic patients with normal urine findings and stable graft function.

Materials and Methods

Recipients Selection

This study was done in settings of TU Teaching Hospital. All patients who underwent kidney transplantation between 2071 Kartik and 2072 Ashwin were eligible for enrollment in the study.

Immunosuppressive Protocol

All renal transplant recipients received triple immunosuppressive regimens. They were started on tacrolimus and mycophenolate mofetil two days prior to surgery. Intravenous methylprednisolone was given on the day of surgery, followed by oral prednisolone on subsequent days.

All recipients received induction with rATG on Day 0 and Day 1 post-operatively. The usual dose of rATG was 1mg/kg on each day. However, patients who were highly sensitized received up to 2mg/kg of rATG on each day. Patients with two haplo-identical HLA at A, B, DRB1 loci were not prescribed induction with ATG.

Tacrolimus was given at the dose of 0.1mg/kg/day. Tacrolimus trough level (CO) level was measured on D1 and D5 after transplantation. It was then measured weekly for the first month. After the first month, it was requested on clinician's discretion. At the time of protocol biopsy, i.e. at six months of renal transplantation, the target level of 6-7ng/ml was aimed. Mycophenolate mofetil was given at the dose of 2 gm per day in divided doses. Recipients were maintained at 5 mg of prednisolone as the continuation dose. Sensitized recipients were maintained at 10 mg as the continuation dose.

They were followed up post-operatively on out-patient basis, as per institution protocol. At six months post transplantation, surveillance graft biopsy was performed in all patients who gave informed written consent.

Recipients Exclusion

Following recipients were excluded:

1. Recipients not consenting to the study
2. Recipients who had proteinuria at six months
3. Recipients who didn't have stable graft function at six months
4. Recipients with acute kidney injury, active infections or urinary tract obstruction

Biopsy Protocol

Recipients undergoing protocol graft biopsy were admitted a day prior to the procedure. All basic investigations including coagulation parameters and viral serology were sent routinely. Contraindications to biopsy were uniformly ruled out prior to the procedure.

Renal biopsy was performed under real time ultrasound guidance with Bard 18 gauze automated biopsy gun. Two core of tissues were obtained from each individual and preserved in normal saline and formalin. Presence of active post-procedure bleeding was ruled out by ultrasonography. All patients underwent structured health history and physical examination. Patients' clinical and laboratory parameters were recorded. Renal biopsy reports were reviewed on follow-up.

Results

Total of 57 CKD patients underwent renal transplantation during the study period. Eight recipients refused to undergo renal biopsy at six months. Out of 49 recipients who underwent renal graft biopsy at 6 months, 2 already had significant proteinuria or renal impairment. Remaining 47 recipients underwent the defined protocol biopsy and were included in data analysis.

Characteristics of the Study Population

The mean age of enrolled renal transplant recipients was 33.7 years \pm 10.83 years. The study population consisted of 33(70.2 %) male and 14(29.8 %) female. The cause of CKD was listed as Hypertension in 23 (48.9%), Undetermined in 21 (44.7%), Chronic Glomerulonephritis in 1 (2.1%) and Diabetes Mellitus in 2 (4.3%) recipients. The mean HD duration before undergoing renal transplantation was 6.47 months. \pm 4.4 months. Six (12.8%) recipients underwent pre-emptive kidney transplantation. Among all recipients, 27 (57.4%) received kidney from blood related donors, whereas 20 (42.6%) received kidney from non-related donors. The mean age of the donor was 44.0 years \pm 11.33 years. The donor population consisted of 34 (72.34%) female and 13 (27.65%) male. The level of HLA Mismatch was 0 in 7 (14.9%) recipients, 1-3 in 22 (46.7%) recipients and 4-6 in 18 (38.3%) recipients. HLA DRB1 mismatch was 0 in

14 (29.8%), 1 in 23 (48.9%) and 2 in 10 (21.3%) recipients. Induction with rATG was given in 40 (85.1%) recipients. The mean dose of ATG was 94.47 \pm 45.28 milligrams.

Maintenance immunosuppressive regimen was triple drug regimen consisting of Tacrolimus, Mycophenolate Mofetil and Prednisolone in 46 (97.8%) recipients. One patient was switched to azathioprine from MMF during the study period due to financial condition. The mean tacrolimus trough level at six months post-transplantation was 6.94 \pm 1.36 ng/ml.

IgA Nephropathy

IgA Nephropathy was detected in 6 (12.8%) recipients. There was no association with age ($p=0.962$) or sex ($p=0.452$) of the recipient, or age ($p=0.569$) or sex ($p=0.519$) of the donor. There was no association with whether the donor was related or not ($p=0.693$). There was no association with the level of HLA DR mismatches ($p=0.759$). There was no association with the use of rATG as induction ($p=0.273$).

The recipient and donor characteristics and immunologic characteristics are demonstrated in following table.

Table 1. Recipient and donor characteristics (N=47)

Characteristic	Value
Age of the patient (yrs.)	33.7 \pm 10.83
Sex	
Male (%)	70.2 (n = 33)
Female (%)	29.8 (n = 14)
Native Kidney Disease (%)	
Hypertension	48.9 (n = 23)
Diabetes Mellitus	4.3 (n = 2)
Chronic Glomerulonephritis	2.1 (n = 1)
Undetermined	44.7 (n = 21)
HD Duration (months)	6.47 \pm 4.4
Donor	
Related (%)	57.4 (n = 27)
Non-related (%)	42.6 (n = 20)
Donor Age (yrs.)	44.0 \pm 11.33
GFR at 6 months follow-up (ml/min)	77.03 \pm 22.6

Table.2. Immunological characteristics of the recipients (N=47)

Characteristics	Value
HLA Mismatch (%)	
0	14.9 (n=7)
1-3	46.8 (n=22)
4-6	38.3 (n=18)
Pre-transplant B Cell Cross match (%)	4.3 (n=2)
Positive	95.7 (n=45)
Negative	
Second Transplantation (%)	4.3 (n=2)
Yes	95.7 (n=45)
No	
Use of induction immunosuppression (%)	85.1 (n=40)
rATG	14.9 (n=7)
No induction	97.9 (n=46)
Maintenance immunosuppression (%)	2.1 (n=1)
Mycofenolate Mofetil	6.94 ± 1.36
Azathioprine	
Tacrolimus Trough Level (ng/ml)	

Discussion

IgA Nephropathy was detected in 12.8% recipients. Unfortunately, no pre-transplant biopsies were performed in these cases. Thus, we couldn't classify them as true recurrence.

Ortiz et al reported the histological recurrence of IgAN in almost one-third of the patients after 2 years from transplantation. In a study which reviewed IgAN recurrence in 32 protocol biopsies, recurrence rate was 53%. [2] Another study including 11 biopsies had recurrence rate of 27%. [5] With regards to recurrence, the results are found to be similar in the studies including the patients using modern immunosuppression. In most centers, the suspicion of IgAN recurrence is based on the presence of hematuria, proteinuria or a decline in renal function. In those cases, the recurrence rate was between 12.5 and 50%. [6] Importantly, it was found that 52% of the IgAN recurrences diagnosed by protocol biopsies

were not accompanied by proteinuria or hematuria. Thus, protocol biopsies with immunofluorescence analysis constitute an essential tool for the diagnosis of recurrence, even if it is clinically silent [7]. In our study, we were not able to rule out the possibility that IgA deposits were already present in the donors. Autopsy studies from cases without known renal disease report histologic IgAN in 4–8%. [8] However, a gradual resolution of IgA deposits is expected to occur within 45 days following transplantation. In a study of 0-h renal biopsies, where 87% of transplants were from living donors, latent mesangial deposition of IgA was present in 16% of its cases. Interestingly, the co-deposition of C3 was detected in only 19%. [9] In our study, recurrent IgAN was associated with C3 deposition in all cases. This may suggest that there was already complement activation and therefore potential inflammatory response. Taking into account both the timing of protocol biopsy and the concomitant complement deposition, we do not consider that the IgA deposits were related to persistence of donor IgA deposits in the graft. Use of Mycophenolate mofetil for immunosuppression has been thought to lower incidence of recurrence as opposed to azathioprine-based therapy. However, it could not be verified in a small retrospective study and still needs to be tested in a prospective study. [10] Almost all of our patients were on MMF based therapy, except one who was switched to azathioprine. So, we were not able to make the comparison between the two groups. Three out of six recipients with mesangial IgA deposits were treated with increased doses of prednisolone and mycophenolate mofetil. These were the ones who also exhibited glomerular or interstitial inflammation. All six recipients received cod liver oil and ARB as supportive management.

The optimal regimen of immunosuppressive drugs for the treatment of primary IgAN in patients at risk of progression still remains uncertain. [11] The use of calcineurin inhibitors, either in the presence or absence of induction therapy, does not influence the risk of recurrence. When azathioprine and Mycophenolate mofetil (MMF), cyclosporine and tacrolimus, sirolimus and prednisone were compared, there was no difference in the rate of graft loss due to recurrence [12]. A study has reported development of IgAN with nephrotic range of proteinuria in two transplant recipients after conversion from a calcineurin inhibitor based immunosuppression to sirolimus [13]. Use of steroid free or rapid steroid withdrawal regimen hasn't been found to affect the risk of recurrence [14]. Recommended treatment for primary IgAN includes ACE-i or ARB [15]. There have also been case reports of fish oil having a favorable effect in recurrent IgAN, but no studies have been performed to support its routine use [16].

Safety of Protocol Kidney Biopsy

Use of protocol biopsies has been limited in some centers by concerns over their safety. There are a number of studies that suggest that the biopsy procedure is considerably safe [17,18]. None of the recipients in our study developed complications related to the procedure. This is in accordance with large studies which reported major complication rate between 0.4 to 1 percent. [8] It is also in accordance with the view that it is ethically justifiable to perform protocol graft kidney biopsies both in clinical trials and routine care.

Conclusion

Our study demonstrates that IgA Nephropathy does occur in patients with stable GFR and without any clinical or laboratory abnormalities. Protocol biopsy is valuable in detection of early histologic

abnormalities before onset of clinical manifestations, thus helping in prompt management with aim to prolong the graft survival.

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Journal of Nobel Medical College

Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np
Volume 6, Number 1, Issue 10, January-June 2017, 12-19

Original Article

Outcome of the Treatment of Distal Tibia Fractures by Minimal Invasive Locked Plate – A Short Term Study

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Received: 20th January, 2017; Revised after peer-review: 25th February, 2017; Accepted: 28th March, 2017

Abstract

Background

Treatment of fracture distal tibia is challenging. Classic open reduction and internal plate fixation requires extensive soft tissue dissection and causes periosteal injury. The locking screw-plate interface allows fracture fixation without plate–bone adherence, thus preserving the fracture hematoma, and reduces the risk of nonunion by maintaining microvascular circulation within the cortex and its investing tissues.

Material & Methods

This study included 33 patients of age between 18 to 62 years with extra-articular and simple intra-articular fracture of distal tibia. All fractures were fixed by minimally invasive technique with pre-counteracted distal tibia locking plate under image intensifier control. The American Orthopaedic Foot and Ankle Society (AOFAS) scale was used for functional assessment.

Results

Out of 33 there were twelve 43-A1, five A2, five A3, five B1, three B2, two C, one C2 fractures. There were 29 closed fracture and four open fracture (three type I and one type II). The overall mean time of union was 16.3 weeks. The mean AOFAS score was 93 points. In all 30 cases there were no wound problems, whereas three cases had superficial wound infection. No any cases needed secondary procedure for healing of bone.

Conclusion

The short-term results shows that minimally invasive locked plating is good solution for the challenging distal tibia fracture. This technique minimizes soft tissue complication and provides good union and functional outcome.

Key words: *Distal tibia fracture, Locked plate, Minimally invasive plate osteosynthesis.*

Introduction

Treatment of fracture distal tibia is challenging because of the limited soft tissue, the subcutaneous location, and poor vascularity of distal tibia. Although many options are available for treatment of distal tibia fracture, the best one remains controversial [1,2]. External fixation with ilizarov frame, ankle spanning hybrid fixator

with or without minimal internal fixation is good option especially, if it is associated with extensive soft tissue injury. But it is associated with complications like pin-track infections malunions or nonunions [3], and inaccurate reduction [4], especially of intra-articular fractures. Classic open reduction and internal plate fixation requires extensive soft tissue dissection and causes

periosteal injury. That is why it is associated with high rates of complications, including infection (range 8.3–23%) and delayed union and nonunions (range 8.3–35%) [5].

Closed intramedullary nailing do not disturb fracture's hematoma and maintains the integrity of the soft tissue coverage, but it is technically difficult, unstable fixation and can lead to malunion [6]. MIPPO involves inserting a plate in a subcutaneous extraperiosteal tunnel, bridging the fracture site, which is then secured proximal and distal to the fracture zone. Minimally invasive plate osteosynthesis (MIPPO) aims to reduce iatrogenic soft-tissue injury and damage to bone vascularity and preserve the osteogenic fracture hematoma [7]. The locking compression plate device allows the screws to lock to the plate, therefore creating a stable, fixed-angle device [8,9]. The locking screw-plate interface allows fracture fixation without plate–bone adherence, thus preserving the fracture hematoma, and reduces the risk of nonunion by maintaining microvascular circulation within the cortex and its investing tissues [10,11].

The aim of our study was to assess short-term clinical and radiological results of treatment of extra-articular and simple intra-articular fracture of distal tibia with MIPPO technique using locking compression plates regarding time to union, complications, and functional outcome using the American Orthopaedic Foot and Ankle Society (AOFAS) ankle score [14].

Material & Methods

This was a prospective study that was carried out between November 2011 to December 2015 in the orthopaedic department of Nobel medical college and teaching hospital, Biratnagar. This study was approved by the ethical committee. The written informed consent was taken

from all patients for participation in the study. This study included Gustilo-Anderson grade I and II open and closed injuries of the distal tibia fractures with extra-articular or simple intra-articular extension. Patients with type III open fractures as per Gustilo and Anderson classification, articular comminution (AO B3, C3), deformity existing before the fracture, ipsilateral proximal tibia fractures, pathological fractures and lower limbs with neurological deficits or vascular diseases were excluded.

The study initially included 35 patients with distal tibial fracture but two patients were lost during follow-up; thus only 33 patients were included in the final evaluation.

All the cases with fracture distal tibia who presented to orthopaedic outpatient or emergency department were evaluated clinically and plain radiographs of the distal tibia and the ankle were sent. A computed tomography scan of the distal tibia and the ankle was obtained in patients with extension of the fracture to the joint. Each injury was carefully evaluated for the extent of soft tissue injury, fracture pattern, bone comminution, bone loss, articular extension and the need for fixation of fibula. All cases were initially managed by temporary immobilization of limb by long leg posterior slab. Open injuries were treated with intravenous antibiotics, adequate wound debridement, and lavage before any definitive fixation. Definitive surgery was planned when the ankle swelling subsided, and the 'wrinkle sign' was present.

Fractures were classified according to the AO comprehensive classification system [12], whereas open injuries were classified according to the Gustilo and Anderson classification [13].

Operative technique

Patients were operated upon under regional anesthesia on a standard radiolucent

orthopedic table. A pneumatic tourniquet was inflated on the thigh after giving intravenous antibiotic. Patients were positioned supine on the operative table. All the patients were treated with medial distal tibia anatomical locked plate using the MIPPO technique using image intensifier. We fixed the fibula fracture if it was syndesmotic, displaced infrasyndesmotic, or suprasyndesmotic associated with comminution, impaction, or shortening at the tibia fracture. It was fixed first by using MIPPO, open plating, or intramedullary thick K-wires before tibial fixation. The main fracture fragments of the distal tibia were aligned and reduced by manual traction. If the reduction was difficult, a dissector, Schanz screw, or periosteal elevator was used as a joystick to assist in reduction. Then the fracture fragments were fixed with individual percutaneously inserted lag screws if possible. Cannulated screws and K-wires were used before plating to fix the intra-articular extension of the fracture if required. An entry site is developed over the distal tibia through a 4 to 5 cm curved anteromedial incision centered over the medial malleolus, and the plate is then inserted from the distal to the proximal, through a tunnel between the periosteum and the intact overlying tissue. Compared with the other side, alignment, limb length, and rotation were assessed and adjusted before fixing the plate. It was reassessed after the plate was secured by one screw to the proximal and distal fragments. If satisfactory, the remaining screws were applied. At least three bicortical screws were inserted proximal to the fracture, whereas bicortical or unicortical screws were inserted distal to the metaphyseal fracture using as many of the distal plate holes as possible through small stab wounds. The stab incisions were irrigated and closed with routine skin sutures, and then the wound was dressed.

Postoperatively, the limb was maintained in the elevated position and immobilized by using a removable below knee back slab for 2 weeks. Parenteral antibiotics were continued for 3 days postoperatively, and then oral antibiotics were given for an additional week. Active range of motion and non-weight-bearing crutch walking while still in the hospital was allowed, and weight bearing as tolerated was allowed over time depending of the fracture pattern, fracture healing, and the stability of fracture fixation, but most patients could bear weight at least partially at 6 to 8 weeks. If the fracture was intra-articular, we kept the patients non-weight-bearing for the first 2 weeks, and asked them to start toe-touch weight bearing starting from the fourth postoperative week, and outpatient physiotherapy was carried out under supervision to maximize the range of motion of the foot and the ankle.

Patients were evaluated clinically, functionally, and radiologically (plain antero-posterior and lateral radiographs) at 2, 6 weeks and then every 6 weeks from surgery till union. Clinical and functional outcomes were assessed using the Clinical Rating Systems for the ankle-hindfoot developed by the American Orthopedic Foot and Ankle Society [14].

Statistical analyses

Statistical analyses were done by using SPSS (version 18). Quantitative variables were expressed as mean \pm SD. Categorical values were expressed as a percentage and compared using the χ^2 -test. *P* value less than 0.05 was considered significant.

Results

Out of 33 patients available for complete follow up, there were 20 men and 13 women, with a mean age of 37 years (range 18-62 years). Twelve patients were injured in road traffic accidents, twelve

patients had fall from height and nine patients fracture due to slip and fall.

Table 1. The ankle – hind foot scale for clinical rating [14]

Item	Mean Score
Pain (40 points)	38
Functions (50 points)	
Activity limitation,	
support requirement(10)	8.5
Maximum walking	
distance blocks (5)	4.5
Walking surfaces (5)	4.5
Gait abnormality(8)	7.5
Saggital motion (8)	7.5
Hind –foot motion (6)	5
Ankle-hind foot stability(8)	8
Alignment (10)	9.5

According to the AO classification, there were twelve 43-A1, five A2, five A3, five B1, three B2, two C1, one C2 fractures. There were 29 closed fracture and four open fracture (three type I and one type II as per the Gustilo and Anderson classification). The duration between the initial trauma and surgery was 7.5 ± 3 days (range 6-14 days), based on the soft tissue condition of the local area. The mean post operative stay in hospital for patient was 13 days (range 7-21 day).

There was associated fibular fractures in 15 cases, of which only eight cases were fixed by either one third tubular plate or reconstruction plates or k-wires. The average follows up period was 11 months (range 9-15 months). The mean time to full weight – bearing was 11.5 ± 2.5 weeks (range 8-17 weeks). It was more in open fractures. Regarding fracture union, it was occurred in 29 cases (87.9%) between 12 and 18 weeks (average 16 weeks), whereas four (three closed and one open fracture) cases (12%) had union between

20 to 24 weeks. The overall union time was 16.3 weeks. No any patients required second operation to achieve union. A lag screw was inserted in six cases; the mean time to union in fractures with lag screw was 12 weeks compared with a mean time of 17 weeks in the fractures in which lag screw was not used ($p=0.1$). **Figure 1 and 2** In all 30 cases wounds healed without problems, whereas three cases had superficial wound infection. The superficial infections were treated successfully with wound care and antibiotics and all achieved radiological union without any secondary procedures.

Figures



a.



b.



c.

Figure.1.a. showing AO 43-A2 fracture, b. immediate post –operative ,c. after 12 weeks x-ray of 60 years female with distal tibia fracture.

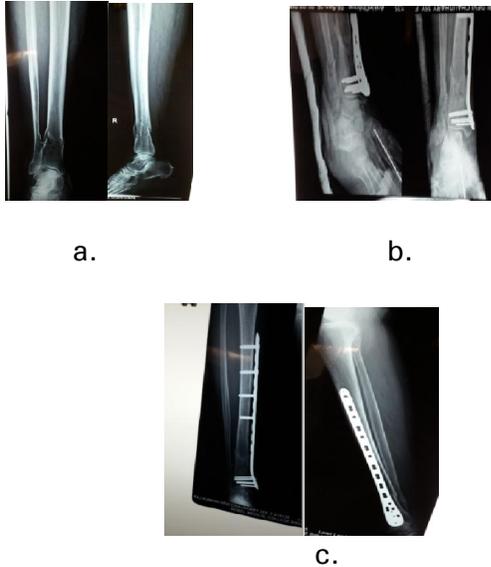


Figure 2. a. thirty seven year female with 43-A1 fracture, b. post-operative, c. after 12 weeks of operation.

Five patients had angular deformities less than or equal to 5 degree- four varus, one valgus deformities. No patients had any rotational, recurvatum, procurvatum or implant failure. Limb length discrepancy of <1cm was found in three patients but all were asymptomatic. All patients had almost full ROM comparable to the other side of limb of same patients. In seven patients, the plate was prominent but this did not necessitate plate removal.

The AOFAS score was obtained at a minimum of 12 weeks after the start of full weight bearing. The mean score was 93 points (range 71 to 100 points). **Table 1**

Discussion

Reports in the literature of outcome of ORIF of distal tibia fractures show high rates of infection [15]. Minimally invasive plating technique has many advantages like use of smaller incision, less soft tissue dissection, preservation of periosteal blood supply of bone, and use of intra-operative imaging reduce iatrogenic soft-tissue damage and damage to bone vascularity,

and preserve the osteogenic fracture hematoma. They are believed to improve healing rates and decrease complications [7,16,17].

In our study, the overall mean time for union was 16.3 weeks. These results are similar to those obtained by Oh et al. [18], who, reported a mean time to union of 15.2 weeks (range: 12–30 weeks) in 20 patients using contoured limited contact-dynamic compression plate. In addition, in 2004, Redfern et al. [19] reported a mean of 23 weeks (range: 18–29 weeks) to union with no complications in 20 patients with closed fractures of the distal tibia, which was more than our results. Collinge et al. [20] reported a longer mean time to union of 35 weeks (range: 12–112 weeks) in 26 patients with high energy distal tibial metaphyseal fractures, as their series included open and closed fractures with high soft-tissue injuries, which were not included in our study. On the other hand, Collinge and Protzman [21] reported a mean of 21 weeks (range: 9–60 weeks) in 38 patients with distal tibial low-energy metaphyseal fractures, which we found to be compatible with our results. Ahmad et al. [11] retrospectively reviewed 18 patients with distal tibial metaphyseal fractures treated with locked distal tibial plates and reported a rather lengthy average time to union of 23.1 weeks (range: 8–56 weeks). Although the technique used by Ahmad et al. [22] is the same as ours, we believe the discrepancy was due to the complexity of the fracture in their series and due to a rather smaller sample size. However, with time to union varying from one study to another, we believe MIPPO still provides a faster time to union than does open plating. In the study done by Yang et al. [23] reported an average of 27.8 weeks (range: 18–36 week) in 14 patients with 43A distal tibial fractures managed by using the open plating technique.

Oh *et al.* [18] used the Olerud and Molander ankle score to assess the functional outcome, which for all patients ranged from 80 to 100%. Ahmad *et al.* [22] reported an average AOFAS ankle score of 88.8. Collinge *et al.* [20] reported an average AOFAS ankle score of 83 (range: 65–100). In our study, the mean AOFAS ankle score was 93. However, our study did not include grade III open injuries, which was in contrast to the findings of Collinge *et al.* [20]. This difference in functional outcome shows the importance of the soft tissues in the MIPPO technique. We did not fix all fibular fractures. Our results are in agreement with that of a study by Gupta *et al.* [24], who did not fix the fibular fractures proximal to the syndesmosis when the tibia fracture was simple. But, with impaction, comminution, shortening of the tibia, the fibula should be fixed first to maintain the lateral column of the ankle, which helps in the reduction of the tibia fracture and prevents later collapse. We fixed 8 of 15 fractured fibulas. Three (9%) of our patients got less than 1 cm limb length discrepancy without any limp, whereas a study by Rongaet *al.* [1] reported limping in 8/19 (42%) patients. We did not find any case of non-union and deep infection which required any secondary procedure. Hasenboehler *et al.* [25] published a series of 32 patients with diaphyseal and distal tibial fractures treated with the MIPPO technique and reported one case of plate bending of more than 18° at 5 months postoperatively because of excessive weight bearing. Mushtaq *et al.* [26] reported one patient with implant failure, which was revised and ultimately healed with good functional outcome, whereas we did not have any cases of implant failure. Hasenboehler *et al.* [14] reported that 29 patients complained of local disturbance over the medial malleolus, which was caused by the high-plate profile. In our

study, although implant prominence was noted in seven patients but no one compell it for removal. These results are comparable to those of Bahariet *al.* [27] who found superficial tenderness or impingement over the medial aspect of the medial malleolus in five cases (of 42) and Rongaet *al.* [1] who found that the plate was palpable in the subcutaneous tissues in six out of 19 patients.

Our study showed that five patients (15%) had angular deformities, all of them less than 5°, where one case had valgus deformity and four cases showed varus deformity. No patient had a leg-length discrepancy greater than 1 cm. These results are comparable to other published studies of Rongaet *al.* [1], Collingeet *al.* [21], and Hasenboehleret *al.* [25].

In our study, we utilized the standard operative table, which necessitated the presence of an extra assistant to maintain reduction. We also used devices like the bone clamp to facilitate reduction. The anatomical plate itself was used as a mold. Percutaneous lag screws were applied whenever the fracture configuration allowed its insertion. This technique was described in most of the series we reviewed [18,22].

Conclusion

Out of the fractures managed by this method, most of them showed uncomplicated healing within a reasonable period of time. Functional assessment using the AOFAS scoring system showed excellent outcomes. The complication rate was minimal. The MIPPO method can be used safely in the management of distal tibial fractures even with simple articular extension. The procedure, however, is technically demanding, requiring the availability of appropriate tools and surgical implants. Careful follow-up of the patients is recommended. This technique, as confirmed by our results, minimizes the

complication rate, promotes union within a reasonable period of time.

The limitation of our study was small sample size, shorter follow up and there were no comparison with other modalities of treatments.

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Journal of Nobel Medical College

Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np
Volume 6, Number 1, Issue 10, January-June 2017, 20-28

Original Article**Noradrenaline and Albumin for Type 1 Hepatorenal Syndrome: A Prospective Study from Eastern Nepal**

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Received: 22th August, 2016; Revised after peer-review: 25th September, 2016; Accepted: 18th October, 2016

Abstract**Background**

Hepatorenal Syndrome (HRS) is a serious complication of liver cirrhosis with critically poor prognosis with treatment currently based on vasopressors. We aimed to study the safety and effects of Intravenous Noradrenaline in patients with Type 1 HRS and also to define factors predictive of a response.

Materials and Methods

It was a prospective observational study conducted in a tertiary care hospital in Eastern Nepal enrolling patients with Type 1 HRS from 2014 to 2015. All patients received Noradrenaline (0.5-3 mg/hr, intravenously) and albumin (1 g/kg followed by 20–40 g/day). Primary outcome was improvement of renal function.

Results

60 Type 1 HRS patients were enrolled in the study -37 males (61.7%) and 23 females (38.3%), mean age 58.18 ± 9.33 years. The therapy was well tolerated as only 6.7% of patients withdrew treatment. Reversal of HRS was observed in 38 patients (63.3%) with the mean duration of 6.39 ± 1.33 days. Of the baseline variables, higher urine output, higher mean arterial pressure and lower serum creatinine were predictive of response. Multivariate analysis showed Mean arterial pressure to be an independent variable of response (adjusted odds ratio 0.588, 95% CI- 0.393-0.880, $P > 0.05$). Finally mean arterial pressure had a negative correlation with serum creatinine and a positive correlation with Urine output.

Conclusion

Noradrenaline and albumin are safe and effective in improving renal function in patients with Type 1 HRS. There is a need for studies with larger sample size to correlate improvement in renal function with overall survival.

Key words: *Nepal, Noradrenaline, Type 1 Hepatorenal Syndrome*

Introduction

Cirrhosis is a worldwide problem that is associated with a substantial economic burden. Hepatorenal Syndrome (HRS) is a complication of decompensated liver cirrhosis carrying relatively poor prognosis. The disease is secondary to

severe renal vasoconstriction as a result of changes in splanchnic and general circulations complicated by perturbations in systemic and renal vasoconstrictors and vasodilators [1]. International club of ascites has defined Type 1 HRS as a rapidly progressive renal failure with the

rise in serum creatinine value to more than 2.5 mg/dl in less than 2 weeks[2]. Type 2 HRS presents with insidious onset refractory ascites with moderate and more stable impairment of renal function. The definition of acute kidney injury in cirrhosis is constantly evolving. The international club of ascites (ICA) organized a consensus development meeting in Dec 2012 and proposed a new definition of AKI in cirrhosis [3]. Currently the treatment of Type 1 HRS is based on vasopressors as a bridge to liver transplantation. Terlipressin (along with albumin) has been a widely studied vasopressor in the treatment of Type 1 HRS, the benefit of which has been supported by many randomized controlled trials and metaanalysis [4-14]. Similarly, other treatment options include octreotide, midodrine and noradrenaline (NA) along with albumin which have been studied in few trials. Terlipressin is available in developing countries like Nepal but is expensive and not easily available. Moreover, noradrenaline being cheap and easily available becomes the preferred treatment of choice, though the cost of albumin remains high. Published papers on the treatment of Type 1 HRS with noradrenaline in Nepal are virtually nonexistent. Our aim was to study the safety and effects of Intravenous Noradrenaline in patients with Type 1 Hepatorenal Syndrome (HRS) and also to define factors predictive of a response and to correlate hemodynamic changes to changes in renal function in Type 1 HRS.

Material and Methods

Design of the study

It was a prospective observational study in a tertiary center of eastern Nepal, enrolling all consecutive adult patients (age > 18) who met the criteria of type 1 HRS from November 2014 to November 2015. The study was conducted in Medical wards and Intensive care units (ICU) under division of

Gastroenterology, Department of Internal medicine.

Patients

Sixty patients of type 1 HRS were enrolled in the study. Criteria for inclusion in the study were: decompensated cirrhosis with ascites and type 1 HRS. The diagnosis of cirrhosis was based on clinical, laboratory, and ultrasonographic findings [15]. Decompensation was defined as the presence of ascites, variceal bleeding, encephalopathy or icterus [16]. Type 1 HRS was diagnosed by using the criteria of the International Ascites Club [2]. Exclusion criteria were congestive cardiac failure, respiratory failure, coronary disease, or peripheral artery disease. The study was approved by the Institutional Review Board and written informed consent was taken from the patients or their relatives.

Treatment and Interventions

On suspicion of Type 1 HRS, patients were enrolled in the study. The patients were either admitted for 15 days or asked to follow up after discharge on Day 15 of therapy. After enrollment patient's urine output and arterial blood pressure (by using a noninvasive technique) were measured every 4 hours. All patients received Human Albumin infusion (1g/kg/day) for 48 hours to rule out the existence of renal failure because of volume depletion. Albumin being expensive, all patients and relatives were appropriately counseled regarding the grave nature of the disease and the emphasis was made on the role of drugs like albumin to which they were willing to afford. We managed to procure poor patients funds to provide IV Albumin for patients who could not afford. Response to volume expansion was assessed after 48 hours. Patients who failed to achieve daily urine output more than 600 ml and /improvement in the serum creatinine level were considered to have Type 1 HRS.

These patients received a continuous infusion of NA at an initial dose of 0.5 mg/h, designed to achieve an increase in the MAP of at least 10 mmHg or an increase in 4-hour urine output to more than 200 ml. Upon failure of achieving these goals the NA infusion was increased every 4 hours in steps of 0.5 mg/hr up to the maximum dose of 3mg/hr. Efficacy was assessed on serum creatinine measured daily. A 30% decrease in serum creatinine being considered a positive response to NA.

NA was administered either until HRS reversal (serum creatinine below 1.5 mg/dl and or creatinine clearance >40 ml/min), or for a maximum of 15 days. NA dose was subsequently tapered to 0 over 3 days [17]. Patients also received Human Albumin infusion 20 g per day till the duration of the vasopressor therapy. Patients were excluded from the study if they developed any adverse effects secondary to the treatment (Noradrenaline or Albumin).

Statistical Analysis

Collected data was entered in MS Excel 2007 and converted to SPSS 11.5 version for statistical analysis. For descriptive statistics percentage, mean \pm SD, Median (IQR) was calculated and also graphical and tabular presentations were made. For inferential statistics χ^2 -test, paired t test and Pearson's correlation coefficient were applied to find out the significant difference between day wise reading and other related variables at 95% CI, where $p=0.05$. For multivariate analysis if variable was significant at <0.05 then that variable was considered for multivariate analysis. For multivariate analysis binary, logistic regression was applied to determine baseline patient characteristics that would be predictive of HRS reversal (defined as serum creatinine on treatment ≤ 1.5 mg/dl).

Results

Patient characteristics

60 Type 1 HRS patients were enrolled in the study -37 males (61.7%) and 23 females (38.3%), mean age 58.18 ± 9.33 years. Alcohol was the most common cause of cirrhosis (86.7%). Precipitating factor for Type 1 HRS could not be identified in any of the subjects. The baseline characteristics are shown in table I.

Response to Noradrenaline and Albumin

Of the 60 patients, 38 patients (63.33%) responded to treatment (defined by serum creatinine <1.5 mg/dl) while 18 patients (30%) did not respond to treatment. The average number of days required for reversal of HRS (Patients who responded to treatment) was 6.39 ± 1.33 days. Treatment was stopped in 4 patients (6.7%) due to side effects encountered. All of the treatment induced side effects were attributed to I.V. Noradrenaline. Of the 4 patients 3 patients experienced central chest pain which got relieved after the NA infusion was stopped. There was no any obvious electrocardiographic abnormality detected in these patients but the therapy was not reinitiated in these patients again. Similarly, one patient experienced shortness of breath during the therapy which was relieved after cessation of NA therapy. The treatment was not reinitiated in the patient again. All the patients tolerated Human Albumin without experiencing any known adverse reaction to the compound. Four patients (6.7%) died during the course of treatment probably due to the natural course of the disease. They were also considered as non-responders and included in that group for the purpose of simplicity.

Factors predictive of response

Of the baseline variables, higher urine output (responders 780.26 ± 316.40 ml/24 hours vs non-responders 536.6 ± 313.27 ml/24 hours, p value <0.05), higher mean arterial pressure (responders 71.84 ± 2.42 mmHg vs non-responders 61.44 ± 5.80

mmHg, $p = <.001$) and lower serum creatinine mg/dl (responders $3.21 \pm .57$ mg/dl vs non responders $4.19 \pm .70$ mg/dl, $p <.001$) were predictive of response. Multivariate analysis showed Mean arterial pressure to be an independent variable of response (adjusted odds ratio 0.588, 95% CI- 0.393-0.880, $P > 0.05$). The findings of multivariate analysis are shown in table II. We also assessed the changes in the clinical and laboratory parameters in responders and non responders. The decrease in serum creatinine and increase in mean arterial pressure was significant in both the groups. The findings are shown in table III.

Correlation of hemodynamic changes to changes in renal function in Type 1 HRS.

We went further to analyze the various hemodynamic alterations achieved by therapy with noradrenaline and the parallel changes in the renal function. We selected the values of mean arterial pressure (mmHg), serum creatinine (mg/dl) and urine output (ml/24h) at day 0, day 7 and day 15 and performed a correlation study between the parameters (MAP vs Creatinine and MAP vs Urine Output). With the higher values of MAP, corresponding serum creatinine values were significantly lower on Day 0, Day 7 and Day 15 ($r = -0.675, p = <0.001, r = -0.874, p = <0.001$ and $r = -0.888, p = <0.001$, respectively). Mean arterial pressure had a negative correlation with serum creatinine. Similarly with the higher values of MAP, corresponding urine output values were significantly higher on Day 0, Day 7 and Day 15 ($r = -0.529, p = <0.001, r = 0.818, p = <0.001$ and $r = 0.772, p = <0.001$, respectively). Mean arterial pressure had a positive correlation with urine output. The findings of the correlations between MAP, serum creatinine and urine output on day 0 and day 15 are depicted in fig 1 and fig 2, respectively.

Tables

Table I. Demographic, Clinical and Laboratory data of All Patients with Cirrhosis and Type 1 HRS at the Time of Inclusion in the Study

Demographic Characteristics	All (n = 60)
Age (Years) (Mean ± SD)	58.18 ± 9.33
Gender Male	37 (61.7%)
Female	23 (38.3%)
CAUSE OF CIRRHOSIS	
Alcohol	52 (86.7%)
Hepatitis B	4 (6.7%)
Hepatitis C	0 (0%)
Others/Cryptogenic	4 (6.7%)
SBP	7(11.7%)
Biochemical Investigations	
Bilirubin (mg/dl) (Mean ± SD)	2.52 ± .40
Albumin (g/dl) (Mean ± SD)	2.8 ± .07
CTP A	0 (0%)
B	6(10%)
C	54(90%)
MELD (Mean ± SD)	32.7 ± 5.283
Prothrombin Time (Secs) (Mean ± SD)	29.3 ± 7.41
Sodium (mmol/L) (Mean ± SD)	124.75 ± 6.75
Creatinine (mg/dl)(Mean ± SD)	3.6 ± 0.80
Urine output (ml/24 hrs)(Mean ± SD)	680.33 ± 331
MAP (mmHg) (Mean ± SD)	67.92 ± 6.38

NOTE. Values are mean ± SD.

CTP-Child Turcotte Pugh Score;MELD- Model for end stage liver disease;MAP-Mean arterial pressure.

Table II. Multivariate logistic regression analysis of factors affecting response to vasopressor therapy (Among those P value < 0.05 in univariate analysis)

Variables	Adjusted Odds Ratio	95% C.I. for EXP(B)		P value
		Lower	Upper	
Age	1.143	0.961	1.358	0.13
Gender	0.401	0.019	8.434	0.56
Creatinine	2.896	0.57	14.716	0.20
Urine Output	1.000	0.997	1.004	0.89
Prothrombin Time	1.068	0.669	1.705	0.78
Albumin	0.000	0.000	761.369	0.25
MAP *	0.588	0.393	0.880	0.10

NOTE. None of the parameters except MAP were predictive of response.

* p < 0.05

MAP- Mean arterial pressure

Table III. Change in parameters with therapy in the Responder and Non Responder group.

Parameter	Responders n=38		P value (Day 0 vs Day 15)	Non-Responders n=18		P value (Day 0 vs Day 15)
	Day 0	Day 15		Day 0	Day 15	
Creatinine * (mg/dl)	3.371 ± 0.48	1.18 ± .13	<0.001	4.460 ± .63	2.77 ± .46	<0.001
Albumin (g/dl)	2.821 ± 0.08	2.77 ± .06	.003	2.78 ± .079	2.800 ± .08	.443
Bilirubin (mg/dl)	2.47 ± 0.42	2.46 ± .42	.183	2.68 ± .28	2.66 ± .28	.168
Sodium (mmol/l)	126.11 ± 6.21	126.21 ± 5.47	0.839	124.10 ± 4.98	125.50 ± 4.53	0.338
PT (secs)	30.58 ± 6.94	30.63 ± 6.96	0.661	26.70 ± 8.00	26.90 ± 7.92	0.343

MAP * (mmHg)	71.84 ± 2.42	86.68 ± 2.24	<0.001	59.00 ± 4.16	64.30 ± 4.16	<0.001
Urine output (ml/24 hrs)	741.58 ± 311.86	1458.95 ± 318.64	<0.001	365.00 ± 181.06	442.00 ± 137.99	.052

NOTE. Values are mean ± SD.

Discussion

The results of this prospective observational study showed that noradrenaline with albumin are effective and safe in the treatment of Type 1 HRS. Overall reversal of type 1 HRS was achieved in 63.33% of patients. The percentage of responders to treatment in our study is lesser compared to a similar study conducted by Duvoux et al. He enrolled 12 patients with type 1 HRS for therapy with noradrenalin and albumin. Of the 12 patients, 10(83%) patients responded to the treatment [17]. The therapy was well tolerated as only 4 patients (6.7%) withdrew from treatment. In a study done by Ghosh et al, one patient out of 23 experienced atypical chest pain during the treatment with normal cardiac investigations. No adverse effects related to the intravenous albumin infusion were seen [18]. Noradrenalin can be given safely for the treatment of Type 1 HRS though the common side effects of the drug should be monitored during the treatment, mainly chest pain and shortness of breath. Univariate analysis showed lower creatinine, higher MAP and higher urine output at baseline were predictive of response. However on multivariate analysis only mean arterial pressure was the only independent predictor of response in our study. Studies in the past have also attempted to define the factors predictive of response. In the study conducted by Virendra Singh et al, baseline CTP score, MELD, urine output on D1, serum albumin and MAP were associated with response. However, in multivariate analysis only CTP score was associated with response [19].

Figures

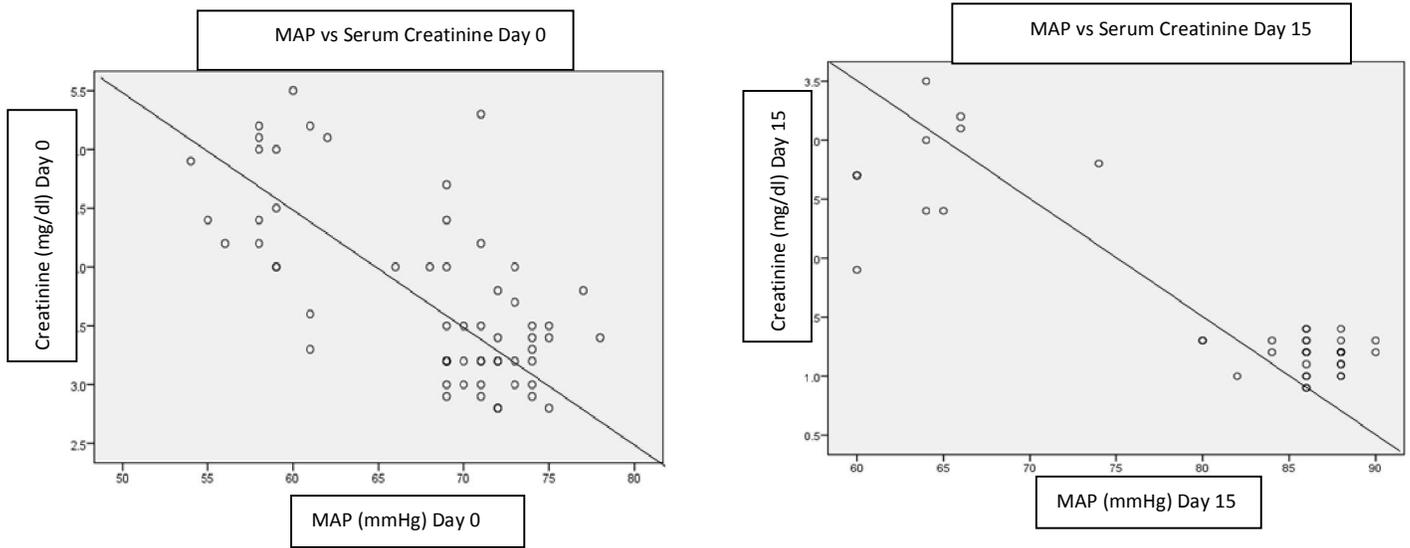


Fig. 1. Changes in hemodynamics with renal function- MAP vs Serum Creatinine.
MAP-Mean arterial pressure

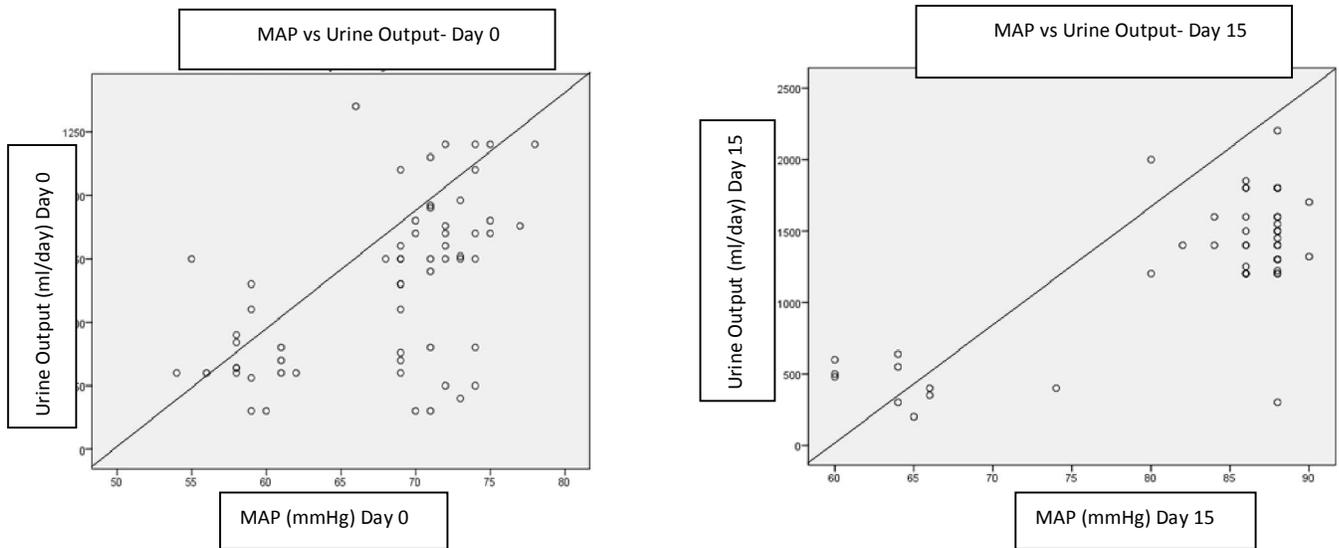


Fig. 2. Changes in hemodynamics with renal function- MAP vs Urine Output.
MAP-Mean arterial pressure

In another study conducted by Marta Martín-Llahi et al the factors predictive of response to therapy were etiology of cirrhosis, baseline serum bilirubin, leukocyte count, serum creatinine and urine volume, and treatment assignment in both forms of hepatorenal syndrome. Upon conducting a multivariate analysis, the independent factors were baseline urine volume, serum creatinine and leukocyte count, and treatment assignment [20].

Use of vasoconstrictors has been associated with increasing effective arterial volumewhich can be reflected by the various positive biochemical changes it produces during the therapy. In our study in the patients who responded to treatment serum creatinine decreased with therapy significantly. There was a positive response in MAP which significantly increased during the treatment along with the urine output. Serum creatinine decreased significantly with therapy in the non responder group too. But this was not able to achieve the primary end point (of serum creatinine <1.5 mg/dl).

Similarly even though the MAP increased significantly in the non responder group too, it was not enough to achieve the reversal of HRS. In the study conducted by Duvoux et al NA initiation was followed rapidly by a significant improvement in urine output, urinary sodium excretion, serum creatinine, creatinine clearance and MAP [17]. Since both noradrenaline and albumin were used as a therapy in all the patients in our study it would be difficult to differentiate the individual contribution of improvement in hemodynamic and laboratory parameters. A well designed randomized controlled trial comparing noradrenaline alone with noradrenaline and albumin in treatment of type 1 HRS is necessary. This becomes more important in developing countries if we could justify no added benefit of albumin over noradrenaline so that we could use only

the later and significantly reduce the cost associated with albumin.

An outstanding observation made in this study was the strong association of improved hemodynamics with recovery of kidney function in Type 1 HRS. We correlated the Day 0, Day 7 and Day 15 values of MAP with serum creatinine and Urine output to see if there is any significant association. An increase in Mean Arterial Pressure (MAP) was strongly associated with the decrease in serum creatinine level and increase in urine output. Velez JC et al conducted a pooled analysis of clinical trials to explore across all tested vasoconstrictors to see the changes in hemodynamics and renal function with Vasopressor therapy. Velez JCO et al found that an increase in MAP is positively associated with improved renal function and they considered a goal directed treatment of HRS [21].

There were limitations in our study. Since hemodynamic assessment was an important aspect of this present study we could only manage to monitor patients MAP (Mean Arterial Pressure). A proper assessment of the patients' volume status by central venous pressure measurement would have given us a better insight and titrate the dose of albumin accordingly. Similarly changes in systemic circulation (Cardiac output, Systemic vascular resistance) and Renin- aldosterone system (plasma active renin, aldosterone level) could not be monitored in this study due to technical reasons.

Another major limitation to this study was that it was a prospective observational study. We evaluated the patients at the end of the therapy or at day 15. Data regarding long term survival of these patients post therapy could not be analyzed given the design of the study. The probability of whether the patients who responded to therapy have a better long term survival as compared to the non

responders would further justify the role of Noradrenaline (Vasopressors) in the acute management of Type 1 HRS.

Current study shows that noradrenaline and albumin can achieve reversal of kidney injury in Type 1 HRS with a relatively excellent safety profile. Singh et al suggested that noradrenalin is as safe and effective as Terlipressin, but less expensive [19]. Noradrenaline is a potential cheap and safe option for Type 1 HRS in a developing nation like Nepal where poverty and burden of the disease is difficult to bear.

Conclusion

In conclusion noradrenaline is effective in reversal of kidney injury in Type 1 HRS (63% in our study). Albumin appears to be contributing in improvement of hemodynamics and renal function. Future studies with long term follow up are necessary to assess if reversal of HRS is predictive of survival.

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Journal of Nobel Medical College

Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np
Volume 6, Number 1, Issue 10, January-June 2017, 29-35

Original Article

Knowledge of Primary School Teacher Regarding Learning Disabilities in School Children.

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Received: 15th February, 2017; Revised after peer-review: 4th April, 2017; Accepted: 20th May, 2017

Abstract

Background

Learning disability refers to a heterogeneous group of disorders manifested by difficulty in reading, writing, spelling and reasoning ability. It usually show up when a child has difficulty reading, speaking, writing, figuring out a math problem, communicating with parents or paying attention in class. Children with learning disability can succeed in school and can have successful career in life if right support and intervention is provided to them.

Material & Methods

Quantitative approach with Descriptive crosssectional design was used to assess the knowledge of primary school teachers. A structured knowledge questionnaire was developed focusing on learning disabilities. The study was carried out in 16 schools of Dharan, Nepal. About 150 primary school teachers were selected by convenience sampling technique. Structured knowledge questionnaire was used to collect needed data on knowledge of primary school teachers. The data collected were tabulated and analyzed by using descriptive and inferential statistics.

Results

Majority, 79 (52.67%) of the primary school teachers had moderately adequate knowledge and 71 (47.33%) had inadequate knowledge regarding learning disabilities. There was a significant association of knowledge of primary school teachers with demographic variables such as class involved in teaching.

Conclusion

The school teachers have inadequate knowledge regarding learning disabilities. The teachers play an important role in identifying learning disabilities in school children at initial state. The children with learning difficulties should be helped at early stage and proper training and guidance should be provided to them.

Keywords: *Knowledge, Learning disabilities and School children, Primary school teachers*

Introduction

Learning disability is a disorder that refers to difficulties in listening, speaking, reading, writing and mathematics. 10 out of every 100 school children are said to suffer from learning disabilities in the world [1]. Nearly 3 million students receive

special education every year and halves which are 15% of US population are diagnosed with learning disabilities every year [2]. The common learning disabilities are dyslexia (Problem in reading); dysgraphia (problem with spelling, handwriting); dyscalculia (problem in

mathematics); dysparaxia (Poor balance and eye- hand coordination) [3]. A child with a learning problem has several related difficulties which last over time. The sign differ from one person to another. Schools are hostile towards learning disabilities at large. The teachers are unknown about features and difficulties in children. The lack of necessary facilities for identification results in damage to the self esteem and discourages them to study [4].

The teachers are challenged to find and provide best possible instructions to the children with learning disability as they find it difficult to adjust in schools. The source of best support and good resources should be initiated in the school environment by the teachers [5]. A study conducted by Shari M found that only 5% of the teachers had adequate knowledge about learning disabilities. There were statistically significant differences in overall knowledge, causes and classification, clinical manifestation, investigations across the 'gender' variable [6]. In Nepal, teachers and parents are not aware of learning problems found in children. Children with learning disabilities find difficulties in trying hard, have low attention span and cannot be motivated themselves on their own. It is not a problem with intelligence but it is caused by a process that affects receiving, processing and communicating information. People with learning disabilities have difficulty in processing sensory information because they have different view to see, hear and understand things [3]. A study was conducted by Shenoy J, Kapoor M to assess the factors affecting learning in children revealed that teacher's negligence, parent's bad behavior and poor instruction are the factors responsible for learning problems [7].

Children with learning difficulties are risk population. The children have trouble in expressing their feelings, calming themselves down. These children are likely

to develop low self-esteem, have fewer friends, and are one and one-half times more likely to drop out of school. So, they need to be identified at the earlier stage and proper training and guidance should be provided to them [8].

Materials and Methods

Quantitative approach with Descriptive cross-sectional design was used to assess the knowledge of primary school teachers regarding learning disabilities in school children. A structured knowledge questionnaire was developed focusing on learning disabilities. The level of knowledge was categorized into adequate, moderately adequate and inadequate [6]. Convenience sampling technique was used. The study was carried out in 16 schools of Dharan, Nepal. About 150 primary school teachers were selected by convenience sampling technique. Structured knowledge questionnaire was used to collect needed data on knowledge of primary school teachers. The collected data were analyzed using SPSS version 22. Frequency and percentage distribution was used to determine the level of knowledge. Chi square test was used to associate the knowledge of primary school teachers with demographic variables.

Results

Table - 1: frequency and percentage distribution of primary school teachers according to their demographic variables.

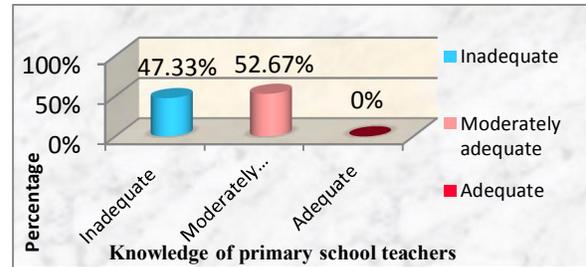
n = 150

S. no	Demographic variables	Categories	Frequency	Percentage
1	Age	21-30 yrs	40	26.7
		31 – 40 yrs	46	30.7
		41-50 yrs	40	26.7
		51- 60 yrs	24	16
2	Sex	Male	58	38.7
		Female	92	61.3
3	Marital status	Married	103	68.7
		Unmarried	33	22.0
		Separated	14	9.3
4	Religion	Hindu	12	84.7

			7	
		Muslim	1	0.7
		Christian	7	4.7
		Buddhists	15	10.0
5	Educational qualification	Certificate level	18	12.0
		Intermediate level	58	38.7
		Bachelor level	56	37.3
		Master level	18	12.0
6	Years of teaching experience	Below one year	16	10.7
		1-3 yrs	31	20.7
		Above three years	10	68.7
7	Class involved in teaching	One	16	10.7
		Two	38	25.3
		Three	41	27.3
		Four	39	26.0
		Five	16	10.7
8	Identification of child with learning disabilities	Yes	98	65.3
		No	52	34.7

Table 1 Depicts the frequency and percentage distribution of primary school teachers according to their demographic variables. Maximum numbers

46(30.7%) of the subjects were in the age group of 31-40 years, majority i.e. 92(61.3%) of the subjects were females, majority i.e.103(68.7%) of the subjects were married, maximum of 127 (84.7%) subjects belonged to Hindu religion, majority i.e.58(38.7%) completed their intermediate level of education, majority of the subjects 103(68.7%) had more than 3 yrs of teaching experiences, 39(26.0%) were involved in teaching third grade students, majority of the respondents 98(65.3%) had identified a child with learning disabilities before.



Graph 1: Distribution of primary school children according to their level of knowledge regarding learning disabilities in school children.

The above graph depicts that majority of the subjects 71(47.33%) had inadequate knowledge and 79 (52.67%) of them had moderately adequate knowledge and none of them had adequate knowledge regarding identification of learning disabilities.

Table 2: Knowledge Scores of Primary School Teachers on Knowledge Questionnaire

n = 150

S.No	Knowledge / Domains	Max. Score	Attributes			Mean	SD
			Adequate knowledge	Moderately adequate knowledge	Inadequate knowledge		
1	Concept and definition	4	6(4%)	94(62.67%)	50(33.33%)	1.84	0.97
2	Causes and classification	4	1(0.66%)	55(36.67%)	94(62.67%)	1.19	1.008
3	Clinical manifestations	11	1(0.67%)	38(25.33%)	111(74%)	4.57	1.569
4	Diagnosis	3	0	106(70.67%)	44(29.33%)	1.81	0.775
5	Management	8	5(3.33%)	94(62.67%)	51(34%)	3.96	1.330
6	Role of a teacher	3	146(97.33%)	0	4(2.67%)	2.59	0.545
7	Outcomes	2	116(77.33%)	30(20%)	4(2.67%)	1.75	0.494
Over all		35	0	79(52.67%)	71 (47.33%)	33.51	6.884

The above table describes the outcomes of maximum score, knowledge score of different attributes, mean and SD in overall aspects and also the different domains of knowledge. On an overall aspect of knowledge, with the maximum score of 35, the mean score was 33.51 having SD of 6.884. Majority of the respondents ie 146(97.33%) had adequate knowledge about role of a teacher.

Table - 3 : Association of Level of knowledge of primary school teachers with their demographic variables.

n = 150

Sl no	Demographic variables	Categories	Knowledge level		N	Test Statistic		Inference
			Moderately adequate	Inadequate		df	χ^2 and p- value	
1	Age	21-30 yrs	21	19	40	3	$\chi^2 = 4.064$ $p = 0.255$	NS
		31 – 40 yrs	29	17	46			
		41-50 yrs	18	22	40			
		51- 60 yrs	10	14	24			
2	Sex	Male	31	27	58	1	$\chi^2 = 0.079$ $p = 0.78$	NS
		Female	47	45	92			
3	Marital status	Married	52	51	103	2	$\chi^2 = 0.944$ $p = 0.62$	NS
		Unmarried	17	16	33			
		Separated	9	5	14			
4	Religion	Hindu	67	60	127	3	$\chi^2 = 2.75$ $p = 0.60$	NS
		Christian	2	6	8			
		Buddhists	9	6	15			
5	Educational qualification	Certificate level	9	9	18	3	$\chi^2 = 1.57$ $p = 0.67$	NS
		Intermediate level	31	27	58			
		Bachelor level	31	25	56			
		Master level	7	11	18			
6	Years of teaching experience	Below one year	6	10	16	2	$\chi^2 = 2.69$ $p = 0.26$	NS
		1-3 yrs	14	17	31			
		Above three years	58	45	103			
7	Class involved in teaching	One	8	8	16	4	$\chi^2 = 13.13^*$ $p = 0.01$	S
		Two	11	27	38			
		Three	25	16	41			
		Four	22	17	39			
		Five	12	4	16			
8	Identification of child with learning disabilities	Yes	52	46	98	1	$\chi^2 = 0.13$ $p = 0.72$	NS
		No	26	26	52			

Above table envisage the outcome of chi square analysis being carried out to bring out the association between the knowledge of primary school teachers with their demographic variables. Out of which, only class involved in teaching (chi square value = 13.13, 4 df) was significant and rest of the demographic characteristics such as age, sex, marital status, religion, educational qualification, years of teaching experience and identification of child with learning disabilities were not significant with the knowledge.

Discussion

Teachers play a important role in identifying children with learning difficulties. They are the first ones to recognize difficulties in school children. There is lack of knowledge regarding these conditions due to lack of awareness and

special training courses to the teachers regarding identification of learning difficulties. The study conducted in Pakistan have shown inadequate knowledge about learning problem seven amongst healthcare providers [9,10].

The objective of the study was to assess the knowledge of primary school teachers regarding learning disabilities in children. The distribution of primary school teachers according to the level of knowledge showed that majority of the teachers 79 (52.67%) of them had moderately adequate knowledge and 71 (47.33%) had inadequate knowledge and none of them had adequate knowledge regarding identification of learning disabilities. Findings are supported by a study conducted on 200 primary school teachers in Bangalore, India. The study revealed that the majority of the teachers 148 (74) had moderately adequate knowledge and 42 (21) had inadequate knowledge and only 5% had adequate knowledge [6]. The other study on awareness of learning disabilities also had similar findings which showed that 86% of the teachers had medium level of knowledge, 14% had low level of knowledge [11].

Additionally, there was high number of responses marked with "Don't Know". This indicates that the teachers are aware that they have insufficient knowledge regarding identification of learning difficulties. Similar findings were seen in study conducted by Gerber MM. [12], where 86% of teachers identified that their knowledge regarding learning disabilities were low. The present study showed that majority of the teachers had inadequate knowledge regarding causes and definition (62.67%) and clinical manifestations i.e 74%. The primary teachers had adequate knowledge regarding role of teacher and outcomes of treating learning disabilities i.e 97.33% and 77.33% respectively. It is interesting to know that none of them had adequate knowledge on diagnosis of learning disability.

The above findings were supported by the study on awareness of learning disabilities which explained that 32% were aware of the concept, 35% on type of learning

disabilities, 29% on causes of learning disabilities [13]. These findings were also in agreement with the results of Kakabaraee K.Arjmandnia A. Afrooz G. [14] that revealed 82.1% of teachers achieved a score higher than 10 for causes of learning disabilities. Teachers had 82.1% of knowledge and information about the causes of learning disability. The findings were on the contrary with the results of Jeromey and Kelvan et al. [14, 15], which revealed that school teachers have a good knowledge about the nature of learning disability. The findings of Westwood [16] claimed that primary teachers are skilled in determining the age of occurrence of learning problem.

The second objective was to associate the knowledge scores with selected demographic variables. There was a significant association of knowledge of primary school teachers with demographic variables such as class involved in teaching. Another important finding is no association between knowledge and teaching experience. It is consistent with the study conducted by Anand Lingeswaran [17]. While, the findings were contrary with Adebowale and Moye [18] who found that there was no significant difference in the knowledge of school teachers with age or teaching experience.

The results of the study conducted by Shari M, Narasimha Vrandana [6] revealed that teachers had low level of knowledge. School teachers should be familiar with the children with learning problems and should be capable of identification of these problems in them. This cannot be accomplished without increasing the knowledge of teachers and parents who close relationship with the students. The findings of the study on identification of learning disabilities explained that 85.5% of teachers didn't attend any special courses on learning disabilities. 69.5% of them had never seen a child with learning

problem before, and only 30.5% teachers were able to identify learning disabilities in their students. Today, teachers are more aware and have positive attitude towards children with learning disabilities, but have less knowledge about the sign and symptoms and management of children with LD. The priority of the teachers is to be focused on helping all children learn to reach the highest levels of their potentials. Primary school teachers were deficient in knowledge and skill in spite of working with children with LD. Learning Package is an effective method to increase the competency of Primary School Teachers regarding LD by saying that cognitive change can be brought about by teaching programme [19].

Teachers do not have adequate knowledge regarding learning problems, and don't know what should be done when facing those problems. The results evidenced that their knowledge about learning disorders is superficial, because they did not have any courses about learning disabilities during their academic session.

Conclusion

The present study assessed the knowledge of primary school teachers regarding learning disabilities among the school children. The findings of the study revealed that majority of the teachers 79 (52.67%) of them had moderately adequate knowledge regarding learning disabilities. Appropriate training should be provided to the teachers regarding identification, diagnosing and managing the child with learning problems so that child can succeed in school and go on successful careers later in life.

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Journal of Nobel Medical College

Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np
Volume 6, Number 1, Issue 10, January-June 2017, 36-43

Original Article

Mosquito-Borne Diseases Related Knowledge and Perception among Residents of Semi Urban Region of Eastern Nepal

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Received: 28th February, 2017; Revised after peer-review: 30th March, 2017; Accepted: 26th May, 2017

Abstract

Background

Mosquito borne diseases are endemic in most part of the country. While public health efforts are placed towards the elimination of major vector borne diseases like malaria and filariasis, climatic and manmade environmental changes has led to threats of reemergence of mosquito borne diseases like dengue and chikungunya in new regions. There are needs of studies among community people regarding knowledge and perception of vector borne diseases to change the attitudes of people towards vector control and avoid risky behavior by application of behavior change communication tools.

Material & Methods

A cross sectional study was done among households from 2 wards of Tankisinwari VDC in semi-urban region near Biratnagar sub-metropolitan city. The study duration was of 3 months from November 27 2014 to February 27 2015. Study population was 566 and 654 households from 2 wards. Among them, 57 from one ward and 65 from other ward, a total of 122 households were taken proportionately from both wards. Data was entered into excel sheet and analysis was done using SPSS 16.

Results

People who heard of filariasis as disease transmitted by mosquito bite were 23.8% and malaria (89.3%), Dengue (19.6%). Among the participants, 85% responded that mosquito borne disease can be prevented in their area while 4.9% and 6.6% only heard of indoor residual spraying and insecticide treated bed nets respectively. Among those who did not know about breeding places of mosquito, 29.2% were illiterates, who were significantly more than literates 5.1% ($p < 0.05$). Among those who were aware of environmental vector control measure, closed drainage was preferred by 52.5% and disposal of waste by burial or burning was practiced by 64.4%.

Conclusion

There is need of public health intervention with interactive tools of behavior change communication in the community to enhance perception about mosquito and mosquito borne diseases

Key Words: *Attitudes, Community, Mosquito, Perception, Public health*

Introduction

One of the best-known disease vectors are mosquitoes. Most prevalent mosquito

borne diseases in South East Asia Region include Malaria, Dengue, Chikungunya, Japanese Encephalitis and Lymphatic

Filariasis. In SEAR malaria is endemic in all countries except Maldives. [1]. In Nepal, there is confirmation of all four serotypes of Dengue viruses (DEN-1-4). Hence, there has been sudden resurgence of more severe dengue diseases in Nepal. To prevent the future outbreaks of dengue there is need of health care providers to become familiar with the disease [2]. To overcome the challenges posed by mosquito borne diseases and to prevent humans from infections, there is requirement of effective public health response.

The important interacting drivers to set the novel stage for vector borne diseases are globalization, environmental change, social and demographic change and health system capacity. Disease and vector surveillance as well as monitoring infectious disease drivers like environmental conditions can help to counteract and to respond to emerging vector-borne diseases [3]. Behavior Change Communication (BCC) is an important component of malaria prevention and control strategies. BCC uses tools such as targeted messages and approaches, thus promotes healthy behaviors and reduce risk taking [4]. According to report of micro-stratification of 2012, approximately 13.02 million population of Nepal that is 47.9% live in malaria endemic VDCs [5].

The objective of this study is to assess knowledge and perception regarding mosquito vector borne diseases and its association with selected preventive practices among local community people.

Material & Methods

This cross-sectional study was done in Tankisinwari VDC of Morang District near to Biratnagar Sub-Metropolitan city. The study duration was of 3 months from November 27 2014 to February 27 2015. Study population was 566 and 654

households from 2 wards. Among them, 57 from one ward and 65 from other ward, a total of 122 households were taken proportionately from both wards. The first house was selected randomly, and then every third house was selected from each ward for interview.

For data collection, structured questionnaire was used in Nepali language and face to face interview was conducted with one member of each household, preferably literate member that is 18 years or above. If more than one member were literate and 18 years or above then elder member of household was given the priority. If no one in the household was found literate, elder among 18 years and above was chosen. Study tools were questions regarding demography, knowledge and information regarding prevention of mosquito borne diseases and breeding places of mosquito; questions regarding source of knowledge and measures /practices regarding control of mosquito and activities taken by the government in the region. Written permission was taken from ward office for the study. Verbal consent was taken from the participants after explaining the purpose of the study. In case of absence of consent, the next household was chosen for data collection.

Statistical analysis

Data entry was done using Microsoft excel. Data were analyzed using SPSS version 16. Chi-square test was used to find associations among different variables. A p-value 0.05 was used to indicate statistical significance.

Result

Out of the 122 respondents, male and female respondents were equal in number while 57.4% were of age group 30-60 years. Among respondents, 80.3% knew

to read or write. 66.4% were above poverty line and 63.1% were employed. When it is asked about diseases transmitted by mosquito bite in multiple response questions, 89.3% have heard of Malaria as disease transmitted by mosquito bite, but only 37.7% said heard of Japanese Encephalitis followed by Filariasis by 23.8 %, Dengue by 19.7%. Among the participants, 16.4% also said that Kala-azar is transmitted by mosquito bite. In this study, 94.3% people said that mosquito bite is necessary for transmission of mosquito borne diseases. When asked if mosquito borne disease can be prevented in your area, 85.2% responded positive but only 77.9% said that mosquito borne disease is serious problem in their area. When asked about the prevention and control measures of vector borne diseases in multiple response questions, 87.7% knew about Chemical vector control method, 48.4% knew environmental vector control method and 27% knew about biological vector control method but only 4.9% and 6.6% heard of indoor residual spraying and insecticide treated bed nets respectively. Source of their knowledge as in multiple responses were 95.1% from mass media, 94.3% from friends and neighbor followed by governmental and institutional programs 29.5% and health personals 18.9%.

When specifically asked on multiple responses question 73.8% male and 70.3 % female said mosquito breeds in dirty water. Among those who did not know about breeding places of mosquito, 29.2% were illiterates, who were significantly more than literates 5.1% ($p < 0.05$). Similarly, 37.7% female said mosquito breeds in stagnant water which was significantly lower than male 59% ($p = 0.02$). Similarly, 90.4% of age group 18-30 years said that mosquito breeds in dirty water, which was significantly less among those above 30 years 58.6% ($p < 0.05$).

Similarly, 40% above 30 years said mosquito breeds in stagnant water, this was significantly higher among 18-30 years age group 59.6% ($p = 0.03$). Similarly, knowledge of mosquito breeding in dirty water was found 79.6% among literate, which was significantly more than illiterate 41.7% ($p = 0.001$). Those from below poverty line, 58.5% had significantly less knowledge regarding breeding places as dirty water than that of above poverty line 79% ($p = 0.02$). Also, Knowledge of stagnant water as breeding site was lower among people below poverty line 36.6% than that of above poverty line 54.3% ($p = 0.06$).

Table 1. Demographic characteristic of respondent (n = 122)

Characteristics	N	%
Age group (years)		
18-30	52	46.2
31-60	70	57.4
Gender		
Male	61	50
Female	61	50
Literacy Status		
Literate	98	80.3
Illiterate	24	19.7
Economic status		
Above poverty line	81	66.4
Below poverty line	41	33.6
Employment status		
Employed	77	63.1
Unemployed	45	36.9

Similarly, among people living in pakka houses, 80.8% had more knowledge regarding breeding places as dirty water than those living in kachha house 65.7% ($p = 0.06$). Similarly, knowledge of stagnant water as breeding site was significantly more among those living in pakka houses 63.5% than those living in kachha house 37.1% ($p = 0.004$). Similarly, knowledge regarding breeding places of mosquito as thrown bottles and plastics and others were significantly less among

people below poverty line 17.1% than those above poverty line 33.3% ($p=0.05$). Among the group of people who had knowledge of environmental vector control measure, closed drainage was preferred significantly more (52.5%) than open drainage preference by 47.5 % ($p=0.01$). Disposal of waste by burial or burning was practiced by 64.4% among those who knew environmental control method.

Among those who knew biological measure, disposal of waste by burial or burning was practiced by 63.6%. Similarly, among those who knew chemical measure, closed drainage was preferred by 38.3 % and disposal of waste by burial or burning was practiced by 57.9% while indiscriminately throwing of waste was practiced by 42.1%.

Table 2. Knowledge on mosquito borne diseases (n = 122)

Characteristics	N	%
Source of Knowledge*		
Mass Media	116	95.1
Friends/Neighbor	115	94.3
Health personnel	23	18.9
Heard of measures taken by Government		
Yes	36	29.5
No	86	70.5
Knows that mosquito bite is necessary for disease transmission	115	94.3
Knowsthatmosquitobornediseasecanbeprevented	104	85.2
Knowsthatmosquitobornediseaseis a seriousproblem.	95	77.9
Disease Transmitted by Mosquito Bite*		
Malaria	109	89.3
Japanese Encephalitis	46	37.7
Filariasis	29	23.4
Dengue	24	19.7
Kalazar	20	16.4
Knowledgeonvectorcontrolmeasure*		
Biological control measure	33	27
Environmental control measure	59	48.7
Chemical control measures	107	87.7
HeardofIndoorResidualSpraying	6	4.9
HeardofInsecticidetreatedbednets	8	6.6

Knowledge regarding breeding sites of mosquito*		
Dirty water	88	72.1
Stagnant water	59	48.4
Animal shed	38	31.1
Discarded tires	17	13.9
Bottles/plastics/other	34	27.9
Don't know	12	9.8

*Multiple response

Table 3. Perception on breeding places of mosquito (n = 122)

Characteristics	Mosquito breeds in dirty water		P value	Mosquito breeds in stagnant water		P value	Mosquito breeds in Animal shed		P value	Mosquito breeds in Discarded tires		P value	Mosquito breed in thrown Bottles/Plastics /Other		P value
	Yes	No		Yes	No		Yes	No		Yes	No		Yes	No	
Sex															
Male	45 (73.8)	16 (26.2)	0.6	36 (59)	25 (41)	0.02	24 (39.3)	37 (60.7)	0.05	7 (11.5)	54 (88.5)	0.4	18 (29.5)	43 (70.5)	0.6
Female	43 (70.5)	18 (29.5)		23 (37.7)	38 (62.3)		14 (23)	47 (77)		10 (16.4)	51 (83.6)		16 (26.2)	45 (73.8)	
Age group (years)															
18-30	47 (90.4)	5 (9.6)	0.00	31 (59.6)	21 (40.4)	0.03	19 (36.5)	33 (63.5)	0.2	8 (15.4)	44 (84.6)	0.6	23 (44.2)	29 (55.8)	0.01
>30	41 (58.6)	29 (41.4)		28 (40)	42 (60)		19 (27.1)	51 (72.9)		9 (12.9)	61 (87.1)		11 (15.7)	59 (84.3)	
Literacy status															
Literate	78 (79.6)	20 (20.4)	0.001	48 (49)	50 (51)	0.7	33 (33.7)	65 (66.3)	0.3	14 (14.3)	84 (85.7)	0.5	30 (30.6)	68 (69.4)	0.2
Illiterate	10 (41.7)	14 (58.3)		11 (45.8)	13 (54.2)		5 (20.8)	19 (79.2)		3 (12.5)	21 (87.5)		4 (16.7)	20 (83.3)	
Economic status															
Above poverty line	64 (79)	17 (21)	0.02	44 (54.3)	37 (45.7)	0.06	26 (32.1)	55 (67.9)	0.7	12 (14.8)	69 (85.2)	0.6	27 (33.3)	54 (66.7)	0.05
Below poverty line	24 (58.5)	17 (41.5)		15 (36.6)	26 (63.4)		12 (29.3)	29 (70.7)		5 (12.2)	36 (87.8)		7 (17.1)	34 (82.9)	
Type of House															
Kachha	46 (65.7)	24 (34.3)	0.06	26 (37.1)	44 (62.9)	0.04	20 (28.6)	50 (71.4)	0.4	8 (11.4)	62 (88.6)	0.3	17 (24.3)	53 (75.7)	0.3
Pucca	42 (80.8)	10 (19.2)		33 (63.5)	19 (36.5)		18 (34.6)	34 (65.4)		9 (17.3)	43 (82.7)		17 (32.7)	35 (67.3)	

Table 4. Association of selected practices and knowledge on control of vectors (n = 122)

Characteristics	Knows Biological control		P value	Knows Chemical control		P value	Knows Environmental control		P value
	Yes	No		Yes	no		Yes	No	
Type of preferred drainage									
Open	16 (48.5)	56 (62.9)	0.1	66 (61.7)	6 (40)	0.1	28 (47.5)	44 (69.8)	0.01
Closed	17 (51.5)	33 (37.1)		41 (38.3)	9 (60)		31 (52.5)	19 (30.2)	
Type of preferred method of waste disposal									
Indiscriminately throwing out of house	12 (36.4)	39 (43.8)	0.4	45 (42.1)	6 (40)	0.5	21 (35.6)	30 (47.6)	0.1
burial or burning method	21 (63.6)	50 (56.2)		62 (57.9)	9 (60.0)		38 (64.4)	33 (52.4)	

Discussion

According to WHO, there has been some improvements in combating against some vector borne diseases like malaria and Filariasis but Dengue has emerged and has increased its score at an alarming pace. Environmental changes have big role in spreading this disease in rural areas. The limited health system resources have been highly strained by this cause in many developing countries [6]. Active community participation and organized vector control strategies is required to achieve the best results in malaria control [7]. In this study 94.3 % said that mosquito bite transmit disease, which is similar in study done by Joseph et al. in Mangalore [7] where 90.7% were aware that mosquito bite transmit diseases. In this study, 77.9% said that mosquito borne disease is a serious problem; similarly, Khanal et al. [8] found 72.8% who reported mosquito borne diseases as a serious health problem. In this study 9.8% had no knowledge regarding breeding sites of mosquito. Consistent with this study, other study done by Joshi et al. [9] showed that there was absence of knowledge of breeding site among 20.4%. In this study only 29.5% respondent said that they have heard about government programs for control of mosquito vector borne diseases which is consistent with

the study done by Khanal et al. [8] which showed that awareness about government measure was 37.7%.

Despite of the fact that due to the use of mass drug administration (MDA), elimination program of Lymphatic Filariasis (LF) by 2020 is on the road, LF is endemic in 60 out of 75 districts with 25 million people at risk by early 2000 [4].

In this study people who heard of disease transmitted by mosquito bite as Filariasis (23.8%) was similar with study of Boratne et al. [10] in Punducherry 36.91% but contrasted with the study of Khanal et al [8] in Eastern Nepal which showed 62.7% awareness of Filariasis as transmitted by mosquito bite. However, in this study the knowledge regarding Japanese Encephalitis (37.7%) and Dengue (19.7%) as transmitted by mosquito bite is very low which is similar to the study done by Khanal et al [8] and Boratne et al. [10]. Also, in this study, people who heard of diseases transmitted by mosquito bite as malaria was 89.3%, which were consistent with study [8] which showed 94% people heard of malaria as transmitted by mosquito bite. In this study 48% knew about breeding site as stagnant water and in contrast to this study Khanal et al. [8] found knowledge of stagnant water as breeding site in 83%. However, Boratne et al. [10] showed knowledge of stagnant

water as breeding site among 59.79% of study group, which is consistent with this study. Also in other study done by Joshi et al. in Nepal [9] 59.8% responded stagnant water as breeding places of mosquito which is consistent with this study.

In this study knowledge of breeding habits of mosquito as stagnant water was seen significantly more among males (59%) than in females (23%). There is significant difference in gender in knowledge regarding breeding habit as stagnant water in this study while the other study done by Boratne et al. [10] stated that more than half respondents (60.69%) stated stagnant water as commonest breeding place in Pondicherry, with more in females (61.9%) than males (59.7%). Similarly, in this study, people above poverty line had significantly more knowledge regarding breeding site as dirty water (79%) and stagnant water (54.3%) than the people above poverty line which is also consistent with the finding of study by Boratne et al. [10] and Khanal et al. [8] among total population. Also in this study, people living in pakka houses had significantly more knowledge regarding breeding site as dirty water (80.8%) and stagnant water (63.5%) than that of people living in kachha houses which is consistent with the study done by Boratne et al. [10] and Khanal et al. [8] on total population. Also, this study found significantly more knowledge regarding breeding place as dirty water among literates 58.3%, which is consistent with study done by Boratne et al. [10] among the total population. However, in this study, Knowledge regarding breeding sites as discarded tires was more among the female respondents (11.5%) with no significant difference than males (29.5%). Similar to this study Boratne et al. [10] showed 19.59% male and 23.95% female knew discarded tires as breeding places of mosquito. This shows there is need of public health

intervention to increase the awareness about breeding places of mosquito among community people to control mosquito vector.

In the study of Mangalore, South India, it was said that even though thousands of free insecticides treated nets were distributed in Mangalore and penalty was imposed on the people who created breeding grounds for mosquitoes, there was no suppression of cases of malaria in the city [7] In our study only 6.6% have heard of insecticide treated bed nets which is consistent with findings of other similar study in Nepal done by Joshi et al. [9] which showed 3.6%.

Vectors of Dengue fever breed in the man-made environment of human settlements while irrigation projects has significant role in breeding vectors of Malaria, filariasis and Japanese encephalitis [11]. In this study, among the group of people who had knowledge of environmental vector control measure, closed drainage was preferred significantly more (52.5%) than open drainage preference by 47.5 % ($p=0.01$). In this study, among the group of people who knew environmental vector control measure, waste disposal by burial or burning method was also higher (64.4%) than indiscriminately throwing out of house tendency by 35.6%. In a different study [12], environmental measures like disposing of water holding containers such as tires, parts of automobiles, plastic bottles, cracked pots, etc. was found in 91%, preventing any stagnant water was found in 90% in central Nepal.

Conclusion

This study found that due to lack of information and knowledge, there was low perception about mosquito as well as mosquito control measures in the community and mostly among people above 30 years, illiterates and people below poverty line. The success of vector

control measures relies on acceptance, participation and appropriation by community members as well, which depends on their knowledge and perceptions of both the disease and the vector. Hence it is recommended to make improvements in materials of health education while dissemination of information through various channels.

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Journal of Nobel Medical College

Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np
Volume 6, Number 1, Issue 10, January-June 2017, 44-47

Original Article

Comparative Study of Angle of Inclination and Neck Length of Dry Femur

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Received: 5th March, 2017; Revised after peer-review: 18th April, 2017; Accepted: 17th May, 2017

Abstract

Background

The angle of inclination of the femur is the angle formed between long axis of neck of femur and long axis of the shaft of femur. The average angle of inclination (neck–shaft angle) is 126°, ranging from 115° to 140° in the adult population. As with the angle of inclination of the humerus, the angle of inclination of the femur varies among individuals and also from side to side. The aim of this study was to determine the Angle of inclination and neck length of Femur.

Material & Methods

A total of 50 dry femora (25right and 25 left) of nobel medical college was cross sectionally studied with random sampling without knowing the sex & age of bone. The angle formed between long axis of neck and long axis of the shaft of femur was measured with the help of goniometer. The neck length was measured with the help of sliding calliper.

Results

The mean angle of inclination was 128.98 ± 4.55 degrees, on the right side was 129.84 ± 5.22 degrees and on the left side was 128.12 ± 3.66 degrees. The difference in the mean angle of inclination of right and the left side was found to be statistically insignificant (p value > 0.05). The mean neck length femur was 2.93 ± 0.24 cm, right femur was 3.06 ± 0.19 cm and left femur was 2.80 ± 0.21 cm. The difference in the mean neck length of the right and the left side was found to be statistically insignificant (p value > 0.05).

Conclusion

The Angle of Inclination of Femur and neck length of femur in present study had no remarkable dissimilarity with the results observed in the studies conducted in Nepal and neighbouring countries. In the study there was no statistical significant difference between the neck-shaft angle and neck length of femur of right and left side of the femur but there was positive correlation between angle of inclination and neck length of femur.

Key words:

Angle of Inclination (Neck shaft angle), femur, Goniometer, Neck length, Sliding caliper

Introduction:

The longest and strongest bone in the human body is femur, which transmits

body weight from the hip bone to the tibia in standing position. The femur has a shaft and two ends, superior and inferior. The

superior end of the femur has a head, neck, and two trochanters (greater and lesser). The femoral neck is approximately 5 cm long, neck is narrowest in its mid part and widest laterally [1]. The neck of femur connects to the shaft of femur at an average angle of 126° (angle of inclination, neck–shaft angle) ranging from 115° to 140° in the adult population [2]. As with the angle of inclination of the humerus, the angle of inclination of the femur varies not only among individuals but also from side to side. The angle of inclination in women is smaller than it is in men, due to the greater width of the female pelvis. The Angle of inclination of the femur is important regarding its stability, control of lateral balance, walking and facilitates hip movement. The angle of inclination of the femur changes across the life span, being substantially greater in infancy and childhood and gradually declining to about 120 in the normal elderly person[2]. A pathologic increase in the angle of inclination is called coxa valga, and pathologic decrease is called coxa vara. The clinical importance of the angle of inclination of femur lies in the diagnosis , treatment and follow up of fractures of the neck of femur, trochanteric fractures , slipped upper femoral epiphysis , development dysplasia of the hip and neuromuscular disorders of the lower extremity. The knowledge of normal angle of inclination of femur may be of great value in evaluation of patient with known or assumed pathological conditions and in correctional osteotomy in case of femoral fractures. The angle of inclination can be estimated from a proximal femoral fragment and the required size of the length of the neck can be determined to design the prostheses for the restoration of normal angle of inclination. The knowledge of the angle of inclination is a valuable aid in the diagnosis and treatment of the fractures of upper end of femur.

Materials and Methods:

This was a cross sectional study where dry femora were obtained from the department of human anatomy of Nobel Medical College by random sampling whose sex & age were not determined/ were unknown. Damaged, incomplete and unossified bones were excluded. Only the intact bones which were fully ossified were included in the study. A total of 50 dry femora (25 right & 25 left) were selected using simple random sampling method & were studied from 5th September 2014 to 7th October 2016. The angle of inclination of femur is defined as the angle formed between long axis of neck of femur and long axis of the shaft of femur.

After labelling the bones with numbers, 50 femora were studied for measurements of the angle of inclination and neck length of the femur

1. The long axis of neck of femur was drawn through the midpoint of narrowest part the neck.
2. The long axis of the shaft of femur was drawn through the midpoint of narrowest part of the shaft.
3. The angle formed between the long axis of neck and long axis of shaft of femur was measured by goniometer.
4. The neck length of femur was measured with the help of sliding calliper.

Data were collected and analysis was done using SPSS version 16.0.

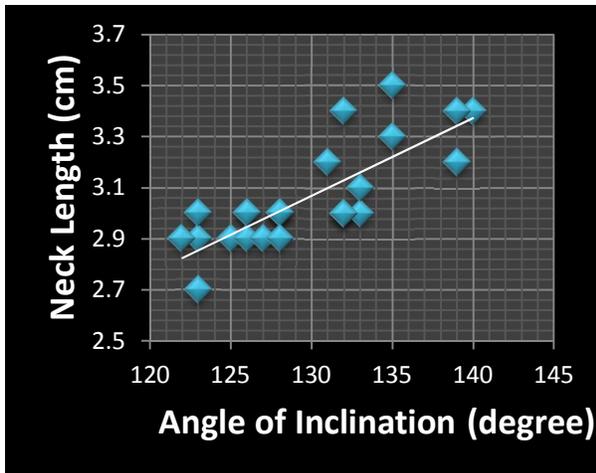
Results:

In results of present study, the mean angle of inclination was 128.98 ± 4.55 degrees, on the right side 129.84 ± 5.22 degrees and on the left side 128.12 ± 3.66 degrees. The difference in the mean angle of inclination of right and the left side of femur was found NOT to be statistically significant (p value > 0.05). The mean neck length of femur was 2.93 ± 0.24 cm, on the right

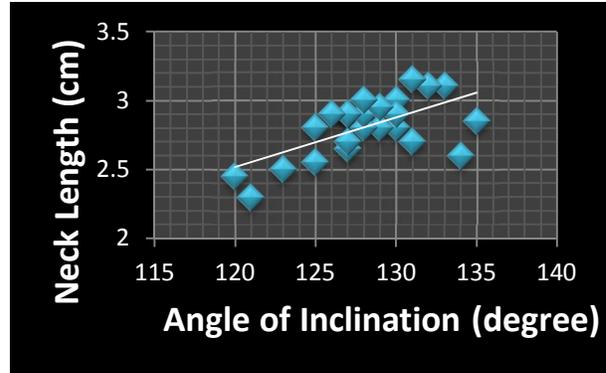
femur $3.06 \pm 0.199\text{cm}$ and on the left femur $2.80 \pm 0.211\text{cm}$. The difference in the mean neck length of femur of the right and the left side was found NOT to be statistically significant ($p \text{ value} > 0.05$). The correlation between angle of inclination and neck length of femur was found statistically significant ($p \text{ value} < 0.05$).

Table 1: Showing the result of Femoral Angle of Inclination and Neck length.

Parameter		Number	Mean \pm SD	Range
Angle of Inclination	Total	50	$128.98^\circ \pm 4.55^\circ$	$120^\circ - 140^\circ$
	Right	25	$129.84^\circ \pm 5.22^\circ$	$123^\circ - 140^\circ$
	Left	25	$128.12^\circ \pm 3.66^\circ$	$120^\circ - 135^\circ$
Neck length	Total	50	$2.93 \pm 0.24\text{cm}$	$2.3 - 3.5\text{cm}$
	Right	25	$3.06 \pm 0.19\text{cm}$	$2.7 - 3.5\text{cm}$
	Left	25	$2.80 \pm 0.21\text{cm}$	$2.3 - 3.15\text{cm}$



Graph 1: Correlation between right side Angle of inclination and neck length of femur: increased angle of inclination with increase in neck length.



Graph 2: Correlation between left side Angle of inclination and neck length of femur: increased angle of inclination with increase in neck length.

Discussion:

In the present study the mean angle of inclination was $128.98^\circ \pm 4.55^\circ$, on the right side $129.84^\circ \pm 5.22^\circ$ and on the left side $128.12^\circ \pm 3.66^\circ$. Which falls under the range of 115° to 140° in the adult population given by Moore et al[3]. This was very similar to the earlier study in Nepal by Anusuya Shrestha(2015) who found mean angle of inclination for the right femora $129.92^\circ \pm 6.12^\circ$ and for the left femora $127.36^\circ \pm 5.59^\circ$ [4]. In another study in the neighboring countries, by Issac (1997) in South Indian population the mean neck shaft angle was on the right side 126.9° and on the left side 126.5° [5]. Our results are also in agreement with study of Ravichandran et al, which was 126.55° [7]. The values obtained in the present study are low as compared to the mean values of right and left showed by Gujar et al [6], which has the mean value of 136.6° of right and 136° of left side respectively. The mean femur neck length of present study was $2.93 \pm 0.24\text{cm}$, on the right side $3.06 \pm 0.19\text{cm}$ and on the left side $2.80 \pm 0.21\text{cm}$. The value obtained was closer to the study done by Issac (2003) in South Indian population, 28.6mm for right side and 28.1mm for the left side [5]. Da Silva (2003) found mean neck length for the right femora $22.3 \pm 3.3 \text{ mm}$ and for the left femora $23.5 \pm 3.6 \text{ mm}$ in the Brazilian

population [8]. Subhsh Gujar (2013) found mean neck length for the right femora 34.5 ± 4.0 mm and for the left femora 34.2 ± 3.62 mm in Gujarat (India) [6]. The neck length values obtained in present study are low as compare to the study done by Gujar et al.

Table 2: Femoral Angle of Inclination in different populations

Authors	Population	Side	Angle of Inclination
Present study	Nepali	Right	129.84°
		Left	128.12°
Shrestha A et al	Nepali	Right	129.92°
		Left	127.36°
Isaac et al	South Indian	Right	126.9°
		Left	126.5°
De Sousa [9]	Brazil	Right	131.8°
		Left	132.1°
Gujar et al	Indian	Right	136.6°
		Left	136°

Conclusion

The Angle of Inclination of Femur and neck length of femur in present study had no remarkable dissimilarity with the angles observed in the studies conducted in Nepal and neighbouring countries. There was no any significant difference between angle of inclination of femur of right and left side of the Nepalese population. But there was positive correlation between angle of inclination and neck length of femur.

Accurate acquaintance of femoral neck length and angle is important in knowing, understanding and treating pathologic conditions in the hip joint. The limitation of our study was small sample size, more femoral neck length and angle of inclination would be needed to achieve greater precision in such an analysis.

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Journal of Nobel Medical College

Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np
Volume 6, Number 1, Issue 10, January-June 2017, 48-55

Original Article

Prevalence of Conventional Risk Factors in Acute Coronary Syndrome Patients in Eastern Part of Nepal

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Received: 9th March, 2017; Revised after peer-review: 26th April, 2017; Accepted: 22nd May, 2017

Abstract

Background

Smoking, diabetes mellitus, hypertension and dyslipidemia are known as conventional risk factors of coronary artery disease (CAD) and the prevalence of it varies across populations. There is paucity of data in our country about the prevalence of risk factors for acute coronary syndrome (ACS). This study aims to assess the prevalence of these conventional risk factors in patients who were admitted in Nobel medical college, with the diagnosis of ACS.

Material & Methods

In this observational study, we enrolled 102 patients diagnosed as ACS with stenosis $\geq 50\%$ of any epicardial arteries as shown on angiography admitted in Nobel Medical College between September 2015 to March 2017 and evaluate the prevalence of conventional risk factors. In addition, we analyzed the lipid profiles within 24 hour of the event.

Results

Mean age of the patients was 59 years. Two third (66.7%) of the patients were male. Left anterior descending artery (43.13%) was the most common culprit lesion followed by RCA in 35.29%. Dyslipidemia was present in 73.5%, hypertension in 46.1%, smoking in 38.2% and diabetes in 37.3%. Prevalence of hypertension, diabetes and dyslipidemia was similar among male and female. Smoking (44.1% vs 26.5%) was more common in male ($P < 0.05$). TG ≥ 150 mg/dl was seen in 52% study population and higher level of TG was seen in younger population ≤ 45 years compared to ≥ 45 years old ($p = 0.013$).

Conclusion

Present study showed high prevalence of hypertension, smoking, diabetes and dyslipidemia in patients with ACS, suggesting the need of aggressive risk factor reduction in general population.

Keywords: Acute coronary syndrome, Diabetes, Dyslipidemia, Hypertension, Smoking.

Introduction

Coronary artery disease (CAD) is a leading cause of morbidity and mortality in both developing and developed countries [1]. Epidemiological studies have established cigarette smoking [2], diabetes mellitus

(DM) [3], hypertension (HTN) [4], and dyslipidemia [5] as independent risk factors for CAD and have been labeled as conventional risk factors [6]. Acute coronary syndrome includes unstable angina (UA), Non-ST elevation myocardial

infarction (NSTEMI) and ST elevation myocardial infarction (STEMI), which needs urgent or emergency care to reduce mortality or morbidity. Reduction of these risk factors has been convincingly shown to reduce the risk of future events [2,7]. Prevalence of these risk factors may vary across populations [8]. Our study aims to assess the prevalence of conventional risk factors in patients who were admitted with diagnosis of ACS in Nobel medical college.

Material & Methods

It is an observational, cross-sectional, single center study conducted in Nobel Medical College Biratnagar Nepal. A total of 102 patients admitted with the diagnosis of ACS (Unstable angina, NSTEMI, and STEMI) were enrolled for the study in between September 2015 to march 2017. Performa was designed to collect patient information, which included; age, gender, diabetes, dyslipidemia, hypertension and smoking.

Coronary angiography was done in all patients. Significant CAD was defined as the presence of >50% stenosis of any of the epicardial vessels. Patients only with significant CAD were included in the study. Patients with normal coronary angiography or mild disease, defined as <50% stenosis in any of the epicardial vessels, were excluded, as were patients in whom ACS was considered to be secondary to coronary embolism, arteritis, spontaneous dissection, muscular bridges, or an anomalous origin of the coronary artery. Stable angina patients were also excluded.

Cardiovascular risk factors were defined as follows

- a Smoking: History of cigarette smoking (regularly smokes one or more cigarettes per day)
- b Dyslipidemia: any of the following values in fasting sample taken within 24 hours of the event: TC \geq 200 mg/dL, LDL-C \geq 130 mg/dL, TG \geq 150

- mg/dL and HDL-C \leq 40 mg/dL or patient already on medication for dyslipidemia.
- c Hypertension: systolic blood pressure \geq 140 mm Hg or diastolic blood pressure \geq 90 mm Hg and/or concomitant use of antihypertensive medications.
- d Diabetes Mellitus: fasting plasma glucose \geq 126mg/dL or postprandial glucose \geq 200 mg/dL or patient being treated for diabetes.

Statistical analysis: Continuous variables were expressed as mean with range and categorical variables as count with percentage. Groups were compared using Chi Square test (cross tabulation method) for categorical variables. P value less than 0.05 was considered statistically significant with 95% confidence interval. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 17.0 for Windows (SPSS, Inc., Chicago, Illinois, and USA).

Result

1. Demographic and study characteristics

During the study period, we identified 158 patients with acute coronary syndrome of which 102 patients were finally selected by excluding patients with (1) no angiographic study or refused to do, (2) with incomplete lipid profile at admission and (3) patients with normal coronaries and/or non-significant lesion. Mean age of the study population was 58.74 ranging from 30-84 years, among which 68 (66.7%) were male. The participants were further divided into two groups on the basis of their age as \leq 45 years and \geq 45 years among which 85.3 % were \geq 45 years. Mean value for total cholesterol (TC) was 201.03 mg/dl, which ranged from 117 mg/dl to 319 mg/dl. Mean value for low-density lipoprotein-cholesterol (LDL-C) was 122.87 mg/dl, which ranged from 71 mg/dl to 188 mg/dl. Mean value for Triglyceride (TG) was

167.29 mg/dl, which ranged from 79 mg/dl to 400 mg/dl. Mean value for High-density lipoprotein-cholesterol (HDL-C) was 39.14 mg/dl, which ranged from 19 mg/dl to 98 mg/dl. Anterior wall myocardium was the most commonly involved (43.13%) territory followed by inferior wall myocardium (35.29%)(Table.1).

Table.1 Demographic and study characteristics

Demographic and lipid profile	N= 102
Age	58.74(30-84)
Less than 45 years	15%
More than 45 years	85%
Male	67%
Female	33%
Total cholesterol (mg/dL)	188 ± 46.34
LDL-C (mg/dL)	119 ± 30.41
HDL-C (mg/dL)	39 ± 10.57
Triglyceride (mg/dL)	167 ± 71.25

2. Prevalence of risk factors according to sex

The prevalence of CVD risk factors among the study population is summarized in Table 2. Hypertension was present in 45.6% of male and 47.1% of female was the most frequently observed risk factors in Myocardial infarction and unstable angina groups with (P=0.888), whereas prevalence of smoking was seen in 44.1% male vs 26.5% in female (P<0.05). Among the risk factors T2DM was present in 38.2% in male vs 35.3% in female with (P=0.77), respectively among 102 study populations.

Table.2. Prevalence of risk factors according to sex

Risk factors	All patients N= 102(%)	Male N= 68(%)	Female N= 34(%)	P value
Smoking	39	30(44.1)	9(26.5)	<0.05
Hypertension	47	31(45.6)	16(47.1)	.888
Diabetes	38	26(38.2)	12(35.6)	.077

3. Prevalence of risk factors by age

The prevalence of CVD risk factors among the study population by age is summarized in Table 3. Similar to the prevalence by sex HTN is by far the most common observed risk factor 49.4% in age ≥45 vs 26.7% in age ≤45 years, smoking was seen in 36.8% age ≥ 45 years and higher rate of prevalence 46.7% in age ≤ 45 years and. Among the risk factors T2DM was present in 36.8% with age ≥45 years vs as 40.0% in age ≤45 years, All of the conventional risk factors were non significant with P value ≥0.05 with acute coronary syndrome among 102 study populations.

Table.3 Prevalence of risk factors by age

Risk factors	All patients N= 102	Age >45years N= 87(%)	Age <45 years N= 15(%)	P value
Smoking	39	32(36.8)	7(46.7)	0.46
Hypertension	47	43(49.4)	4(26.7)	0.10
Diabetes	38	32(36.8)	6(40.0)	0.81

4. Lipid profile study

The blood lipid analysis showed that the mean level of total cholesterol was 201.03 mg/dl (IQR 117-319mg/dl), LDL-C was 122.87 mg/dl (IQR, 71-188 mg/dl), HDL-C was 39.14 mg/dl (IQR, 19-98) and Triglyceride was 167.29 mg/dl (IQR, 79-

400 mg/dl). **Table 4.** TC, LDL-C and TG all three levels were higher in women than men and HDL-C was seen higher in men compared to women though the difference were non-significant ($p \geq 0.05$).

Table 4. Pattern of Lipid profiles in study populations by sex

When the lipid profile was differentiated by age, older patient have higher percentage of LDL-C ≤ 130 mg/dl,

	All patients(n=102)	Men(n=68)	women(n=34)	P value
TC (IQR)(mg/dl)	201.03(117-319)	199.90(117-319)	203.29 (118-302)	0.32
TC \geq 200 mg/dl(%)	43.1	39.7	50	
TC \leq 200 mg/dl(%)	56.9	60.3	50	
LDL-C (IQR)(mg/dl)	122.87(71-188)	120.74(44-188)	127.15(47-259)	0.77
LDL-C \geq 130 mg/dl(%)	36.3	35.3	38.2	
LDL-C \leq 130 mg/dl(%)	63.7	64.7	61.8	
HDL-C (IQR)(mg/dl)	39.14 (19-98)	39.97(19-99)	37.47(19-98)	0.67
HDL-C \geq 40 mg/dl(%)	47.1	48.5	44.1	
HDL-C \leq 40 mg/dl(%)	52.9	51.5	55.9	
TG (IQR)(mg/dl)	167.29(79-400)	166.19(79-340)	169.50(84-400)	0.48
TG \geq 150 mg/dl(%)	52.0	54.4	47.1	
TG \leq 150 mg/dl(%)	48.0	45.6	52.9	

TC \leq 200 mg/dl as compared to age \leq 45 years old

Table 5. Lipid profile characteristics by age

AGE	LDL-C		TC		HDL-C		TG	
	≥ 130	≤ 130	≤ 200	≥ 200	≥ 40	≤ 40	≥ 150	≤ 150
≤ 45 (%)	53.3	46.7	40.0	60	40.0	60	53.3	46.7
≥ 45 (%)	33.3	66.7	59.8	40.2	48.3	51.7	51.7	48.3
TOTAL(%)	36.3	63.7	56.9	43.1	47.1	52.9	52	48.0
P value	0.13		0.15		0.55		0.01	

Table 5. Whereas HDL-C level ≤ 40 mg/dl is decreased in older patients compared to younger. This result could be due to decrease in physical activity and exercise in older patients as aerobic exercise/physical activity increases HDL-C level (Table.5). TG ≥ 150 mg/dl was seen in 52% study population. Higher level of TG was seen in younger population ≤ 45 years compared to ≥ 45 years old which was statistically significant ($p = 0.01$).

Table 6. Distribution of dyslipidemia by sex

		No dyslipidemia	Dyslipidemia	Total	P value
Sex	F	8 23.5%	26 76.5%	34 100.0%	0.63
	M	19 27.9%	49 72.1%	68 100.0%	
Total		27 26.5%	75 73.5%	102 100.0%	

Table 7. Distribution of cardiovascular risk factor burden

Risk factors	n=102	%
None	11	10.78
One	21	20.5
Two	38	37.25
Three	30	29.41
Four	2	1.96

As shown in **Table 7**, 10.7% are without any conventional risk factors for ACS, which is negligible compared to 89% patients with at least one or more risk factors for cardiovascular disease.

Discussion

Mean age of the patients was 58.74 years in our study. Younger patients (age less than 45 years) with ACS event were 14.7%. In a study done by Adhikari et.al [9] similar results were found where mean age of the patients were 57 years and younger patient population was 12.6%. It is a matter of concern that younger patients percentage is increasing for ACS event. In this study one third (33%) of the patients were female. The incidence of acute coronary syndrome (ACS) is lower in women than men in all age group[10], which is consistent with our study, having lower percentage 33.3% of total population. The finding that ACS event is more common in male patients is consistent with report from multinational observational Global Registry of Acute Coronary Events (GRACE)[11].

We found high prevalence of Dyslipidemia (73.5%), Hypertension (46.1%), Smoking (38.2%), Diabetes (37.3%) in our study population. In study done by Adhikari et al [9] have lower prevalence of dyslipidemia 45.5% compared to our 73.5% which is much higher, it is s because we included

TG in the definition of dyslipidemia[12].

Cigarette smoking plays a critical role in the development of CHD (Coronary heart disease). Smoking is considered one of the most important modifiable risk factors for increasing cardiovascular disease. In our study, the prevalence of current smoking was 44.1% in male and 26.5% in female. Smoking was significantly higher in male population in overall as well as among all age group in our study. These results are similar to other recent studies. It was the second most frequently encountered conventional risk factor with acute STEMI living in Turkish study population [13]. Though our study showed non-significant risk estimation with acute coronary Syndrome, it could be cause of smaller sample size of population in our study. DM (Diabetes mellitus) is a major health challenge in many Asian populations. However its prevalence is somewhat lower than that observed in developed countries[14], it is significant among South Asians, having 2% prevalence in rural South Asia but approaching 20% prevalence in urban South Asia and amongst immigrant South Asians[15-17].In

our study it is 3rd common among the conventional risk factors only after Hypertension and Smoking. Prevalence of DM in INTER HEART study was 26% in women, 16% in men [8]. The higher prevalence of diabetes in women than in men is not consistent in our study (F 35.3% vs M 38.2%) with other studies that have shown that diabetes is a powerful risk factors in women, though our study did not show any sex disparity in prevalence which were non-significant and also one of the factors effecting the ratio could be higher number of subject for ACS being male.

Hypertension is one of the main factors leading to atherogenesis and the development of vulnerable plaques whose instability or rupture are responsible for the development of acute coronary syndrome (ACS). In general population, the prevalence of hypertension rises progressively with age in both male and female. In GUSTO -1 trial which enrolled 41021 STEMI patients prevalence of a history of previous hypertension was 38.1 % (15544 of 41021) [18]. Similarly, In GISSI-2 with 20491 STEMI patients, history of HTN was present in about 35% of the whole population [19]. In epidemiological studies performed in N-STEMI patients, chronic HTN is the most prevalent risk factors [20]. Similar to this studies prevalence of HTN in-patient presented with ACS at our center was 46.1%. From all the registries and the data available up to now [18, 19, 21-23], ACS patients with hypertension are more likely to be female, older ages similar to that of our study with HTN in Female being 47.1% with age \geq 45 years being 49.4%.

An Observational study has shown untreated dyslipidemia as a strong predictor of in-hospital mortality [24]. Clinically significant changes in lipid occur after an ACS event [25]. From the Time of admission to next morning, TC and LDL-C level can undergo a change of 7% and

10% respectively, in patients with MI and 5% and 6% in those with unstable angina [29]. Our study showed 73.5% had at least one alteration in lipid levels. On other hand, these results could be due to an underestimation of the true prevalence of dyslipidemia as risk factors for Nepalese population.

In previous observational study [26], every 1 mg/dl increment in HDL-C was reported to be associated with 2%-3% decrease risk of CVD in adult. In our study 52.9% of population has HDL-C \leq 40 mg/dl, which co-relates that HDL-C level is strong biomarker and one of the conventional and important risk factors for ACS.

Elevated levels of TG are independent risk factors for CHD [27]. Even our study demonstrated that TG level \geq 150 are statistically significant (P=0.013) risk factors for ACS. For a reduction of 1% in TC has been shown to reduce the risk for coronary artery disease [28] assuming that reverse is true, our study does not correlates to previous studies as our study 57% of population have TC level \leq 200 mg/dl, and suffered acute coronary syndrome event. LDL-C \geq 130 mg/dl is seen in smaller percentage of 36.3% compared to 63.7% of LDL-C \leq 130 mg/dl. This may point out that even lower level of LDL-C can be a risk factor for ACS event [29, 30] and future study needs to validate more accurate event. Our study clearly shows that conventional risk factors occur in most of the ACS patients in cluster. Adhikari CM *et.al* [9] Study showed that 70% population had more than 2 risk factors which is same in our study too. All the above data from studies shows that most of the ACS patients have cluster of conventional risk factors and primary prevention against all of the four conventional cardiovascular risk factors should be address by education, diet, exercise and pharmacologically.

Conclusion

Present study showed high prevalence of hypertension, smoking, diabetes and dyslipidemia in patients with ACS, suggesting the need of aggressive risk factor reduction in general population.

Limitations

This study has some limitations, such as its observational design and small sample size. Doses of atorvastatin taken by patient vary and many are not documented and Lipid profile was taken at variable time within 24 hours. Factors that can impact the cardiovascular risk (eg, obesity, Inactivity, familial history) were not evaluated separately which might change the results if taken into consideration.

Acknowledgments

The authors thank the staff of the Coronary Care Unit, Nobel Medical College, for their valuable cooperation in the preparation of this manuscript.

Disclosure

There was no funding for this research. The authors report no conflicts of interest in this work.

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Journal of Nobel Medical College

Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np
Volume 6, Number 1, Issue 10, January-June 2017, 56-62

Original Article

Epidemiology of Orthopaedic Admissions at A Teaching Hospital of Eastern Nepal

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Received: 21st March, 2017; Revised after peer-review: 20th April, 2017; Accepted: 28th May, 2017

Abstract

Background

There are many other reasons besides fracture for which a patient could potentially be admitted to orthopaedic inpatient care. The goal of this retrospective review was to analyze the spectrum of orthopaedic admissions to a tertiary level teaching hospital of Nepal.

Material & Methods

This retrospective descriptive epidemiological study was based on patients admitted for orthopaedic inpatient care at a tertiary level health care center of eastern Nepal. Registry data of 1 year was used to analyze the spectrum of orthopaedic admissions.

Results

Male admission outnumbered females with a ratio of 1.82:1. Trauma accounted to majority of Orthopaedic admissions (67.9%) and Infection lied second in order (12.4%). Upper and Lower limb fractures (with right sided dominance) contributed to highest numbers of trauma respectively. Incidence of closed to open fracture was 5.45:1. More than half of trauma and fractures involved the 10 – 39 years age group with predominance in 10-19 years. Fracture incidence was higher among men than women until 59 years of age after which the gender ratio reversed.

Conclusions:

Leading cause for orthopaedic admission was Trauma accounting more than 2/3 of the total. Biasness in gender admission reflects true picture of male dominated society. Upper limb injury, right side and closed fractures were dominating. Sexual dimorphism was apparent in fractures which may be due to higher rates of Osteoporotic fractures in elderly females.

Key Words: Admissions, epidemiology, fracture, infection, orthopaedics, trauma.

Introduction

Although fractures make up the majority of the reason for which a person is admitted to Orthopaedics inpatient, there are also many other problems which may necessitate admission [1]. Orthopaedic admissions include both patients with

traumas and non-traumas like tumors, infections, deformities, etc. The pattern of inpatient admissions to any hospital for a fracture or any other orthopaedic injury is changing [1]. Trauma accounts for 9% of global mortality these days and are a threat to health worldwide [2]. Road Traffic

Accident (RTA) lies amongst top five causes of morbidity and mortality in South-East Asian countries [3]. In Nepal, "injury" contributes to 9% of total mortality annually and is the third leading cause of death [4]. Despite trauma, lots of patients with bone pain, bone infection, bone tumor, congenital or post-trauma deformity, post-burn contracture etc. also need inpatient care.

This study aims to give a snapshot of patterns of Orthopaedic injuries and admissions in the hope that it will aid all orthopaedic doctors and paramedical personnel involved in the care of these patients to maintain a standard treatment protocol along with proper planning for better care. This will also help the team to keep high index of suspicion with regards to the possibility of other associated fractures or system involvement so that these can be identified and treated promptly. Knowledge of the entire trauma workload at tertiary level teaching hospital will help not only to manage resources and plan training opportunities but also to predict areas where allocation of resources could improve patient care within the constraints of the current hospital budget.

Material & Methods

This hospital based retrospective descriptive epidemiological study was conducted at Nobel Medical College Teaching Hospital, a tertiary level health care center located in eastern part of Nepal. It was of 1-year duration and was based on patients admitted to inpatient care of Orthopaedic department from 01/10/2014 till 30/09/2015. This retrospective survey was started only after ethical approval from institutional review committee. All patients admitted under direct care of Orthopaedic team were included, irrespective of what treatment they ultimately ended up having. Patients consulted on from other specialties or

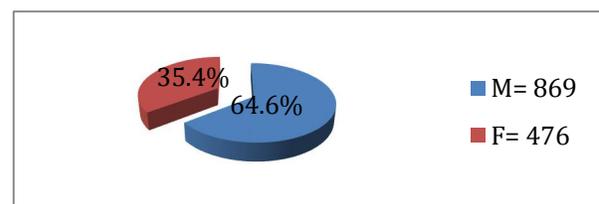
those reviewed in the Emergency Department but then subsequently discharged from hospital were excluded. Admissions with incomplete data in registry were also excluded to prevent the confounding of the result. Patients file were retrieved from the medical record section and demographic data, gender, diagnosis and treatment were recorded.

All diagnoses were grouped into 8 categories namely trauma, infection, tumor, implant removal, foreign body, post-trauma deformity, post-burn contracture and others (includes back pain, joints pain, bursitis, PIVD, CTEV etc). Trauma was further categorized into Upper limb fractures, Lower limb fractures, Spine injuries, Pelvis fracture, Multiple injuries, Poly trauma and Soft tissue injury (STI). Patients with two or more severe injuries in at least two areas of the body were categorized as "Poly trauma" and those with two or more severe injuries in one body area were categorized as "Multiple Injury" [8]. All these categories were reviewed and their epidemiologic trends were noted. Further analysis was done in Microsoft Excel.

Results

There were total 1359 admissions in this period out of which 1345 had complete data in the hospital-based registry and were included in this study for further analysis and calculation of various statistical results. The incidence of inpatient admission of males far outnumbered females with a ratio of 1.82:1 [Figure 1].

Figure 1. Gender distribution



In terms of diagnosis, trauma (913) occupied more than half of all admissions accounting more than 2/3 of total. Infection (167) was second in order. Patients admitted for implant removal (120) were also in significant number. Patients admitted with diagnoses of tumor (62), Foreign body granuloma (36), Post-burn Contracture (5) and Post-trauma Deformity (3) were next in order respectively. Remaining (39) was categorized as others [Figure 2].

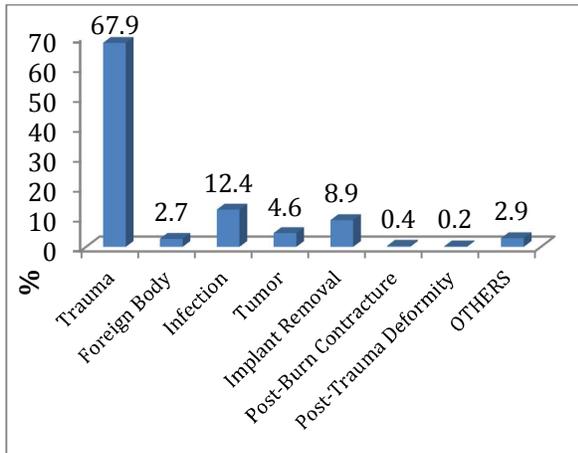


Figure 2. Case distribution in percentage on basis of diagnosis

Case distribution amongst trauma is shown in Table 1. Upper limb fractures (41.0%) predominated all but it made only a negligible difference with Lower limb fractures (40.5%) which stood second in order. Good numbers of Soft tissue injuries (8.1%) were also admitted for management of pain and swelling. Isolated Pelvis fractures were least in order.

Table 1: Case distribution amongst Trauma

Trauma Diagnosis	Case No.	Percentage of Trauma	Percentage of Total
Upper Limb Fractures	374	41.0%	27.8%
Lower Limb	370	40.5%	27.5%

Fractures			
Spine Injuries	37	4.1%	2.7%
Pelvis Fracture	5	0.5%	0.4%
Multiple Injuries	14	1.5%	1.0%
Polytrauma	39	4.3%	2.9%
Soft tissue injury	74	8.1%	5.5%

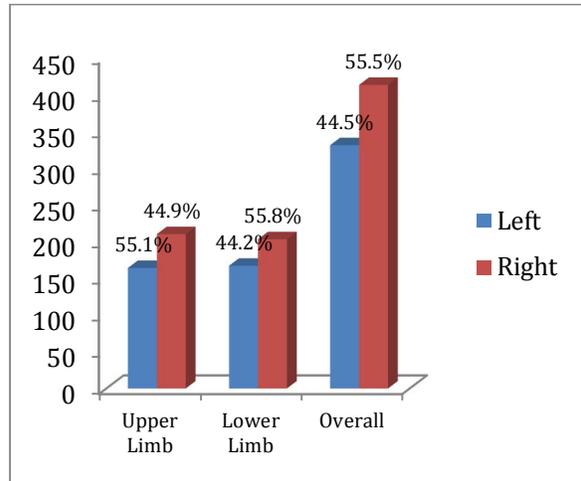


Figure 3. Left side Vs Right Side Injuries

Upper and lower limb fractures were also analyzed for Right or Left sided incidence. Right sided injury was dominant to left one in both Upper and Lower limb fractures with an overall ratio of 1.25:1 [Figure 3].

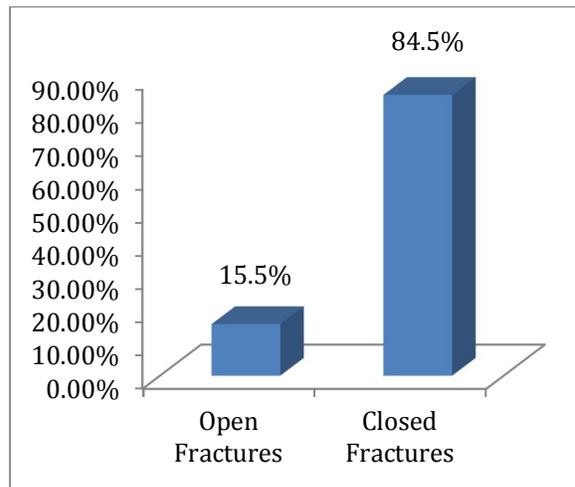


Figure 4. Open Vs Closed Injuries

Admitted fracture cases were also categorized as Open and Closed Fractures. Considering the 839 patients of limbic injuries, multiple injuries and of poly trauma, Closed fractures far outnumbered Open fractures with a ratio of 5.45:1 [Figure 4].

Analyzing trauma in terms of dislocation, 3.8% (35) of trauma cases (2.6% of total admissions) had dislocation. These dislocations included both isolated dislocations and fracture dislocations.

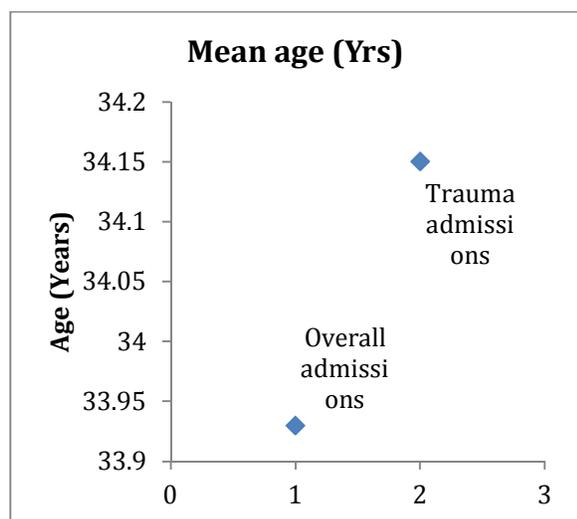


Figure 5. Mean age of admitted patients

Though the “Mean” age of Overall admissions (33.93 years) and Trauma admissions (34.91 years) lied between 30-39 years of age interval [Figure 5], the “Age specific incidence” of Overall and Trauma admission patients were highest in 10-19 years of age group [Figure 6]. After sudden surge in 10-19 years of age interval, there was gradual decrease in Age specific incidence in Overall, Trauma and Fracture admissions [Figure 6]. Highest numbers of trauma (19.4%) involved the 10-19 years age group, whereas more than half (50.3%) of it involved the 10 – 39 years age group [Figure 6].

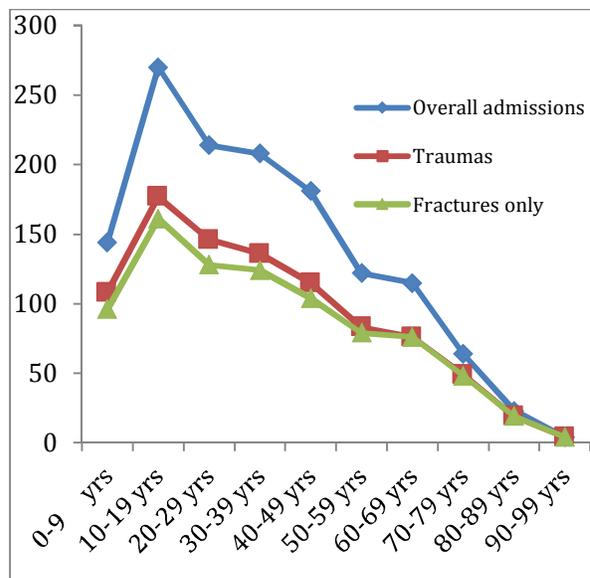


Figure 6. Age specific incidence of admitted patients

Age & Gender specific incidences were also evaluated accordingly in Overall, Trauma and Fracture admissions [Figures 7, 8 & 9]. Somehow same patterns were observed in all of them. Male admissions predominated female till 59 years after which it reversed but again became equal at 85 years and onwards.

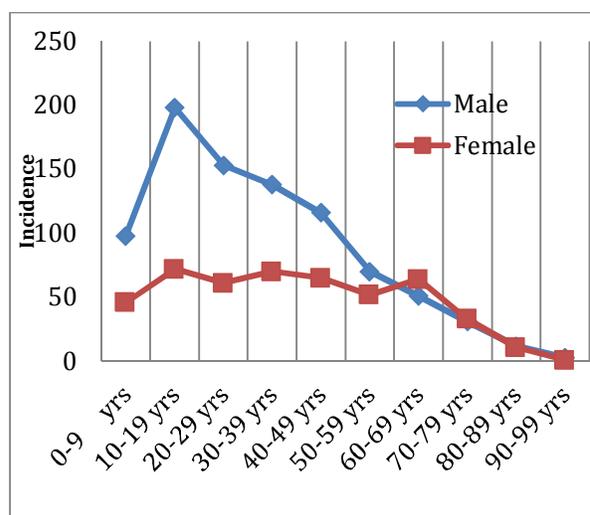


Figure7. Age & Gender specific incidence in overall admissions

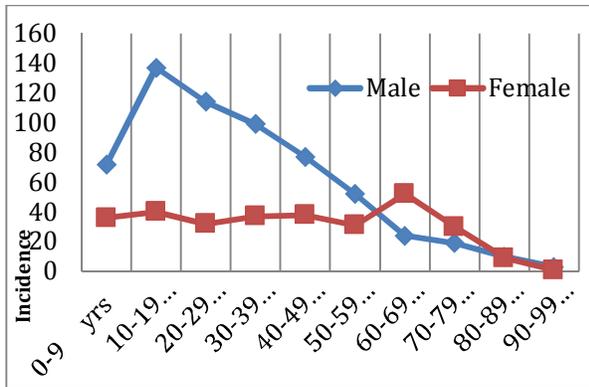


Figure 8. Age & Gender specific incidence in Trauma admissions

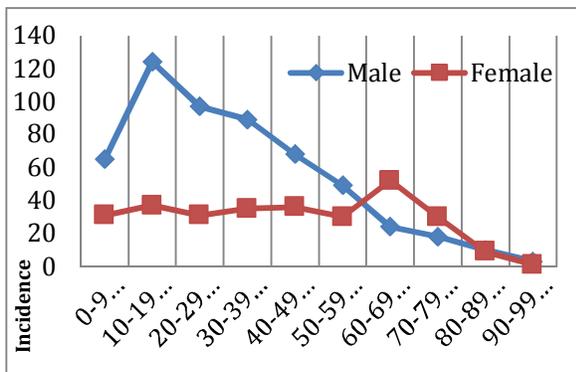


Figure 9. Age & Gender specific incidence in Fracture admissions

Discussion

We found the average age of Overall admissions to be 33.93 years with a gender ratio of 1.82:1 Male to Female. This could be due to gender biasness persisting in male dominated developing countries like Nepal. In a similar study conducted in England, Taylor et al showed the average age of admissions to be 53.12 years with a gender ratio of 51:49 Male to Female [1]. This shows that we get relatively younger population for orthopaedic care and also that our Male admissions far outnumbers Female admissions. This may be because 67.9% of our admissions were “trauma cases” for which Road Traffic Accidents was the major culprit and men drives mostly both the public and private vehicles in Nepal.

Similarly, high male to Female ratio (6:1) was also found in a cross-sectional study conducted in India by Ganveer et al [10]. Wui et al also reported high Male to Female ratio of 2.25:1 in a trauma epidemiology study conducted in Singapore [2] and preponderance of males among injured was also reported by several other studies [11-15].

In our study, Upper limb fractures predominated trauma admissions with only a negligible difference with Lower limb fractures. Results reverse in order was shown by Taylor et al in a similar study conducted in England where Lower limb fractures predominated [1].

In our study both Upper and Lower limb fractures showed right sided dominance. Also, the incidence of closed fracture was much higher than open fracture. Relevant literature couldn’t be found for comparison. In our study Trauma and fractures were predominantly highest in 10-19 years of age group whereas 10 – 39 years of age group comprised more than half of trauma and fractures. In a similar study on injury pattern following road traffic accidents in central India, Ganveer et al reported that majority of the victims (75%) were in age group of 18-37 years [10]. But in a similar type of English study, Taylor et al reported a bimodal distribution of patient age following trauma admissions. Admission rates for children and young adults were higher up to 19 years of age, and also for those above 70 years [1]. It may be because of increasing elderly population in England with a resultant increase in the number of osteoporotic fractures. Bimodal incidence of fracture with peaks in youth and very elderly has been reported by many previous studies also [16].

In our study, we also evaluated the Age & Gender specific incidences of Trauma and Fractures. It showed Male predominance over Females till 59 years only and after that a reverse pattern of female

predomination over males was seen. In a similar study conducted in England and Wales on epidemiology of fractures, T. P. van Staa *et al.* reported the fracture incidence to be higher among men than women until 50 years of age after which the gender ratio reversed [17].

Our study has some limitations. First, results may not be generalized to other settings because the study was performed in only one tertiary care teaching hospital. Second, the time duration of this study is of only one year and patient number is only 1345. Lastly, we have not presented the types or outcome of treatment received. It would be really interesting to compare our current findings over time as we continue to develop our trauma care.

Conclusion

Results showed the Orthopaedic inpatient admission of males to be significantly higher than females reflecting the real picture of male dominated society. "Trauma" accounted to majority of Orthopaedic admissions and Infection lied second in order. Upper Limb and Lower limb fractures contributed to highest number of trauma's respectively and their incidence nearly coincided with each other. Right sided injury was dominant to left one in both Upper and Lower limb fractures. Incidence of closed fracture was much higher in comparison to open fracture with a ratio of 5.45:1. Trauma and fractures were predominantly highest in 10-19 years of age group whereas more than half of them involved the 10 – 39 years age group. Age & Gender specific incidences of Trauma and Fractures showed Male predominance over Females till 59 years only and after this the pattern reversed making female predomination over males till 85 years. This may be due to higher rates of Osteoporotic fractures in elderly females.

The foregoing statistics will not only help us in planning for service delivery but also to suggest avenues by which inpatient care can be improvised. It will also provide an evidence based approach in counselling the patient and his/her family not only during course of long treatment but also from a medico legal standpoint.

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Journal of Nobel Medical College

Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np
Volume 6, Number 1, Issue 10, January-June 2017, 63-71

Original Article

Hysterosalpingographic Evaluation of Uterus and Fallopian Tubes of Infertile Women

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Received: 14th March, 2017; Revised after peer-review: 30th April, 2017; Accepted: 18th May, 2017

Abstract

Background

Hysterosalpingography (HSG) is a routinely performed radiological investigation for evaluation of uterine cavity morphology and fallopian tube patency in infertile women. This study was undertaken to describe patterns of HSG findings and to assess any significant difference in uterine and fallopian tube findings in women with primary and secondary infertility in eastern part of Nepal.

Material and Methods

Hospital based cross sectional descriptive study was conducted by retrospectively analyzing HSG records of 216 infertile women (both primary and secondary infertility) done from April 2014 to August 2016. Radiological findings in uterus and fallopian tubes were recorded and analyzed. Association between two categorical variables was examined by Chi-square test.

Results

Majority of infertile women (53.2%) had primary infertility. Abnormal HSG was seen in 44.9% infertile women and higher in secondary infertility (57.4%) than with primary infertility (33.9%) (OR = 2.63, 95% CI = 1.51 – 4.57, P value = 0.001). Tubal abnormality was common than uterine abnormality (36.1% versus 8.8%, P value = 0.001). Tubal abnormalities were higher in women with secondary infertility than with primary infertility (52.5% versus 21.7%), whereas uterine abnormalities were common with primary infertility compared to secondary infertility (12.2% versus 5.0%) (P value = 0.001).

Conclusion

Abnormal HSG was more associated with secondary infertility. Infertility was significantly associated with tubal abnormality than with uterine abnormality. Tubal abnormalities are common in women with secondary infertility whereas uterine abnormalities are common in women with primary infertility and are statistically significant.

Keywords: *Hysterosalpingography, Nepal, Primary infertility, Secondary infertility, Tubal abnormality, Uterine abnormality*

Introduction

Hysterosalpingography (HSG) is a routinely performed radiological investigation for

evaluation of uterine cavity morphology and fallopian tube patency in infertile women by instillation of radiographic

contrast media into uterine cavity through cervical canal [1, 2]. Clinically according to the international committee for monitoring Assisted Reproductive Technology (ICMART) and the World Health Organization (WHO) revised glossary, infertility "is a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after twelve months or more of regular unprotected sexual intercourse" [3], and is further classified as primary when there is no occurrence of previous pregnancy and secondary when previously pregnancy has occurred [4]. According to an analysis conducted by WHO, an estimated 48.5 million reproductive age couples were infertile in 2010 worldwide. Inability to conceive and bear a child can lead to psychological and social problems in a couple [5], hence investigation of infertile couple to identify a cause and its subsequent treatment is crucial. Female factor is responsible for 40 – 55% of the causes of infertility, of which fallopian tubal and peritubal factors are seen in 30-40% of cases and uterine abnormalities implicated in about 15%. [4]. HSG is relatively quick, safe and non-invasive technique for evaluation of uterine cavity and fallopian tube lumen and is best imaging modality to examine fallopian tubes [6]. Advances in a field of reproductive medicine have increased the role of HSG in evaluation of infertile women with increase in number of HSG examinations done these days. Various pathologies like congenital uterine anomalies, endometrial polyp, submucosal uterine fibroid, uterine synechiae, adenomyosis, fallopian tubal blockage, hydrosalpinx and peritubal adhesions can be identified by HSG. Indication of HSG other than infertility includes evaluation of women with recurrent abortions, to check patency of fallopian tubes after tubal ligation or recanalization and assessment of uterus before myomectomy. Even though

complications like pain, discomfort, infection, vasovagal reaction, uterine perforation, intravascular or lymphatic intravasation of contrast media and allergic reactions related to contrast media can be seen during and after HSG, it plays a significant role in management of female infertility [1, 2].

Local data regarding prevalence and patterns of abnormalities seen in HSG examinations of infertile women are important to obtain baseline information and thus for further planning of infertility treatment and reproductive health management. This study was undertaken to describe patterns of HSG findings in uterus and fallopian tubes of infertile women and to assess any significant difference in uterine and fallopian tube findings in women with primary and secondary infertility seeking infertility treatment in teaching hospital in eastern part of Nepal.

Materials and Methods

This hospital based cross sectional descriptive study was conducted by retrospectively analyzing HSG records of infertile women (both primary and secondary infertility) referred for HSG examination to Department of Radiodiagnosis and Imaging of Nobel Medical College Teaching Hospital (NMCTH), Biratnagar over a period of 29 months from April 2014 to August 2016. Ethical clearance for the study was obtained from IRC-NMCTH. HSG records of 216 infertile women were included for the study after excluding patients with history of salpingectomy or tubal ligation.

HSG examination is done in our department following standard protocol. Procedure is explained to the patient and consent obtained prior to examination. Ongoing vaginal bleeding, active pelvic infection, recent uterine or tubal intervention / surgery and history of allergy to contrast

media are considered contraindication for the procedure. The couple is asked to avoid unprotected intercourse from day one of menstrual cycle till the day of HSG examination to ensure the risk of potential pregnancy is eliminated. HSG is done between 6th – 10th day of last menstrual cycle after cessation of vaginal bleeding. In the presence of female attendant, the patient is placed supine on X-ray table in lithotomy position and 20 mg of Hyosine Butylbromide is given intravenously. Following aseptic technique speculum is placed in vagina, cervix localized and cleansed by iodine solution. Volsellum is used to hold anterior lip of uterine cervix and Leech Wilkinsons cannula or foley's catheter (8F) inserted into distal cervical canal. Side marker is placed on one side of pelvis (right or left) and scout image of pelvis taken before instillation of contrast medium into uterine cavity. 10 - 15 ml of water soluble iodinated contrast medium (76% urograffin) is instilled into uterine cavity via a cannula / catheter maintaining tight seal to prevent reflux of contrast. Spot radiographs are then obtained demonstrating uterine cavity, fallopian tubes and peritoneal spillage of contrast media. All the HSG records were reviewed and analyzed by author himself. Age, parity and infertility duration were recorded on data sheet. Variables like size, shape and outline of uterine cavity; filling defects within uterine cavity; opacification, visualization and caliber of bilateral fallopian tubes and peritoneal spillage of contrast from fallopian tubes were studied and recorded. The examination was declared normal when HSG demonstrated regular outlined triangular uterine cavity without filling defects, with opacification and visualization of normal caliber bilateral fallopian tubes and free peritoneal spillage of contrast media. Failure of opacification of fallopian tubes was considered to be blocked (unilateral or bilateral). Dilated

fallopian tubes was labeled as hydrosalpinx (unilateral or bilateral) and demonstration of alternating dilatation and narrowing along the length of fallopian tubes called beaded. Similarly, uterine abnormalities were classified accordingly, as congenital (Mullerian duct anomalies) and acquired (synechiae, fibroid). Obtained data were recorded in Microsoft Excel spreadsheet and analyzed using IBM SPSS statistics 20 software. Frequency, percentage and mean with standard deviation (SD) were calculated to explore the characteristics of categorical and numerical variables. Association between two categorical variables was examined by Chi-square test. Logistic regression was used to find out the association between HSG findings and type of infertility after adjusting age group as a confounding variable. Probability of significance was set at 5% level.

Results

Of the total 216 infertile women included in this study, 115 (53.2%) had primary infertility and 101 (46.8 %) secondary infertility. Mean age (years) \pm standard deviation (SD) was 29.42 ± 4.32 with age range of 20 – 40 years. Mean age (years) \pm SD of women with primary and secondary infertility was 27.10 ± 3.71 (range: 20 – 36 years) and 32.07 ± 3.34 (range: 24 – 40 years) respectively. Mean duration of infertility (years) \pm SD of total patients was 7.16 ± 3.63 years (range: 2 – 18 years), with mean duration of 5.24 ± 2.31 years (range: 2 – 14 years) and 9.34 ± 3.63 years (range: 4 – 18 years) for primary and secondary infertility respectively. Majority (96 (44.4%)) of women belonged to 26 – 30 years age group and majority (97 (44.9%)) had infertility of 6 - 10 years.

Table 1: HSG findings with type of infertility

HSG finding	Primary infertility	Secondary infertility	Total	Odds ratio (OR) (95% confidence interval (CI))	P value *
Normal	76 (66.1%)	43 (42.6%)	119 (55.1%)	2.63 (1.51 – 4.57)	0.001
Abnormal	39 (33.9%)	58 (57.4%)	97 (44.9%)		
Total	115 (100%)	101 (100%)	216 (100%)		

*Chi-square test

Out of 216 infertile women, 97 (44.9%) had abnormal HSG. Abnormal HSG was seen in 39 (33.9%) and 58 (57.4%) women with primary and secondary infertility respectively (OR = 2.63, 95% CI = 1.51 – 4.57, P value = 0.001). Also, HSG abnormality is significantly associated with type of infertility even after adjusting age effect. (Table 1).

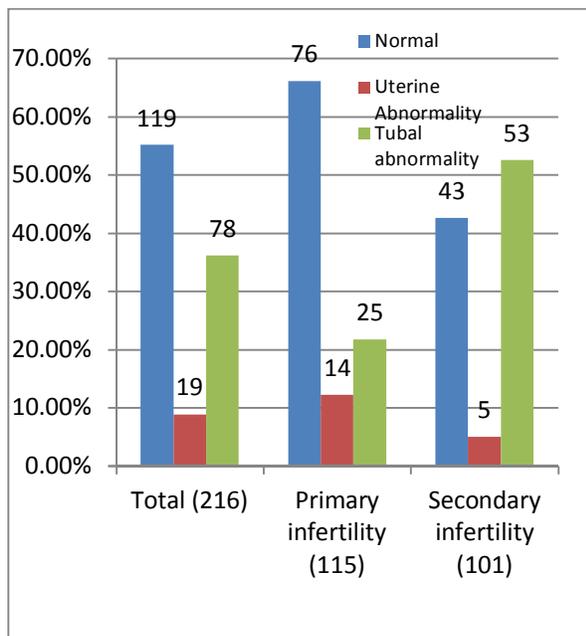


Figure 1 : Distribution of HSG findings

Table 2: Type of abnormality in HSG (n = 97)

Abnormality	Primary infertility (n = 39)	Secondary infertility (n = 58)	Total (n = 97)
Uterine	14 (35.9%)	5 (8.6%)	19 (19.6%)
Tubal	25 (64.1%)	53 (91.4%)	78 (80.4%)

As shown in table 2 tubal abnormality was more associated with infertility than uterine abnormality and is statistically significant (P value = 0.001). Uterine abnormality is significantly associated with primary infertility whereas tubal abnormality is higher in secondary infertility in comparison to the uterine abnormality (P value = 0.001). (Table 2).

Table 3: Distribution of uterine findings in HSG according to type of infertility.

Findings in uterus	Primary infertility (n = 115)	Secondary infertility (n = 101)	Total (n = 216)
Normal	101 (87.8%)	96 (95.0%)	197 (91.2%)
Bicornuate uterus	3 (2.6%)	1 (1.0%)	4 (1.9%)
Unicornuate uterus	3 (2.6%)	0 (0.0%)	3 (1.4%)
Septate uterus	1 (0.9%)	0 (0.0%)	1 (0.5%)
Arcuate uterus	1 (0.9%)	0 (0.0%)	1 (0.5%)
Fibroid	4 (3.5%)	2 (2.0%)	6 (2.8%)
Synechiae	2 (1.7%)	2 (2.0%)	4 (1.9%)

Uterine abnormalities were found in 19 (8.8%) infertile women out of 216 and in 14 (12.2%) and 5 (5.0%) women with primary and secondary infertility respectively. This difference in occurrence of uterine abnormalities between primary and secondary infertility is statistically significant (P value = 0.001). Of the total

19 uterine abnormalities, congenital uterine anomalies were seen in 9 (4.2%) and acquired abnormalities in 10 (4.6%) women. (Table 3).

Table 4: Distribution of tubal findings in HSG according to type of infertility

Findings in fallopian tubes	Primary infertility (n = 115)	Secondary infertility (n = 101)	Total (n = 216).
Normal	90 (78.3%)	48 (47.5%)	138 (63.9%)
B/L tubal block	7 (6.1%)	14 (13.9%)	21 (9.7%)
Right tubal block	5 (4.3%)	10 (9.9%)	15 (6.9%)
Left tubal block	2 (1.7%)	9 (8.9%)	11 (5.1%)
B/L hydrosalpinx	3 (2.6%)	7 (6.9%)	10 (4.6%)
Right hydrosalpinx	1 (0.9%)	6 (5.9%)	7 (3.2%)
Left hydrosalpinx	2 (1.7%)	5 (5.0%)	7 (3.2%)
Right tubal block with left hydrosalpinx	1 (0.9%)	1 (1.0%)	2 (0.9%)
Left tubal block with right hydrosalpinx	2 (1.7%)	1 (1.0%)	3 (1.4%)
Beaded tubes	2 (1.7%)	0 (0.0%)	2 (0.9%)

Tubal abnormalities were found in 78 (36.1%) infertile women out of 216 and in 25 (21.7%) and 53 (52.5%) women with primary and secondary infertility respectively. This difference in incidence of tubal abnormalities between primary and secondary infertility is statistically significant (P value = 0.001). Of the tubal abnormalities, tubal blockage was most common abnormality present in 47 (21.8%) women followed by hydrosalpinx in 24 (11.1%) women. Beaded fallopian

tube was seen in 2 (0.9%) of infertile women. (Table 4).

(Figures: 2 – 5)

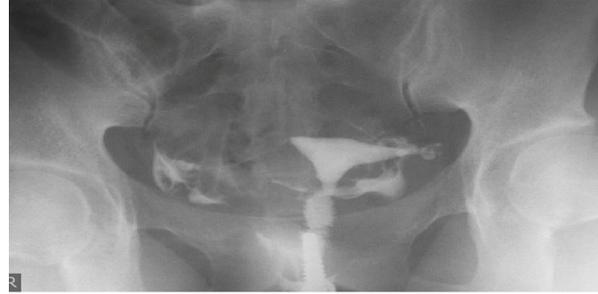


Figure 2: Normal HSG

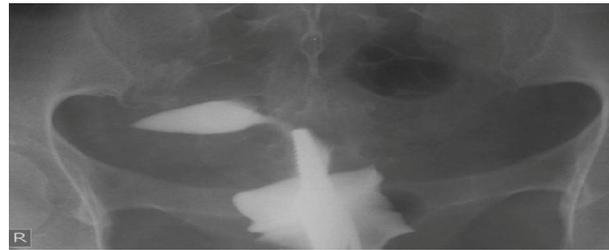


Figure 3: B/L tubal block



Figure 4: B/L hydrosalpinx



Figure 5: Bicornuate uterus

Discussion

Infertility is a global health problem with little change in its level over a period of two decades between 1990 – 2010 and can lead to various psychological and social problems to an infertile couple [5]. Hence proper evaluation of infertile couple is of paramount importance to identify its cause and plan subsequent management. HSG still remains an initial imagining modality in evaluation of uterine cavity and fallopian tube lumen of infertile women and is best imaging modality to examine fallopian tubes [6].

Majority of infertile women (53.2%) in this study had primary infertility in concordance with another study done in Nepal by Shrivastava VR et al [7], which also states higher proportion of women with primary infertility than with secondary infertility. A number of studies [8 -13] too show higher percentage of women with primary infertility as compared to secondary infertility, though in different proportions. However, in other studies [14 -24] there was preponderance of secondary infertility. In this study, abnormal HSG was seen in 44.9% infertile women, higher than 29.0% seen in study of Shrivastava VR et al [7]. Relatively comparable rate of HSG abnormality was observed in studies conducted by Nampakdianan K et al [8], Mesbahi S et al [10] and Poonam [11] which showed abnormal HSG in 38.5%, 42.0% and 52.4% women respectively. However HSG abnormalities were higher in studies of Ramzan R et al [9], Bukar et al [19], Malwadde EK et al [21], Haque S [23], Cisse R et al [24] and Danfulani M et al [25] with 61.9%, 70.6%, 83.4%, 61.7%, 62.1% and 56.1% respectively. This study showed abnormal HSG to be more associated with secondary infertility (57.4%) than with primary infertility (33.9%) (OR = 2.63, 95% CI = 1.51 – 4.57, P value = 0.001), and a women with secondary infertility 2.63 times more

likely to have an abnormal HSG compared to women with primary infertility, which is comparable to the study of Nampakdianan K et al [8] who found abnormal HSG in 32.7% and 54.0% women with primary and secondary infertility respectively. Higher number of normal HSG found in women with primary infertility suggests that the cause may be non-structural or due to male infertility factor. Hence investigation of male partner in couple with primary infertility is important and should be carried out. However, in study of Shrivastava VR et al [7] and Ramzan R et al [9] little difference was found in abnormal HSG incidence between women with primary and secondary infertility (Shrivastava VR et al - 30.0% and 27.2%, Ramzan R et al - 59.7% and 64.8%). Infertility was found to be significantly associated with tubal abnormality than with uterine abnormality in this study (36.1% versus 8.8%) (P value = 0.001). Different other studies show wide variation in occurrence of tubal abnormality with 19.0%, 28.9%, 21.0%, 42.8%, 43.5%, 40.0%, 61.8%, 45.0%, 72.9%, 38.3%, 62.0% and 35.3% in studies of Shrivastava VR et al [7], Nampakdianan K et al [8], Mesbahi S et al [10], Poonam [11], Okafor CO et al [13], Bello TO [15], Akinola RA et al [16], Lawan RO et al [18], Bukar M et al [19], Haque S [23], Cisse R et al [24] and Danfulani M et al [25] respectively. Also, uterine abnormality was seen in 4.6%, 9.6%, 25.0%, 24.8%, 14.9%, and 38.3% of infertile women in studies conducted by Shrivastava VR et al [7], Nampakdianan K et al [8], Mesbahi S et al [10], Poonam [11], Haque S [23] and Cisse R et al [24] respectively. In contrary to studies [7, 8, 11, 23, 24] which showed tubal abnormalities to be common than uterine abnormalities, the study by Mesbahi S et al [10] showed higher percentage of abnormality in uterus than in tubes (25.0% versus 21.0%).

This study showed tubal abnormalities to be higher in women with secondary infertility than with primary infertility (52.5% versus 21.7%) and is statistically significant (P value = 0.001). This finding is in agreement with that of Nampakdianan K et al [8] of 48.5% versus 21.4%, and Bello TO [15] of 44.8% versus 20.8%. Higher incidence of tubal abnormalities in secondary infertility may be due to poor health care after previous pregnancy or abortion, higher prevalence of pelvic inflammatory disease and increased risk of sexually transmitted diseases. This is in disparity with the finding of Shrivastava VR et al [7], which state no much difference in tubal abnormality between primary and secondary infertility (19.1% versus 18.7%). Of the tubal abnormalities, tubal blockage was found to be most common abnormality, present in 21.8% women followed by hydrosalpinx in 11.1%, in consistent with studies of Poonam [11] (34.3% and 5.7%), Akinola RA et al [16] (41.8% and 9.0%), Lawan RO et al [18] (32.7% and 10.5%), MalwaddeKE et al [21] (38.9% and 12.8%) and Fatima Y et al [26] (30.0% and 16.3%), although in different proportions. Tubal blockage and hydrosalpinx were found in almost similar number in study of Cisse et al [24] (25.9% and 25.3%). In contrast, Bello TO [22] found hydrosalpinx to be more common than tubal blockage (23.3% and 20.8%). Also, high incidence of hydrosalpinx (44.5%) was noted in study of Adetiloye [27]. Beaded fallopian tube was seen in 0.9% infertile women, similar as reported by Akinola RA et al [16] (0.5%) and Fatima Y et al [26] (1.3%) and lower than that reported by Ramzan R et al [9] (5.9%) and Poonam [11] (2.9%). Uterine abnormalities in this study was common in women with primary infertility compared to women with secondary infertility (12.2% versus 5.0%, P value = 0.001), in concurrence with the finding of

Shrivastava VR et al [7] (5.4% versus 2.9%) and Nampakdianan K et al [8] (9.4% versus 4.3%). Congenital uterine anomalies were seen in 4.2% and acquired abnormalities in 4.6% women. Bicornuate uterus (1.9%) was the most common congenital anomaly noted, followed by unicornuate uterus (1.4%); while fibroid (2.8%) was the most common acquired abnormality, followed by synechiae (1.9%). Comparable incidence of congenital uterine anomaly was found by Bukar M et al [19] (3.7%) and Arthur et al [28] (4.0%); lower by Shrivastava VR et al [7] (2.8%), Sanfilippo et al [29] (1.4%) and Nickerson [30] (1.6%) and higher by Ramzan R et al [9] (6.4%), Poonam [11] (20.0%), and Aziz MU et al [20] (6.2%). Bicornuate uterus was also found to be commonest congenital uterine anomaly by Bukar M et al [19] (1.8%) and Aziz MU et al [20] (4.0%), whereas unicornuate uterus was commonest in study of Shrivastava VR et al [7] (1.6%) with bicornuate uterus seen in 1.2%. Uterine fibroid (16.9%) was as well seen to be commonest acquired uterine abnormality in study of Eze CU et al [31] (synechiae 5.3%), in contrast to the finding of Bukar M et al [19] who reported synechiae (12.9%) to be common than fibroid (5.9%).

As this study was based on single center, results may not represent entire population. Findings of other investigations like hysteroscopy or laparoscopy were not available; hence precision of HSG in identifying uterine and tubal abnormalities could not be exactly determined. Therefore, further multicentric studies and additional diagnostic techniques like hysteroscopy or laparoscopy in conjunction with HSG are needed to be carried out to determine diagnostic accuracy of HSG.

Conclusion

HSG is an excellent imaging modality for evaluation of uterine cavity and fallopian tube lumen of infertile women. Women with

secondary infertility are more likely to have an abnormal HSG than women with primary infertility and tubal abnormalities are more common than uterine abnormalities. Tubal abnormalities are commonly observed among women with secondary infertility in comparison to primary infertility, whereas uterine abnormalities are common among women with primary infertility as compared with secondary infertility and are statistically significant.

Conflict of interest: There is no conflict of interest to be declared.

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Journal of Nobel Medical College

Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np
Volume 6, Number 1, Issue 10, January-June 2017, 72-76

Original Article**In Situ Extracorporeal Shock Wave Lithotripsy (ESWL) and ESWL after Push Back For Upper Ureteric Calculi: A Comparative Study**

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Received: 25th April, 2017; Revised after peer-review: 23rd May, 2017; Accepted: 20th June, 2017

Abstract**Background**

ESWL is one of the most important modality for the treatment of urolithiasis. In situ ESWL is a non-invasive and safe procedure for renal and upper ureteric stones in selected cases & can be performed on outpatient basis. However, some urologists claim a higher success rate of ESWL after push back procedures for upper ureteric calculi.

Materials & Methods

This prospective study was done to compare the results of treatment of upper ureteral calculi by in situ ESWL and ESWL after push back. 90 consenting patients with single upper ureteric stones of ≤ 1 cm in size with no distal obstruction were selected and divided into two groups. 50 patients in group 1 were treated by in situ ESWL while 40 patients in group 2 were treated by push back followed by ESWL.

Results

Better clearance was achieved with ESWL after push back (92.5% clearance after 90 days) than with in situ ESWL (90% clearance after 90 days) but it was not statistically significant ($p > 0.05$). The mean shock wave was 1994 ± 449 for in situ ESWL group and 1757.5 ± 255 for ESWL after push back group, which was statistically very significant ($p < 0.01$). The mean energy used was 5.07 ± 0.81 in the in situ ESWL group and 4.6 ± 0.48 in ESWL after push back group and this difference was also statistically significant ($p < 0.01$). Post procedure complications like loin pain, hematuria, lower urinary tract symptoms (LUTS) and fever were more common in ESWL after push back group than in the in situ ESWL group and the differences were statistically significant.

Conclusion

In situ ESWL is a better option than ESWL after push back for the management of upper ureteric stones in selected group of patients.

Key Words: ESWL, Pushback, Stone clearance, Upper ureteric stones

Introduction

Urolithiasis is the third most common disease of the urinary tract, urinary tract infections and pathological conditions of the prostate being the first and second respectively [1]. There are various modalities of treatment of stone disease

ranging from open surgical procedures to non-invasive ESWL; in between these two are minimally invasive PCNL, URS and laparoscopic removal. Most of the urologist prefers ESWL as it is non-invasive and safe procedure [2]. In the early days ESWL was used to disintegrate renal stones only and

ureterolithotomy was practiced for upper ureteral stones. However, ureterolithotomy requires anaesthesia, prolonged hospitalization and convalescence and may be associated with significant morbidity.

Ureteroscopic or percutaneous management of ureteral stones has variable success rate depending on the site of stones which is 50% in the upper ureters [3], but it also requires anaesthesia and has a complication rate of 2-4% [4].

Therefore, it was a natural extension to use ESWL for the management of ureteral stones after the success achieved in the management of renal stones. The treatment of upper ureteral calculi has been markedly altered by recent developments in shock wave lithotripsy (in situ or after push back), ureteroscopy and percutaneous stone removal. The non-invasive nature of ESWL has a strong appeal to the patients and physicians, and has become the first line treatment option for proximal ureteral stones [5]. Although some urologists claim a higher success rate of ESWL after push back procedure, the invasiveness of the additional ureteral manipulation must be considered [6]. On the other hand, in situ ESWL for uncomplicated upper ureteric calculi is appealing because it is non-invasive, requires no anaesthesia, low morbidity, low cost and can be performed as an outpatient therapy and offers acceptable results. So, this study has been done to compare the results of treatment of uncomplicated upper ureteral calculi by in situ ESWL and ESWL after push back.

Materials and Methods

This prospective study was done in the Department of Urology, Morang Sahakari Hospital, Biratnagar from April 2015 to April 2017 after getting institutional ethical clearance. 90 patients with single upper ureteric stones of ≤ 1 cm in size with no distal obstruction were selected and divided into two groups. Stones located

< 2 cm lateral to the spine, size > 1 cm in size, pregnant women and patients with bleeding disorders were excluded from the study. After taking the informed consent, 50 patients of group 1 was treated by in situ ESWL while 40 patients of group 2 was treated by push back followed by ESWL. In all case, ESWL was done by Allengers UROLITH⁺ lithotripter.

All patients were thoroughly examined and routine investigations done. IVU was done in all patients to see the condition of kidneys, grade of hydronephrosis, location and size of stone. All patients were advised to take mild laxative and ultracarbon in the night before ESWL. All patients were given nothing per oral from morning on the day of procedure and were given intravenous fluid & diclofenac suppository half hour prior to the procedure. Additional analgesia or sedation was given on demand basis. In patients of group 2, a pre-ESWL push back procedure was done under spinal anaesthesia and fluoroscopic guidance. After dislodging the stone back into the kidney, a DJ stent was kept in situ and ESWL was done.

After ESWL, all patients were advised to follow up after 7 days with a plain X-ray of KUB region, and if necessary second & third session of ESWL were given at one-week interval. If the stone fails to clear after third session, the patient was observed for 90 days to see stone clearance. Refractory cases were referred for other modalities of treatment. The data were analysed using SPSS version 16. Students- t test and chi- square test were used and p-value of < 0.05 was considered significant.

Results

50 patients were treated by in situ ESWL (Group 1) while 40 patients were treated by push back followed by ESWL (Group 2). The demographic and baseline characteristics of the patients are shown in

Table I. The mean age in both groups was approximately 35 years. Most of the patients were males with the left ureter being involved predominantly (70 – 75%).

Table I: Demographic & baseline characteristics among the groups

Characteristics	Group 1 (N = 50)	Group 2 (N = 40)
Mean age ± SD Range (years)	34.86 ± 11.74 17-62	35.12 ± 14.48 16-62
Sex distribution		
Male	32 (64%)	30 (75%)
Female	18 (36%)	10 (25%)
Involved ureter		
Left	35 (70%)	30 (75%)
Right	15 (30%)	10 (25%)
Size of stone		
< 1 cm	28 (56%)	15 (37.5%)
1 cm	22 (44%)	25 (62.5%)

The outcome variables were stone clearance rates (table II), ESWL sessions required, shock wave & energy required, post procedure complications and hospital stay (table III).

Table II: Stone clearance rates between the groups.

Stone clearance rates	Group 1 (in situ)	Group 2 (push back)	p-value
Clearance after 1 st session			
< 1 cm	18 (36%)	8 (20%)	> 0.05 ⁿ
1 cm	10 (20%)	13 (32.5%)	
Clearance after 2 nd session			
< 1 cm	5 (10%)	5 (12.5%)	> 0.05 ⁿ
1 cm	7 (14%)	7 (17.5%)	
Clearance after 3 rd session			
< 1 cm	3 (6%)	2 (5%)	> 0.05 ⁿ
1 cm	2 (4%)	2 (5%)	
Overall clearance after 90 days			
< 1 cm	26 (92.86%)	15 (100%)	> 0.05 ⁿ
1 cm	19 (86.36%)	22 (88%)	

ⁿχ² test was not significant

Table III: Number of ESWL sessions, shock wave & energy required, complication & hospital stay between the groups.

Variables	Group 1 (in situ)	Group 2 (push back)	p-value
Avg. ESWL sessions required(n)			
< 1 cm	1.54	1.46	
1 cm	1.77	1.48	> 0.05 ⁿ
Shock waves required (n)			
Mean ± SD	1994 ± 449	1757 ± 255	< 0.01*
Range	1500-5000	1000-2000	
Energy required (KV)			
Mean ± SD	5.07 ± 0.81	4.63 ± 0.48	< 0.01*
Range	4-8	4-6	
Complications (n)			
LUTS	12 (24%)	28 (70%)	< 0.001 ^a
Loin pain	20 (40%)	25 (62.5%)	< 0.01 ^a
Fever	5 (10%)	12 (30%)	< 0.01 ^a
Haematuria	15 (30%)	28 (70%)	< 0.001 ^a
Hospital stay (days)			
Mean ± SD	1.06 ± 0.24	2.4 ± 0.74	< 0.001*
Range	1-2	2-5	

ⁿχ² test was not significant; * t test was significant; ^aχ² test was significant

Discussion

In the in situ ESWL group, 28 (56%) cases were cleared of stone after 1 week of first session, among which 18 (36%) were < 1 cm in size and 10 (20%) were 1 cm in size. However, the higher clearance rate of the smaller stones was not statistically significant. It was also observed that 12 (24%) cases required second and 5 (10%) cases required third sessions for complete clearance of stone. Overall clearance was achieved in 45 (90%) cases after 90 days in this group. These findings are similar to those by El-Gammal et al. who reported 94.8% clearance rate for upper ureteric stones treated by ESWL in situ with 66.7%

patient stone free after first session, 17.7% needed two sessions and 8.5% required three sessions [7]. Similarly, Shameen et al. also reported good results with 96.6% stone free rates in a study on 118 patients of ureteral stones of mean 11.1 mm in size treated with in situ ESWL using Lithostar plus lithotripter [8].

In the ESWL after push back group, 21 (52.5%) cases were cleared of stone after 1 week of first session, among which 8 (20%) were <1 cm in size and 13 (32.5%) were 1 cm in size. However, the higher clearance rate of the larger stones was not statistically significant. It was also observed that 12 (30%) cases required second and 4 (10%) cases required third sessions for complete clearance of stone. Overall clearance was achieved in 37 (92.5%) cases after 90 days in this group. Although more clearance rate was achieved in ESWL after push back, it was not statistically significant ($p > 0.05$). Danuser et al. also reported 96% stone free rates at 3 months after ESWL in situ and 94% stone free rate at 3 months after push back followed by ESWL [6]. Similarly, Kumar et al. in a similar comparative study showed 80% clearance rate in group 1 and 88.5% clearance in group 2 at 3 months [9]. These results compare favourably with our study although making comparison between them is difficult since the criteria for disintegration and the type of lithotripter used varied.

The number of average ESWL sessions in our study was 1.54 for stone <1 cm and 1.77 for stone of 1 cm in the in situ ESWL group (group 1), whereas it was 1.46 and 1.48 respectively for stones <1 cm and of 1 cm respectively in the push back followed by ESWL group (group 2). Although less number of ESWL sessions were required in push back group, it was not statistically significant. In a study by Kumar et al., the number of average sessions was 1.86 ± 1.2 and 2.03 ± 1.2

respectively for in situ ESWL & ESWL after push back [8].

In our study, more shock wave and energy was needed in the in situ ESWL group than in ESWL after push back group. The mean shock wave was 1994 ± 449 for group 1 and 1757.5 ± 255 for group 2. The difference between the two groups was statistically very significant ($p < 0.01$). The mean energy used was 5.07 ± 0.81 in group 1 and 4.6 ± 0.48 in group 2 and this difference was also statistically significant ($p < 0.01$). However, Danuser et al. found that more shock wave and energy was required for in situ ESWL rather than ESWL after push back [6].

Post procedure complications like loin pain, haematuria, lower urinary tract symptoms (LUTS) and fever were more common in group 2 than in group 1 in our study and the differences were statistically highly significant. All these complications were treated by conservative measures. Similarly, the mean hospital stay was 1.06 ± 0.24 days for group 1 while it was 2.4 ± 0.74 days for group 2 which is again highly significant ($p < 0.001$). Hendrix et al. in a similar study reported an average hospital stay of 0.85 and 1.2 days for in situ ESWL and ESWL after push back groups respectively [10].

Although exact cost of the procedure could not be determined, the cost of group 2 was higher due to the charges for the push back procedure in addition to the charges of ESWL. For ESWL and patients in group 1, they have to pay only a one-time charge of Rupees 25000 irrespective of the number of sessions required. Moreover, the mean hospital stays in group 2 was longer with more working day loss for the patient. Thus, ESWL after push back was costlier than in situ ESWL.

Conclusion

Considering the findings of this study, it can be concluded that in situ ESWL is a

better option than ESWL after push back for the management of upper ureteric stones in selected group of patients and thereby avoids a more invasive procedure. Besides, ESWL after push back may be reserved for the case that fails to clear the stones after in situ ESWL. A major limitation of this study was the non-homogenous nature of study subjects, so further study with homogenous and large sample size is recommended to determine the optimum treatment option for upper ureteric stones more precisely.

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Journal of Nobel Medical College

Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np
Volume 6, Number 1, Issue 10, January-June 2017, 77-82

Original Article

Comparison of Oral Health Related Quality of Life (OHRQoL) in Hypodontia Patients and Patients with Acquired Missing Teeth

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Received: 12th May, 2017; Revised after peer-review: 18th June, 2017; Accepted: 7th July, 2017

Abstract

Background:

Hypodontia is the developmental absence of one or more teeth from the dentition whereas acquired missing teeth are those lost due to caries, periodontal problem or dental trauma. Patients with congenitally missing teeth suffer aesthetic, functional and psychological morbidity to various degree through childhood, adolescence and adulthood. Greater understanding of the impact of hypodontia on patient's quality of life is very important. Oral health related quality of life (OHRQoL) is considered as an outcome measure to evaluate the consequences of edentulism and the available treatment options.

Material and Methods:

A cross-sectional comparative survey was carried out in the department of Prosthodontics, de'Montmorency College of Dentistry/Punjab Dental Hospital Lahore from 02/03/2010 to 01/09/2010. Total 80 partially dentate patients were studied which included 40 hypodontia patients and 40 patients with acquired missing teeth. All patients were given OHIP-14 questionnaire and responses were recorded on 5-point Likert scale. The mean scores of the two groups were calculated and compared using chi square test.

Results:

The total OHIP scores in hypodontia patients was more compared to that in patients with acquired missing teeth and difference was significant in the patient group with 4-5 missing teeth.

Conclusion:

As the missing teeth number increased, it was found that the OHRQoL in hypodontia patients was more impaired compared to the OHRQoL in patients with acquired missing teeth.

Keywords: *Hypodontia, Oral Health Related Quality of Life (OHRQoL), Oral Health Impact Profile (OHIP).*

Introduction:

The causes of tooth loss can be either acquired or congenital. Hypodontia is the term used to describe the developmental absence of one or more teeth from the

dentition, excluding the third molars and constitutes one of the most common anomalies in human [1]. Lack of one or two permanent teeth, with no associated systemic disorders, is the mildest and the

most common phenotype. Prevalence of hypodontia ranges from 2.6-11.3% [2].

Teeth have an important role in facial appearance, speech and eating ability. Hence, patients with congenitally missing teeth suffer aesthetic, functional and psychological morbidity to various degree³. Along with missing teeth, these patients suffer characteristic changes in teeth, alveolar volume deficiencies and skeletal jaw mal-relationships [3]. Hence the functional and psychosocial impact is more profound in these patients [4].

Oral health related quality of life (OHRQoL) has been considered as an outcome measure to assess the consequences of missing teeth and available treatment options [5]. It provides an insight into the potential consequences of edentulism to the daily lives of patients and hence facilitates understanding of its importance in the providing oral health services [5].

Oral Health Impact Profile (OHIP) is one of the most comprehensive instruments used to measure OHRQoL. It comprises of 49 item questionnaires with statements divided into seven conceptually formulated dimensions (functional limitation, physical pain, psychological discomfort, physical, psychological and social disability and handicap) [6-7]. The fourteen-item short form (OHIP-14) was later developed for the setting where full set of 49 questionnaires was inappropriate [8]. There is overwhelming evidence showing the negative effect of acquired tooth loss on OHRQoL [9-11]. But the available information on OHRQoL in patients with hypodontia is scarce. Wong et al⁵ in a study concluded that severe hypodontia considerably impacts OHRQoL. Hence the aim of the study was to compare the OHRQoL in patients with hypodontia and patients with acquired missing teeth.

Material and Methods:

The study sample was 80 with two groups of 40 each. Hypodontia patients were included in Group A and patients with acquired missing teeth in Group B. These patients were recruited from the outdoor of department of Prosthodontics, Punjab Dental Hospital. Informed consent was taken for each subject and they were asked to fill a questionnaire eliciting information on demographic factors. In addition, a self-administered questionnaire called OHIP-14 (Annexure 1) was used to measure OHRQoL. The questionnaire consisted of 14 questions.

Responses were made on 5-point Likert scale and coded as (0=never: 1=hardly ever: 2=occasionally: 3=fairly often: 4=very often). The scores on Likert scale is inversely proportional to the improvement in OHRQoL.

The criteria for inclusion in the study were patients between 15 and 30 years of age and with less than 6 missing teeth (hypodontia and acquired missing teeth patients assessed clinically, radiographically and by history). Exclusion criteria were patients who were edentulous in one arch and partially dentate in opposing arch and those who were unable to understand the questionnaire.

Statistical analysis:

SPSS software version 11 was used to analyze the data. Age and OHRQoL was presented using mean and standard deviation and gender by frequency and percentage. The results were presented in tabular form and the two groups compared for OHRQoL scores by using chi square test. P-values ≤ 0.05 was considered to be significant. Total OHIP score was stratified for number of missing teeth (≤ 3 , > 3) to address effect modifier.

Results:

The mean age of hypodontia patients was 22.2 ± 4.66 years and that of acquired missing teeth patient was 25.2 ± 4.08 . In the hypodontia group, there were 13 males and 37 females whereas in the acquired missing teeth group, there were 18 males and 22 females.

In patients with 1-3 missing teeth, total OHIP score in hypodontia group was 13.59 ± 7.10 and that in patients with acquired missing teeth was 11.10 ± 5.11 with no significant difference between the two groups.

In patients with 4-6 missing teeth, total OHIP scores in hypodontia patients was 22.74 ± 7.62 and that in patients with acquired missing teeth was 12.20 ± 5.06 with a significant difference found between the two groups (Table 1).

In the analysis of the questions, it was found that there was no significant difference between the hypodontia patients and acquired missing teeth patients in the domain of functional limitation, physical pain, physical disability, social disability and handicap (Table 2,3,5,7,8,9). However significant difference was found in the domain of psychological discomfort and psychological disability between the two groups, the impact being more in the hypodontia patients (Table 4, 6).

Table 1: Comparison of ohrqol in hypodontia patients and patients with acquired missing teeth

Number of missing teeth	Missing teeth	Total patients	Total score	Level of significance
1-3 teeth missing	Hypodontia	17	13.59 ± 7.107	0.225 (not significant)
	Acquired missing teeth	20	11.10 ± 5.119	
4, 5 teeth missing	Hypodontia	23	22.74 ± 7.623	0.000 (significant)
	Acquired missing teeth	20	12.20 ± 5.064	

Table 2. Functional limitation

Responses	Question 1		Question 2	
	Trouble pronouncing words		Taste worse	
	Hypodontia patients	Acquired missing teeth patients	Hypodontia patients	Acquired missing teeth patients
Never	12	20	34	38
Hardly ever	5	8	4	2
Occasionally	16	9	1	0
Fairly often	5	2	1	0
Very often	2	1	0	0
P value	0.180		0.409	

Table 3. Physical pain

Responses	Question 3		Question 4	
	Painful aching		Uncomfortable to eat food	
	Hypodontia patients	Acquired missing teeth patients	Hypodontia patients	Acquired missing teeth patients
Never	17	21	8	12
Hardly ever	13	10	16	5
Occasionally	9	9	9	15
Fairly often	1	0	5	7
Very often	0	0	2	1
P value	0.612		0.068	

Table 4. Psychological discomfort

Responses	Question 5		Question 6	
	Felt conscious		Felt tense	
	Hypodontia patients	Acquired missing teeth patients	Hypodontia patients	Acquired missing teeth patients
Never	2	4	3	7
Hardly ever	3	5	5	5
Occasionally	9	19	6	12
Fairly often	12	12	7	10
Very often	14	0	19	3
P value	0.001 (significant)		0.002 (significant)	

Table 5. Physical disability

Responses	Question 7		Question 8	
	Unsatisfactory diet		Interrupted meals	
	Hypodontia patients	Acquired missing teeth patients	Hypodontia patients	Acquired missing teeth patients
Never	12	20	34	38
Hardly ever	5	8	4	2
Occasionally	16	9	1	0
Fairly often	5	2	1	0
Very often	2	1	0	0
P value	0.180		0.409	

		missing teeth patients		missing teeth patients
Never	5	7	17	19
Hardly ever	8	13	15	11
Occasionally	12	13	6	9
Fairly often	11	7	1	1
Very often	4	0	1	0
P value	0.168		0.676	

Table 6. Psychological disability

Responses	Question 9		Question 10	
	Difficult to relax		Felt embarrassed	
	Hypodontia patients	Acquired missing teeth patients	Hypodontia patients	Acquired missing teeth patients
Never	6	23	6	15
Hardly ever	12	10	2	8
Occasionally	12	5	9	8
Fairly often	9	2	16	7
Very often	1	0	7	2
P value	0.001 (significant)		0.008 (significant)	

Table 7. Social disability

Responses	Question 11		Question 12	
	Irritable with others		Difficulty doing job	
	Hypodontia patients	Acquired missing teeth patients	Hypodontia patients	Acquired missing teeth patients
Never	35	39	33	39
Hardly ever	2	1	6	1
Occasionally	2	0	0	0
Fairly often	1	0	1	0
Very often	0	0	0	0
P value	0.149		0.135	

Table 8. Handicap

Responses	Question 13		Question 14	
	Less satisfying life		Unable to function	
	Hypodontia patients	Acquired missing teeth patients	Hypodontia patients	Acquired missing teeth patients
Never	25	30	35	38
Hardly ever	11	8	4	2
Occasionally	2	2	1	0
Fairly often	2	0	0	0
Very often	0	0	0	0
P value	0.201		0.409	

Discussion:

The study compared OHRQoL of hypodontia patients with acquired missing teeth patients as both groups represent partially dentate subjects with similar treatment needs. The prevalence of severe hypodontia is very less. Fowler et al [12] in a study found the prevalence of severe hypodontia to be less than 1%. Hence patients with mild to moderate hypodontia (<6 missing teeth) has been included in this study.

Among the various oral health status measures available for measuring OHRQoL, OHIP is one of the most widely used questionnaire. Studies by Maria et al [13], Mike et al [14] and Ozahayt et al [15] have used OHIP to assess OHRQoL in patients with missing teeth. In this study also, OHIP has been used to assess the QOL between hypodontia and acquired missing teeth patients. Patients aged 15-30 was included in the study as these age group patients would have better understanding of the questionnaire.

In patients with 4-5 missing teeth, significant difference was found in the total OHIP scores between hypodontia and acquired missing teeth patients with the OHRQoL being more impaired in the hypodontia group. As the severity of hypodontia increases, the functional and psychosocial problems which these patients face also increases, hence the impact on QOL also increases. Studies by Wong et al [5] and Ide et al [9] support this finding in which they found a strong correlation between number of missing teeth and higher OHIP scores.

In the analysis of the questionnaire, significant difference was found between the two groups in the domain of psychological discomfort and psychological disability with the scores being more for hypodontia patients. The reason could be that hypodontia patients suffer the impact of missing teeth through their early

childhood which might affect their self-esteem, self-confidence and their psychosocial wellbeing. The range of problems that these patients face is greater as the remaining teeth present maybe malformed, malaligned and the condition maybe associated with a syndrome. Study by Wong et al [5] supports this finding in which he assessed the OHRQoL impact among children with severe hypodontia using CPQ and he found that majority of them (88 %) reported OHRQoL impact in the psychological domain.

No significant difference was found in the domain of functional limitation, physical pain, physical disability, social disability and handicap between the two groups. The reason could be that both groups represent partially dentate subjects with less than 6 missing teeth, hence the degree of problem encountered by these patients with regards to speech, taste alteration, painful aching of jaws, difficulty in eating, unsatisfactory diet, dissatisfaction with life and inability to function could have been similar.

Conclusion:

The study found an impaired OHRQoL in hypodontia patients compared to acquired missing teeth patients as the number of missing teeth increased. The domain of psychological discomfort and psychological disability was more affected in the hypodontia group, thus suggesting that the psychosocial impact is more in this group. There is a wealth of research into the prevalence and probable etiology of hypodontia but there has been little understanding of how hypodontia affects the person functionally, socially and emotionally. Vast number of studies have been done on OHRQoL in patients with acquired missing teeth but there are hardly any studies done on OHRQoL in hypodontia patients. Hence, this study thus highlights the importance of understanding the impact of hypodontia on quality of life.

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Journal of Nobel Medical College

Available Online: www.nepjol.info, www.nobelmedicalcollege.com.np

Volume 6, Number 1, Issue 10, January-June 2017, 83-85

Case Report

A Rare Site Mandibular Condyle Osteochondroma Complicated by Fracture

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Received: 18th February, 2017; Revised after peer-review: 4th March, 2017; Accepted: 20th March, 2017*

Abstract

Osteochondromas are most common benign bone tumor occurring at the metaphyseal region of long tubular bone but rarely seen at maxillofacial region with less than 100 cases of mandibular condyle osteochondromas reported in literature. This article reports a rare case of mandibular condyle osteochondroma with associated fracture in 32 years old female patient presenting with sudden onset of severe pain at right preauricular region following yawning.

Key Words: *Computed tomography, Fracture, Mandibular condyle, Osteochondroma, Temporomandibular joint.*

Introduction:

Osteochondroma as defined by world health organization (WHO) "is a cartilage capped bony projection arising on the external surface of bone containing a marrow cavity that is continuous with that of the underlying bone" [1]. Majority of osteochondroma are solitary, however approximately 15% are multiple and associated with hereditary multiple osteochondromas [2]. It is most common benign tumor of bone occurring in 3% of population and constitutes 35 - 50% and 8 - 15% of all benign and primary bone tumors respectively [2, 3]. Osteochondromas occur in a bone with embryonic development by endochondral ossification [4] and most commonly occur in metaphyseal region of long tubular bone (femur, humerus, tibia) with rare occurrence in maxillofacial region [5]. Usually osteochondromas are asymptomatic and found incidentally with most common clinical symptom being long

standing slowly growing hard mass, but may present with symptoms due to complications like bony deformity, vascular compromise, nerve impingement, fracture, overlying bursa formation and rarely malignant transformation [1,6].

This article reports a case of osteochondroma in a rare site at mandibular condyle complicated by fracture.

Case presentation:

A 32 years old female patient presented with sudden onset of severe pain at right preauricular region for 2 days following yawning. She also gave history of slowly growing painless hard swelling at right preauricular region, facial asymmetry, progressive difficulty in opening of mouth and in mastication and crowding of tooth for last 2 years. No history of previous trauma or surgery was present. On clinical examination malocclusion, facial asymmetry with deviation of midline

towards right side, limitation of mouth opening and a bony hard swelling of size approximately 1.5 x 1.5 cm at right temporomandibular joint (TMJ) region were noted. There was tenderness over the swelling, however overlying skin was normal. Patient was then referred for computed tomography (CT) of TMJ, which showed a well-defined bony outgrowth originating from medial surface of right mandibular condyle and extending superiorly with continuation of cortex and medullary cavity of bony outgrowth and parent bone. Associated fracture was seen at the base of bony outgrowth. Left TMJ was normal. (Figure: 1, 2). After correlating clinical and radiological findings diagnosis of right mandibular condyle osteochondroma with fracture was made. Surgical resection of the lesion was done and diagnosis of osteochondroma confirmed by histopathology.

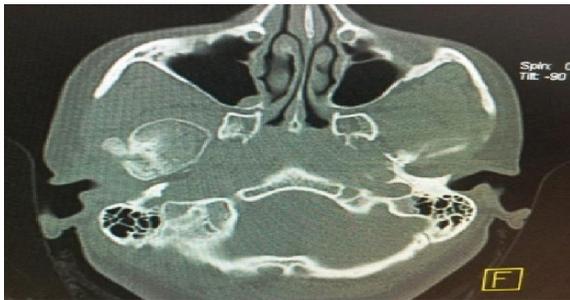


Figure 1

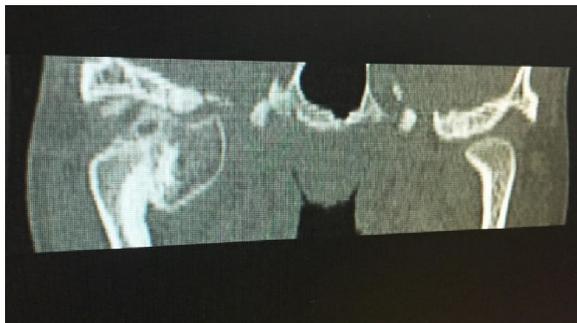


Figure 2

Figure 1 & 2: Axial and coronal CT scan images showing a well-defined bony outgrowth originating from medial surface

of right mandibular condyle with fracture at the base of bony outgrowth.

Discussion

Although osteochondromas most commonly occur at metaphyseal region of long tubular bone, they are rarely seen in maxillofacial region [5]. In maxillofacial region, they are reported in skull, skull base, maxillary sinuses, posterior maxilla, zygomatic arch and in mandibular condyle, coronoid process, ramus, body and symphysis [3,7]. Less than 100 cases of mandibular condyle osteochondromas are reported in literature [5,7,8] with majority (55.9%) arising from medial aspect of condyle in one of the case series [9], as seen in this case. The exact etiology for origin of mandibular condyle osteochondroma is still not clear with trauma and inflammation suggested as contributory factors [4]. Also, controversies regarding nature of the lesion being developmental, neoplastic or reparative exists [3,4]. The theory of aberrant foci of epiphyseal cartilage on the surface of bone is supported by occurrence of osteochondroma in the condyle [10]. According to another theory, stress in the tendinous insertion region of lateral pterygoid muscle where focal accumulations of cells with cartilaginous potential exist leads to formation of these tumors [11]. Hard swelling at the region of TMJ, facial asymmetry, difficulty in mouth opening, cross bite to the contralateral side, malocclusion, TMJ pain, clicking and recurrent joint dislocation are common symptoms of mandibular condyle osteochondroma [8,9] but may also present due to complications like fracture, as the patient did in this case. Radiological investigation includes radiograph and CT scan of TMJ. Panoramic radiograph shows well defined radioopacity with distinct border at the region of mandibular condyle. CT scan plays significant role in diagnosis

and preoperative treatment planning of the lesion. Bony outgrowth with continuity of its cortex and medullary cavity with that of parent bone can easily be demonstrated by CT scan, which is the most important diagnostic feature of osteochondroma. Coronal images give better anatomical details and relationship of outgrowth and parent bone. Even though non-calcified cartilaginous cap is not seen with CT scan, it has high accuracy for demonstration of calcified cartilage. Also, CT scan plays vital role in differential diagnosis, particularly differentiating mandibular condyle osteochondroma from unilateral condylar hyperplasia and should be performed in all cases of suspected condylar osteochondroma. [4,7,12]. Other differential diagnosis to be considered include osteoma, benign osteoblastoma, chondroma, chondroblastoma, giant cell tumor, myxoma, fibro-osteoma, fibrous dysplasia, fibrosarcoma and chondrosarcoma [13]. On histopathological examination, osteochondroma shows chondrocytes of the cartilaginous cap arranged in clusters parallel to lacunar spaces [4]. However definitive diagnosis of osteochondroma should always be made correlating clinical, radiological and histopathological findings.

Surgery is the treatment of choice for mandibular condyle osteochondroma with an aim to achieve acceptable mouth opening ranges, recovery of facial asymmetry, establish facial harmony and correction of malocclusion [4,13].

Conclusion:

Mandibular condyle is a rare site for osteochondroma, however should be considered in differential diagnosis in patients presenting with slowly growing swelling at TMJ region and facial asymmetry. Fracture of the lesion can occur resulting in sudden onset of pain at TMJ region. CT scan plays crucial role in diagnosis and preoperative treatment

planning of these lesions, hence should be performed in all cases of suspected mandibular condyle osteochondroma.

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