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Original Article

Does Combined Intravenous and Intraarticular Tranexamic Acid (TXA) offer better result for bleeding Management in Simultaneous Bilateral Total Knee Arthroplasty (BTKA) than Intraarticular use alone? - A Study of 30 Cases

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Abstract

Tranexamic acid (TXA) is efficacious for reducing blood loss and transfusion use in patients who undergo bilateral TKA, and it is administered intravenously alone, intraarticularly alone, or as a combination. The purposes of our study was to determine (1) whether combined IV and intraarticular TXA reduces blood loss and blood transfusion use compared with intraarticular use alone and (2) whether the frequency of adverse events is different between these routes of administration in patients who undergo simultaneous bilateral TKA. Between April 2015 to March 2019, we performed 36 simultaneous bilateral TKAs in CMH Dhaka & CMH Chattogram. Of those, 98% of patients were eligible for this randomized trial and all of those patients agreed to participate in the study. The study included two groups: one simultaneous BTKA with intraarticular TXA alone (n = 15) and the other simultaneous BTKA with combined IV and intraarticular TXA (n = 15). There were no differences in demographic data among the intraarticular alone and IV plus intraarticular TXA groups in terms of age, BMI, or preoperative hematologic values. The primary outcome variables were total blood loss calculated based on patient blood volume and a drop in the hemoglobin level and administration of blood transfusion. The secondary outcomes of this study were a decrease in the postoperative hemoglobin level; the proportion of patients with a hemoglobin level lower than 7.0, 8.0, or 9.0 g/dL; and the frequencies of symptomatic deep vein thrombosis, symptomatic pulmonary embolism, wound complications, and periprosthetic joint infection. Total blood loss with intraarticular TXA alone in patients undergoing simultaneous bilateral TKA was not different from the total blood loss with the combined IV plus intraarticular TXA regimen (1050 ± 250 mL versus 904 ± 220 ml p = 0.082. The use of blood transfusions between intraarticular alone and combined IV and intraarticular TXA was also not different among two groups of patients (02 unit of blood in all 15 patients, p = 0.99) of bilateral TKA. Furthermore, the frequency of symptomatic thromboembolic events, wound complications, and periprosthetic joint infections was low, without any differences among the two groups (p-.99).

Because there was no difference between intraarticular alone and combined intraarticular plus IV regimen of TXA administration, we recommend that IV and intraarticular TXA should not be used in combination. Moreover, other studies have found no differences between intraarticular and IV TXA used alone and hence to avoid potential complications associated with systemic administration, we recommend that intraarticular alone is sufficient for simultaneous BTKA.

Key words: I/V, TXA, I/A.TXA, Bilateral, BTKA.

INTRODUCTION

Like other countries the number of TKAs continues to grow because the mean age of the population in our country continues to increase [1,2]. This rising number of TKAs and an emerging trend towards enhanced recovery after TKA has prompted to seek safer perioperative management strategies, including effective blood management[3]. Blood loss after TKA is estimated to be

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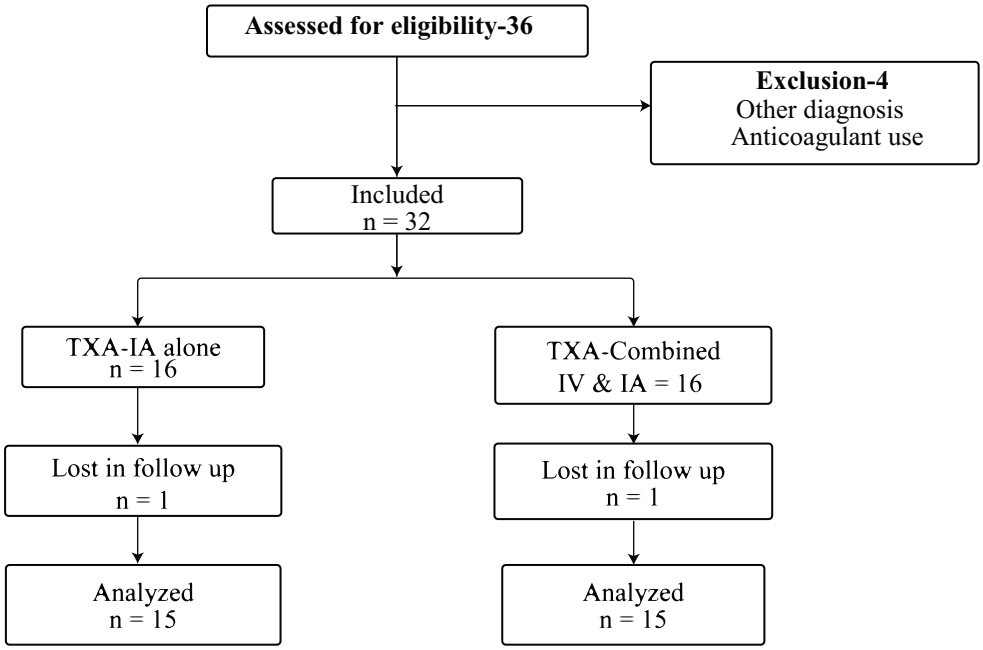
approximately 1000 mL to 1500 mL, leading to anemia in about 10% to 38% of patients [4-9]. In patients who undergo simultaneous bilateral TKA, the estimated total blood loss and the frequency of anemia are higher than in those with unilateral TKA, leading to at least a threefold increase in the use of allogenic blood transfusion [10,11]. Postoperative anemia is associated with an increased risk of hypovolemic shock, renal failure, breathlessness, fatigue, cardiac abnormality, and delayed wound healing [12-15]. Allogenic blood transfusion in patients undergoing TKA, along with hypersensitivity reactions and blood-transmitted diseases, is also associated with periprosthetic joint infections [16]. Hence, a reduction in total blood loss and the use of allogenic blood transfusions after bilateral TKA could result in better recovery, a shorter hospital stay, and reduced overall treatment costs [17,18].

During the past two decades, tranexamic acid (TXA) has been widely adopted in patients undergoing TKA because it is believed to be both safe and effective [19,20]. Several studies have recommended using TXA routinely in patients who undergo simultaneous bilateral TKA because of its efficacy in reducing blood loss and transfusion rates without increasing the occurrence of thromboembolic events [21,22]. However, current research regarding the ideal method of TXA administration in patients undergoing simultaneous bilateral TKA seems to be inconclusive [23]. Despite a low risk of adverse effects of IV TXA, concerns in the orthopaedic community persist about possible systemic effects such as thromboembolism [24,25]. However, whether combining an IV regimen with an intraarticular TXA dose—which has shown to be more effective than placebo—offers an advantage in terms of efficacy has not been evaluated [26]. Hence, the efficacy and safety of a combined IV and intraarticular TXA regimen must be compared with intraarticular TXA alone to determine the best route of administration of TXA in BTKA.

We therefore performed this randomized, controlled study to determine (1) whether combined IV and intraarticular TXA reduces blood loss and use of blood transfusion compared with intraarticular use alone and (2) whether the frequency of adverse events are not different between these routes of administration in patients who undergo simultaneous BTKA.

MATERIALS AND METHODS

We performed 36 simultaneous bilateral TKAs between April 2015 and March 2019 (Fig- 1). We only included patients with a diagnosis of primary osteoarthritis who were scheduled for bilateral simultaneous primary TKA to reduce potential confounders of the outcomes. We excluded patients with a diagnosis other than primary osteoarthritis, severe ischemic heart disease, coagulation disorders, preexisting hepatic or renal dysfunction, a history of thromboembolic disease, and those using anticoagulation therapy. As per our routine practice, patients younger than 65 years of age without any preexisting cardiovascular diseases were offered simultaneous bilateral TKA subject to the agreement and consent from the patient.



[The flow diagram shows the number of patients undergoing simultaneous bilateral TKA assessed and included at each stage of the randomized control trial; IA = intraarticular, IV – Intravenous, TXA - Tranexamic acid.]

Among the 36 patients who underwent simultaneous bilateral TKA, four were excluded: two had diagnoses other than primary osteoarthritis and two because they used anticoagulants. After excluding these patients, we enrolled and randomized 32 patients with simultaneous bilateral TKA into one of two TXA groups, each either intraarticular TXA alone or combined IV plus intraarticular TXA.

1. Randomization and Blinding

Patients undergoing simultaneous BTKA enrolled in this study were randomly assigned to one of two groups: intraarticular TXA alone, and combined IV plus intraarticular TXA. Informed consent was obtained from all enrolled patients. The randomization sequence was kept concealed which were opened only after inclusion criteria were satisfied. All patients and the clinical investigator who prospectively collected all clinical information were unaware of the patients' identities until the final data analysis. One patient in each of the two treatment groups was lost in follow-up at 1 week and 8 weeks duration and they were excluded from the final analysis. Hence, the numbers of patients available for the final analysis were 30 in which 15 patients of one group with simultaneous bilateral TKA were administered intraarticular TXA alone and 15 in other group of patients with simultaneous bilateral TKA were administered combined IV and intraarticular TXA.

2. Administration of TXA

Patients in the simultaneous BTKA with intraarticular TXA-only group were given 1 g of TXA with 20 ml of .5% Bupivacaine and 30 mg of ketorolac in 2 ml as made total 50 ml of cocktail by mixing normal saline was injected into the capsule, retinaculum, quadriceps and patella tendon. For patients in the simultaneous BTKA with combined IV plus intraarticular TXA group in addition to the intraarticular injection described above, IV TXA at a dose of 10 mg/kg with 100 mL of normal saline was slowly administered 10 minutes before the tourniquet was inflated, and the same dose was repeated 3 hours after the previous dose. As the mean duration of the effect of TXA is approximately 3 hours, the second IV dose of TXA was administered 3 hours after this period to extend the effect over the first 6 hours, when most bleeding occurs [10,26].

3. Perioperative Management and Surgical Procedures

We used a standard perioperative management protocol for all patients. Patients underwent a standardized medical clearance protocol in outpatient clinics to allow us to identify patients with anemia, which was defined as a hemoglobin level below 11 g/dL for men and below 10 g/dL for women. Patients with anemia were given oral iron supplements to improve their hemoglobin level, unless other underlying diseases were suspected. Patients who took aspirin, antiplatelet agents, or nonselective cyclooxygenase inhibitors were asked to discontinue the medications 1 week before surgery.

All TKAs were performed by a single senior surgeon who is specialized in knee surgery. All patients were given combined spinal and epidural anesthesia. A pneumatic tourniquet with pressure of approximately 200 mmHg above the systolic blood pressure was used in all patients. The standard medial parapatellar approach was used. The surgical steps were meticulously performed to minimize the risk of bleeding. The medullary canal of the femur was plugged with a bone block after all bone cuts were made and before the prosthesis was fixed with cement. Final prosthesis fixation was followed by deflation of the tourniquet and cauterization of arterial bleeders to achieve hemostasis. A closed suction drain was placed subcutaneously to reduce postoperative blood loss through the drain and to reduce the risk of wound complications [9]. After the wound was closed, a compressive dressing with ice was applied during the first 24 hours. A vacuum drain placed in the subcutaneous space was removed approximately 24 hours postoperatively, and the total amount of blood collected through the drain was calculated in milliliters. All patients were given IV ceftriaxone 1g. The first dose was given 1 hour before incision and then doses were given 12 hourly up to 7 days postoperatively.

A blood transfusion was given postoperatively to patients with a hemoglobin level less than 7 g/dL and to those with a hemoglobin level between 7 g/dL and 8 g/dL and persistent anemic symptoms such as dyspnea or tachycardia despite volume replacement. Patients with a hemoglobin level between 7 g/dL and 8 g/dL without any anemic symptoms were given IV iron and erythropoietin. No blood transfusions were given if the hemoglobin level was greater than 8 g/dL. We chose a transfusion trigger level of 7 g/dL [27]. When we performed a transfusion, we administered 1 unit of packed red blood cells at a time, and we checked the hemoglobin level after each transfusion; we continued to transfuse until the hemoglobin level was ≥8g/dL.

4. Outcome Measures

The primary outcome measures were the total blood loss and the frequency of allogeneic transfusion. The total

blood loss was calculated that is based on patient blood volume and a drop in the hemoglobin level [6]. Patients who were given an allogeneic blood transfusion based on the strict transfusion criteria were also noted.

The secondary outcomes of this study were a drop in the postoperative hemoglobin level; the proportion of patients with a hemoglobin level lower than 7.0, 8.0, or 9.0 g/dL; and the frequencies of symptomatic DVT, symptomatic PE, wound complications and periprosthetic joint infection. The drop in the postoperative hemoglobin level was calculated by subtracting the hemoglobin level on postoperative Day 5 from the preoperative hemoglobin level, unless patients were given an allogenic transfusion. If patients underwent a transfusion, the lowest hemoglobin level before the transfusion was used for the calculation. Because certain cut-off values of the hemoglobin level are frequently used as transfusion triggers, proportions of patients with hemoglobin levels below 7.0, 8.0, and 9.0 g/dL were calculated. Patients were not routinely screened for DVT; however, all symptomatic thromboembolic events were meticulously recorded. Patients with calf or thigh pain, swelling, or tenderness underwent venous doppler and Duplex ultrasonography to evaluate for the presence of DVT, and patients with chest pain, shortness of breath, or unexplained tachycardia generally underwent CT angiography to rule out PE. Thereafter, we consulted with hematologists to confirm the diagnosis and plan the treatment of diagnosed thromboembolic events. Additionally, the occurrence of wound complications such as oozing, which was defined as dressing soakage more than 5 ml from the wound beyond 2 days after surgery; superficial wound necrosis; and periprosthetic joint infection was noted. Patients were followed up after discharge at 2 weeks, 4 weeks, 6 weeks, 8 weeks, 3 months, 6 months and 1 year after surgery. The primary endpoints (total blood loss and blood transfusion rate) were noted during hospital stay whereas secondary variables such as wound complications, thromboembolic events, and periprosthetic joint infection were noted through the most recent follow-up. Mean follow-up of patients in the current study was 10 ± 2 months

There were no differences in demographic data among the intraarticular alone and combined group of patients of simultaneous bilateral TKA in terms of age (60 ± 5 years versus 62 ± 5 years; p = 0.079); proportion of female patients (66% versus 55%; p = 0.72); BMI (27 ± 3 kg/m^2 versus 27 ± 3 kg/m^2; p = 0.99); or preoperative hematologic values (11 ± 1 g/dL versus 11 ± 1 g/dL; p = 0.99); respectively (Table-I).

5. Statistical Analysis

We compared patients in two groups of each other for the primary and secondary outcome variables. Continuous variables such as total blood loss, drop in the hemoglobin level, and drained volume via vacuum drainage were tested using ANOVA significant difference test. Categorical variables such as the frequency of allogenic transfusion; proportions of patients with hemoglobin levels lower than 7.0 g/dL, 8.0 g/dL, and 9.0 g/dL; and the frequencies of venous thromboembolic events and wound complications were tested using a chi-square test. The statistical analyses were performed using the Statistical Package for Social Science (SPSS version 23.0 for Windows, Chicago, IL, USA), and p values < 0.05 were considered significant.

Table-I

Demographic data of the study groups

Veriable	Intaarticular TXAAlone	Combined $^{I}/_{V}$ and Intaarticular	p value
Number of female patient 6 (%)	10 (66%)	8 (55%)	0.72
Age year	60+5	62+5	.079
Height cm	152	152	0.14
Weight kg	65+5	65+5	0.33
BMI (kg/ml)	26+2	26-3	0.99
Pre-op – Hb-level-gm/dl	.11+2	11+2	0.99
A Partial thromboplastic time (sec)	28+2	28-2	0.99
Prothombin time	12+1	12+1	0.99
Bleeding Time	3+1	3-1	0.99
Operation time (min)	120+5	120+5	.28
Torniquite time (min)	120+10	130+10	.303

Table-II

Comparison of primary and secondary outcome variables among the two groups

Veriables		Intraarticular TXAAlone N = 15	Combined $^{I}/_{V}$ and Intraarticular TXA N = 15	p value
1.	Calculated total blood loss (ml)	1050+250	1004+.250	0.082
2.	Hemoglobin drop gm/dl	3.5+1	3.4+1	0.113
3.	Number of patients undergoing allogeneic transfusion (%)	15	15	.99
4.	Number of patient with Hemoglobin level below 7.0 gm/dl (%)	0	0	.99
5.	Number of patient with Hemoglobin level below 8.0 gm/dl (%)	9	9	.99
6.	Number of patient with Hemoglobin level below 9.0 gm/dl (%)	6	6	.99
7.	Number of patient who were given iron supplements (%)	9	9	.99
8.	Number of patient who were symptomatic - DVT	0	0	-
9.	Number of patient who were symptomatic – Pulmonary Embitison	0	0	-
8.	Number of patient who were symptomatic – Skin necrosis	0	0	-

RESULTS

We found no difference between administration route, either intraarticular alone or combined IV and intraarticular TXA treatment among patients of simultaneous bilateral TKA procedures in terms of total blood loss and use of blood transfusion (Table -2). The calculated total blood loss in patients undergoing simultaneous bilateral TKA was not different between the intraarticular TXA-only group and the combined IV and intraarticular TXA group (1050 mL ± 250 mL versus 1004 ± 250 mL, mean difference 46 mL).

The secondary outcome measures were not different between groups of simultaneous bilateral TKA with both routes of TXA administration (Table-2.) It was not different in the simultaneous TKA with intraarticular-alone and combined IV and intraarticular TXA groups (3.5 ± 1 g/dL versus 3.4 ± 1 g/dL; p = 0.113). Moreover, the proportion of patients with a hemoglobin level lower than 7.0 g/dL, 8.0 g/dL, and 9.0 g/dL were not different among patients of simultaneous bilateral TKA groups with both routes of administration. Similarly, the frequency of thromboembolic events, wound problems, and deep infection were not different between patients who underwent simultaneous bilateral TKA with both routes of administration (Table - 2). Notably, the proportion of patients experiencing symptomatic DVT, PE, and wound complications were extremely low among patients in all groups. With the numbers available, there were no differences between the intraarticular alone and IV plus intraarticular groups in terms of the frequency of wound oozing (Table -2); it was uncommon in all groups, and all patients who experienced it were successfully managed with compressive dressing and short-term immobilization (< 48 hours). Furthermore, there was no superficial wound necrosis in any patients. However, one patient with simultaneous bilateral TKA had deep periprosthetic joint infections detected at 6 months and all were treated successfully with two-stage revision.

DISCUSSION

TXA has been widely used to reduce blood loss after simultaneous bilateral TKA. Intraarticular TXA alone has shown similar or better efficacy than IV TXA alone with additional advantages like convenience and lower cost of single dose administration with potentially less risk of sytemic adverse events [28,29]. However, the efficacy of a combined IV plus intraarticular TXA regimen has been evaluated against an intraarticular TXA-alone regimen in simultaneous bilateral TKA.We therefore sought to compare the efficacy of combined IV and intraarticular TXA with that of intraarticular TXA alone. The key findings of this study were that combined IV plus intraarticular TXA does not provide an additional benefit compared with intraarticular TXA alone in terms of blood loss and the use of blood transfusion in patients undergoing simultaneous bilateral TKA. Furthermore, the frequency of adverse events such as thromboembolic episodes, wound problems, and infection were rare, with no difference between intraarticular TXA alone and combined IV and intraarticular TXA group. As there was no difference between the efficacy of intraarticular alone and combined intraarticular plus IV regimen of TXA administration, we recommend that intraarticular alone is sufficient for routine simultaneous bilateral TKA.

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In this randomized trial, combined IV and intraarticular TXA offered no benefit compared with intraarticular TXA alone in terms of blood loss and the use of transfusion in patients who underwent simultaneous bilateral TKA procedures. These study results favoring intraarticular TXA alone in patients who undergo bilateral TKA are aligned with the results of a report by Aggarwal et al. [28] who found intraarticular TXA to be better than IV TXA in terms of reducing blood loss and the use of transfusion. [30]. In contrast, other studies have reported that intraarticular TXA and IV TXA have similar efficacy [31]. Hence, the current study further supports the evidence that intraarticular alone is a favorable route of TXA administration in patients undergoing bilateral TKA. Moreover, if giving systemic TXA in bilateral TKA does not provide any additional efficacy over the intraarticular-alone regimen, perhaps we should not do so, because systemic administration may expose patients to systemic risks [32]. Furthermore, the intraarticular-alone TXA regimen, with its more convenient administration and lower cost due to single dosing, should be a more reasonable choice over a combined IV and intraarticular regimen.

The frequency of serious adverse events such as symptomatic thromboembolism was low and not different between the two routes of TXA administration. Caution in terms of venous thromboembolic events such as DVT and PE is warranted with the use of antifibrinolytic agents such as TXA with combined IV and intraarticular TXA. However, no patients in this study had symptomatic DVT or PE. This reiterates that TXA safely reduces blood loss in patients undergoing simultaneous bilateral TKA, as reported in many studies [33,34]. Furthermore, the frequency of wound complications and infection was low and not different which concurs with the results of other studies [28,29].

CONCLUSIONS

Since there was no difference between the intraarticular alone and the combined intraarticular plus IV regimen of TXA administration, we recommend that TXA should not be used in combination. Moreover, other studies have found no differences between intraarticular and IV TXA used alone [27,28] and hence, to avoid potential systemic complications associated with systemic administration, we recommend that intraarticular alone is sufficient for bleeding management in simultaneous BTKA.

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Original Article

Evaluation of the outcome of Surgical Management of three-part proximal humeral fractures, by PHILOS Plate

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Abstract:

Operative treatment of proximal humerus fracture remains a significant challenge. These fractures are frequently comminuted and are often associated with poor quality bone. Accurate reduction and stable fixation of proximal humeral fractures remain a technically demanding procedure in shoulder surgery. The aim of this study was to evaluate the results of the treatment of three-part proximal humeral fractures fixed by PHILOS plate at NITOR. This prospective observational study was conducted from July 2016 to June 2018 at the National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Dhaka. Thirty (30) patients with proximal humeral fracture were treated open reduction and internal fixation by PHILOS plate. The mean age of the patients was 39.0±11.7 years and the youngest and the oldest one was 20 and 58 years respectively. Majority of the patients were male (90.0%) and business (30.0%) was their main occupation. There was fracture involving right sided 19(63.33%) and left sided 11(36.66%). Only one (3.33%) patient developed avascular necrosis. Mean Constant score was 65.6±15.4. Evaluation of the outcome at average 6 months follow up showed that 3(10.0%) patients had excellent outcome, 14(46.7%) patients had good outcome, 8 (26.7%) patients had fair outcome and 5(16.7%) patients had poor outcome. The result of the study demonstrates that PHILOS plate fixation appears to be a good option for three-part proximal humeral fractures with good to excellent functional outcome.

Keywords: PHILOS Plate, Proximal humerus, Neers 3 part, fractures

INTRODUCTION

Proximal humerus fractures account for 4–6% of all fractures and 25% of humerus fractures.[1]They occur most commonly in the elderly. Most of these fractures are stable and can be treated conservatively. However unstable displaced fractures have high morbidity, especially in older patients. In the younger patients, high energy trauma frequently results in unstable displaced fracture. All these necessitates open or closed reduction and internal fixation.[2]The Neer system is commonly used to classify the proximal humeral fractures. It is based on the presence or absence of displacement or angulation of one or more of the four major segments of the proximal humerus[3, 4]. Based on the epiphyseal line the four major segments of the proximal humerus are the anatomical head, the greater and lesser tuberosities, and the proximal shaft. Associated

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anterior or posterior dislocation of the humeral head can be easily incorporated into this classification system.

Over the last decades several techniques have been applied to the treatment of proximal humeral fractures.[5]The treatment goal is to achieve a painless shoulder with full function. Various methods have been used, including kirschner wire fixation, suture fixation, external fixation, tension band fixation, rush nail fixation, intramedullary nailing, and prosthetic replacement. Conservative therapy for proximal humeral fracture does not result in an acceptable functional outcome. Treatment has been carried out with K-wire, suturing and tension band wiring, with only partial success.[6]

The proximal humeral internal locking system (PHILOS) plate is a part of the latest generation of locking compression plates that is designed specifically for fractures of proximal humerus. The PHILOS plate has locking screws that provide angular stability and better hold even in osteoporotic bone. The screws are placed in converging and diverging directions to provide an optimal repartition of the screws and a stable fixation. Biomechanical studies have confirmed this to be of benefit over conventional plate fixation via unlocked screws. This secure reduction allows early postoperative mobilization. Multiple holes in the proximal part of the plate are also available for suture anchors to the rotator cuff to help the soft tissue augmentation. The PHILOS plate can therefore provide an excellent stable construct even in multifragmented osteoporotic proximal humerus fracture.[7]This secure fixation allows early postoperative mobilization. The aim of our study was to evaluate the functional outcome of proximal humerus fractures (Neers 3 part) treated with PHILOS (Proximal humeral internal locking system).

METHODS

This prospective observational study was conducted on 30 consecutive patients who underwent open reduction and internal fixation of proximal humerus fractures (Neers 3 part) with PHILOS plate from July 2017 to June 2019 at National Institute of Traumatology & Orthopaedic Rehabilitation (NITOR), Sher-e-Bangla Nagor, Dhaka-1207, Bangladesh. Approval was taken from institutional review board before initiation of study. Inclusion criteria for this study were patients with closed displaced three-part fractures, ages between 20 to 65 years, 3, without any neurological deficit, early case (0-14 days). Patients with associated dislocation of shoulder and failure of conservative treatments were included. Pathological fractures and metastatic tumors are excluded from the study. All patients were followed up to a minimum of 12 months. All patients were operated by a senior Orthopaedic Surgeon. Antero posterior, lateral and axillary radiographs are undertaken pre operatively and reviewed for proper Neer classification.[3] Patient demographic data, comorbidities and mechanism of injury were noted and temporary splint were given. Postoperatively patient was given a sling. Postoperative radiographs were reviewed for union at 1, 6 and 12 months. Functional outcome was also assessed by using Constant Shoulder Score and radiographic union score was assessed at 3 and 6 months. After taking inform and written consent with the patients, all patients were operated under general anesthesia. Beach chair position was made and prophylactic antibiotic was given preoperatively. Standard delto pectoral approach was made and cephalic vein was retracted laterally. Conjoint tendon was lifted and fracture was reduced mainly by applying sutures to rotator cuffs and temporarily held with K wires. PHILOS locking plate was applied on lateral aspect after identifying and protecting long head of biceps. Aiming device was used and is attached on the proximal part of plate and a wire was passed in humerus head to prevent proximal migration of plate. Plate was fixed with locking screws in both proximal and distal segments. Final position of implant was assessed with use of image intensifier in different planes. All patients were given sling postoperatively. Patients were given antibiotics for 48 hours and were discharged. All patients were followed after 2 weeks for stitch removal. Serial x-rays were performed at 1, 6, 12months to observe radiological union. Active and passive range ofmotion was started under supervision of senior physiotherapist after 3 weeks of surgery.

RESULT

Among the 30 patients 9 (30.0%) were 20 to 29 years of age, 9 (30.0%) were 30 to 39 years old, 3 (10.0%) was 40 to 49 years old, 9 (30.0%) was 50 to 59 years old. The mean age of the patients was 39.0±11.7 years and the youngest and the oldest patients were 20 years and 58 years respectively.Majority (90%) of the patients were male and the rest (10%) female giving a male to female ratio was 9:1. Among the participants 19 (63.33%) presented with right sided proximal humeral fracture and 11 (36.66%) with left sided fractures.Majority (76.7%) of injuries were caused by RTA, fall from height 13.3%, physical assault 6.7% and only one (3.3%) was machinery injury [Table 1].On the

final follow up to 6 months, 17(56.7%) patients had no limitation of daily activities whereas 13(43.3%) patients had moderate limitation of daily activities. 20(66.7%) patients had no limitation of recreational activities and 10(33.3%) patients had moderate limitations of recreational activities.According to the Constant scoring criteria the forward flexion of shoulder was 610-900 in 3(10.0%) patients, 910-1200 in 9(30.0%) patients and 1210-1500 in 18(60.0%) patients, the abduction of shoulder was 610-900 in 3(10.0%) patients, 910-1200 in 19(63.3%) patients and 1210-1500 in 8(26.7%) patients,20(66.7%) patients can externally rotate their shoulder with hand above head and elbow forward, 4(13.3%) patients can do it with hand above head and elbow backward, 6(20.0%) each can do it either with hand behind head and elbow backward,the dorsum of the hand reaches between shoulder blade in 4(13.3%) patients, waist in 23 (76.7%) patients and thigh in 3 (10.0%) patient.At 12 months follow up, only 3 (10.0%) patients complained of moderate pain, 16 (53.3%) patients had no pain at all and 11 (36.7%) patients had only mild pain.According to Constant scoring criteria power was measured with a spring balance with an average record from five pulls against a measured weight and expressed in pound. 3(10.0%) patients had a power of not more than 10 Ib, 17(56.7%) patients had a power in between 11 to 15 Ib., and 10(33.3%) patients had a power in between 16 to 20 Ib.On the final follow up to 6 months, 17(56.7%) patients had no limitation of daily activities whereas 13(43.3%) patients had moderate limitation of daily activities. 20(66.7%) patients had no limitation of recreational activities and 10(33.3%) patients had moderate limitations of recreational activities [Table 2]. At 1 year 28 (93.33%) patients showed union of the fracture and in 1 (3.33%) patient had nonunion and in 1 patient (3.33%) had delayed union.The outcome of the patients was graded according to Constant score criteria as Excellent (86-100) in 3(10.0%), good (71-85) in 14 (46.7%) patients, Fair (56-70) in 8 (26.7%) patients and poor (0-55) in 5 (16.7%) patients.To determine the final outcome of the study the excellent, good and fair grades according to Constant score was treated as satisfactory group and the poor grade was treated as unsatisfactory group. So a total of 25 (83.0%) patients were in the satisfactory group and only 5 (16.7%) patients were in unsatisfactory group [Table 3].During the course of the study 2 (6.66%) patients developed superficial infection, 1 (3.33%) patient developed delayed union, 1 (3.33%) patients developed subacromial impingement, 1 (3.33%) patient developed avascular necrosis and 2 (6.66%) patients developed loosening of head screw [Table IV].

Table I

Demographic and injury characteristics of the study subjects (n =30)

Characteristics	Value
Age	
20 to 30 years	9(30.0)
31 to 40 years	9(30.0)
41 to 50 years	3(10.0)
51 to 60 years	9(30.0)
Mean (±SD)	39.0± 11.7
Range	(20-58) yrs
Sex	
Male	27(90.0)
Female	3(10.0)
Causes of injury	
RTA	23(76.7)
Fall from height	4(13.3)
Physical assault	2(6.7)
Machinery injury	1(3.3)
Side of injury	
Right	19(63.3)
Left	11(36.7)

Values are presented as frequency, mean or percentage.SD: Standard Deviation.Percentage in the parenthesis

Table-II

Range of movement, pain symptoms and limitation of daily living (n=30)

Range of movement Forward flexion	Frequency	Percentage
61^0-90^0	3	10.0
91^0-120^0	21	30.0
121^0-150^0	6	60.0
Abduction		
61^0-90^0	3	10.0
91^0-120^0	19	63.0
121^0-150^0	8	26.7
External Rotation		
Hand above head and elbow forward (AHEF)	20	66.7
Hand above head and elbow backward (AHEB)	4	13.3
Hand behind head and elbow backward (BHEB)	6	20.0

Table-II (Cont'd)

Range of movement		
Forward flexion	Frequency	Percentage
Internal rotation		
Between shoulder blade	4	
Waist	23	
Thigh	3	
Pain symptoms		
No	16	53.3
Mild	11	36.7
Moderate	3	10.0
Power of shoulder (pound)		
0-10	3	10.0
11-15	17	56.7
16-20	10	33.3
Limitation of daily living	No	Moderate
Limitation of daily activities	17(56.7%)	13(43.3%)
Limitation of recreational activities	20(66.7%)	10(33.3%)

Table - IIII

Outcome of surgery at final follow-up

Radiographic union score	Frequency	Percentage	Grading
12	28	93.3	Union
04	1	3.3	Nonunion
5-11	1	3.3	Delayed union
Constant score	Frequency	Percentage	Grading
86-100	3	10.0	Excellent
71-85	14	46.7	Good
56-70	8	26.7	Fair
0-55	5	16.7	Poor
Mean Postoperative final outcome score = 65.6±15.4			
Evaluation of overall outcome			
Satisfactory	25	83.3	
Unsatisfactory	5	16.7	

Table IV

Complication after Surgery

Complications	Frequency	Percentage
Superficial Infection	2	6.66
Delayed union	1	3.33
Subacromial impingement	1	3.33
Avascular necrosis	1	3.33
Loosening of head screw	2	6.66

DISCUSSION

Proximal humeral fracture is not an uncommon problem encountered in the accident and emergency department of a hospital. However, there is a trend towards treating most of the fractures conservatively hoping that nature would do the best. Displaced proximal humeral fractures always presented a problem in management. According to Neer's classification displacement is defined as greater than 45 degree of angulation or 1 cm of separation of individual parts.

The results of current study demonstrates that mean age of the patients included in the study was 39.0±11.7 years and the youngest and the oldest patients were 20 and 58 years old respectively. Majority (90%) of the patients were male and business was the main occupation (30.0%). From this study it is evident that the proximal humeral fractures in our country seems to occur in early middle-aged population. But the studies conducted by Young and Wallace (1985), Hintermann et al., (2000) showed that relatively older people are affected by the fractures of the proximal humerus.[8, 9]The younger group is characterized as the trauma group who sustained the fracture usually due to some high energy mechanism of injury. The older patients often have osteoporotic bone and sustained comminuted fractures even after trivial trauma. High energy trauma following road traffic accident occurs most commonly in young active people who are usually the earning members of the family.

In the present series, in 23(76.7%) patients, the fracture was caused by RTA, whereas in 4(13.3%) patient the cause was a fall from height. In a series by Court-Brown et al (2001), 90.5% of the fractures had been caused by a simple fall, 4 percent by road traffic accident, 3.2 percent by fall from height and 1.6 percent by a direct blow.[1] Incidence of proximal humeral fractures by road traffic accident in our country is more due to lack of knowledge about traffic rules; most of the drivers are illiterate, reluctant to abide by the traffic rules. The mean age being 39.0±11.7 years meaning that the younger age group are the major sufferers in this series and this coincides with the high energy trauma. There were 27(90%) males and only 3(10%) female patients.In another study by Hintermann et al., (2000), the mean age was 72 years, and the female was 78.57 percent and male were 21.43 percent. The age difference is due to the same cause as mentioned before.[9] In this country, the females are still lagging behind engaging themselves in household activities and males, the principal earning member of the member usually are working outside and more prone to road traffic accident.

In the present series, the right was more affected (63.33%) than the left (36.66%). In a series by Hintermann et al., (2000), the right side (57%) was more affected than the left side (43%). Whereas, in the series by Young and Wallace (1985), right and left humerus was almost equally affected.[8, 9] The cause of left side involvement is probably due to unpreparedness following high velocity injury in most of the cases. In the present series, the basis of diagnosis was clinical examination and radiological evaluation of the affected part in both anteroposterior and lateral views. All the cases were displaced three part fractures and all were treated by open reduction and internal fixation with proximal humeral locking plate. After operation U-cast was applied and kept for 2 weeks till the stitch removal. Pendulum exercise was started as early as 2nd week. Physiotherapy is vital for early recuperation of the patient and is supervised very closely in almost all patients. At follow up, each patient was assessed for pain, limitation of the activities of daily living and range of motion according to Constant-Murley shoulder assessment score (1987).[10] At the final follow up at 6 months there was moderate pain in 10.0% patients with moderate limitation of activity in 43.3% patients.Two patients (6.66%) developed superficial wound infection and were treated by regular local wound dressing with local and systemic antibiotic according to the culture and sensitivity report. Not a single patient developed deep infection in contrast to the series published by Zyto (1997), where it was 10 percent.[11]

In this series at the time of operation all the fractures were closed, during operation strict asepsis was followed in every step and broad-spectrum intravenous antibiotic was given for three days. Initial recovery was uneventful in all the cases except two. In 2(6.7%) there were superficial infection. One patient (3.33%) developed delayed union and 1(3.33%) patient developed non-union.In a series by Neer (1970b), 18.60 percent patients developed avascular necrosis of the head of the humerus. Another series by Hintermann et al., (2000) using a modified angled plate showed avascular necrosis in 4.76 percent of his patients. In the present series only one patient developed avascular necrosis.[3, 9] It indicates that blood supply of the humeral head had not been critically impaired by open reduction and internal fixation by proximal humeral locking plate.In a series by Hintermann et al., (2000), displaced proximal humeral fractures were treated by modified hip blade plate. After one year follow up their satisfactory result was 65.85 percent and unsatisfactory result was 34.15 percent. Among 42 cases in their series, 2 cases developed avascular necrosis possibly due to the hip blade removing more bone during its insertion into the humeral head.[9]

Neer (1970b) experienced 86% satisfactory results with a suture tension band technique.[3] Stableforth (1984) reported 100% satisfactory results with a similar technique.[12]Jaberg at al. (1992) reported 95% fracture union with closed reduction and percutaneous pinning but noted pin tract infection in 7% cases.[13] Kristiansen and Christiansen (1986) reported only 45% satisfactory results using an AO T plate for 3-part fractures.[14] Early clinical results using locking proximal humeral plate have been promising though not without complications. Friess et al., (2008) reported a 50% good Constant score. There were 3 cases of osteonecrosis, 2 nonunions and 19 fractures (26%) with varus malalignment.

Hossen, M.,2003 "management of displaced proximal humeral fractural by Eshaque's modified plate" reported that 8 patients (33.33%) had excellent and 11 patients (45.84%) had satisfactory result, 4 patients (16.67%) had unsatisfactory and 1 patient (4.17%) had failure result.[15]Manzur, R. M., 2011 "Results of surgical management of unstable proximal humeral fracture by proximal humeral locking plate" reported that out of 15 patients, 7 patients (46.6%) had good, 5 patients (33.3%) had fair and 3 (20%) had poor outcome result that is 80% are satisfactory and 20% are unsatisfactory.[16]In the present series proximal humeral locking plate showed satisfactory result in 83.3 percent and unsatisfactory result in 16.7 percent. One case showed avascular necrosis. Obviously narrow plates with narrower screws removed far less bone during insertion and minimal dissection did not jeopardize the already compromised blood supply. These results are comparable to these previously reported. So PHILOS plate gives a satisfactory result displaced 3 part proximal humeral fracture.

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Original Article

The Short-term Outcomes of Varus Derotation Osteotomy for Perthe's Disease Managed at NITOR, Bangladesh

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ABSTRACT

Background: Legg-Calvé-Perthes disease (LCP) an osteonecrosis of the juvenile hip. For the management of this disease, various non-operative and operative methods have been evolved. Among them, varus derotation osteotomy (VDRO) has now been a popular method for the operative treatment of Perthes disease which increases the coverage of the femoral head by varus angulation and correction of the rotation.

Aims: The purpose of this study is to assess the clinical and radiological consequence of varus derotation osteotomy in Perthes disease.

Materials and Methods: We studied 29 children with a mean age of 7.2 years, belonging to Herring's lateral pillar group B and C treated with varus derotation osteotomy. At follow-up, all hips were evaluated clinically by range of motion, limping, limb length discrepancy andradiologically using Catterall's postoperative classification.

Results: Containment was gained in all patients on postoperative x-rays. At a mean follow-up of 7.4 months, good results were obtained in 22, fair in 4, and poor in 3patients using Catterall's postoperative classification.

Conclusion: Our study concludes that varus derotation osteotomy is an effective and easy surgical containment method for children with Perthes disease.

Keywords: Perthes disease, Varus derotation osteotomy, Outcome.

INTRODUCTION

Legg-Calvé-Perthes disease (LCP) is osteonecrosis of the adolescent hip which was first described by Arthur Thornton Legg in 1909[1]. In spite of the general agreement that Perthes results from the uncouplingof bone metabolism with increased resorption and delayed-formation, the preciseaetiology remains unclear. As fewhuman specimens are available, the use of animal models inthe last decade has allowed novel investigation.[2]

When the provoked vascular damageand the mechanical pressure of repetitive stress, the ideal progression from osteolysis to flattening is happened. Histologically,there

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are osteoclasts around bony trabeculae thatindicates active bony resorption at the revascularizationfront. Fibrovascular exchange of normal trabeculae withnumerous small vessels and proliferation of mesenchymaland fibroblast-like cells follows and persists, instead ofareparative phenomenon with new bone formation[3]. One possible clarification of pathogenesis includes the largecartilage anlage of the femoral head. Since Perthes Disease patients inclineto have delayed bone age, on average 2 years in girls and 1year in boys. This results inthe cartilaginous component of their epiphysis relativelylarger, and the traversing blood vessels are more susceptibleto mechanical compression[4].

The primarypurposeof the treatment of Perthes disease is to minimise the deformation of the femoral head softened by the disease process, to prevent future development of degenerative changes and restored the usual range of hip movement[5]. The usualhistory of Perthes disease is that of a self-limited statewith a very variable course. The disease is mild in young adolescent than 6 years of age, in whom good functional outcome can be gained with conservative treatment in the form of non-weight bearing and analgesia. It has been presented frequently, however, that there is a group of patients who certainlyget advantages from containment, either surgical or nonsurgical. Containment of the femoral head within the concavity of the acetabulum decreases the mechanical load on the weight-bearing area of the hip joint, thus protecting it against deformation and allowing the normal development of the femoral head and acetabulum. Surgical containment can be achieved, among others[6]. Varus derotation osteotomy (VDRO) was explained over half a century ago, and is now a well-likedapproach for the operative treatment of Perthes disease. It has been appeared by many authors to improve clinical and radiological consequences in patients. Varus derotation osteotomy increases the coverage of the femoral head by varus angulation and correction of the rotation[7]. Hence, the pushes acting on the weight-bearing part of the femoral head are sent laterally and anteriorly which assists to control the lateral displacement by realigningthe epiphyseal line[8].

MATERIALAND METHODS

This is a prospective observational study conducted in29 children with Perthesdisease operated in our unit from July 2017 to January2020 over a period of two and a half years. Preoperatively the hips were categorized radiographically using Herring's Lateral Pillar Classification[9]. Only children less than 9 years of age at the time of diagnosis and with Lateral Pillar Group B and C were included in the study. According to the Waldenström classification of stages of Perthes disease[10], all patients were in the fragmentation stage at the time of surgery. A minimum of 30° of free abduction was a prerequisite for surgery. None of the patients who met the criteria for operative treatment was given a trial of conservative treatment before proceeding to surgery.

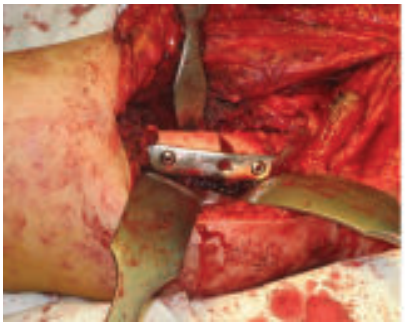


Fig.-1: *Subtrochanteric osteotomy*

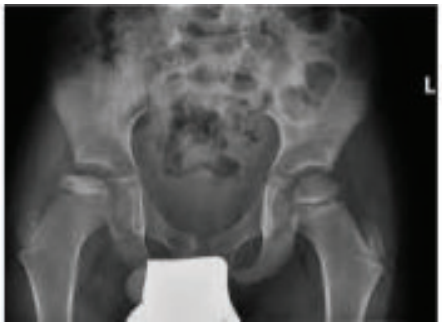


Fig.-2: *Herring's Lateral group B*



Fig.-3: *Early post-operative x-ray* showing osteotomy site



Fig.-4: *Late post-operative x-ray showing healed osteotomy site*

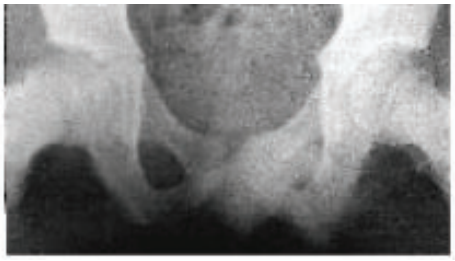


Fig-5: *Post-operative x-ray showing healed femoral head*

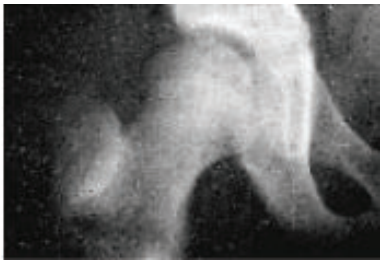


Fig-6: *Post-operative x-ray showing healed femoral head with restored neck-shaft angle*

A total of 29 cases were operated during this period. Bilateral hip involvement was seen in 4 cases, which were excluded from our study. Complete follow-up was available in 25 cases, 18 males and 11 females: the remaining two cases were lost to follow-up. The mean age at presentation was 8.2 years (range: 6 to 9.5 years). The right hip was involved in 19 children, the left hip in 10. The mean time between diagnosis and surgery was 3 months. All patients were operated on by the senior authors.

Thesurgical procedure used was a varus derotation femoral osteotomy. It was done using a lateral approach, with aopened wedge osteotomy, removing a wedge of bone from the intertrochanteric region medially. A varus correction of about 30°was done, with a target neck-shaft angle of 110° postoperatively. The distal fragment was externally rotated and the fragments were fixed in slight extension to improve anterior coverage. The osteotomy site was fixed using a smalldynamic compression plate. Postoperatively spica cast was applied. Immobilisation was kept up to 8 weeks after which gradual weight-bearing was started, depending on the consolidation of the osteotomy site.

At follow-up, all hips were assessed clinically andradiographically. Clinical assessment included a range of joint motion, limping, limb length discrepancy and Trendelenburg sign. Limb length discrepancy was determined by placing a block under the shorter limb to level the pelvis. Plain anteroposterior and lateral x-rays wereobtained at follow-up visits. Catterall's post-operative classification (11) was used to classify the hips into good, fairand poor, which is based on the range of hip motion, hip symptoms and radiography. An asymptomatic hip with a full range of motion and with a round and well-contained femoral head was classified as good. A fair result included an asymptomatic hip with slight restriction of movements, especially in internal rotation. The head is round but broadened and not fully contained within the acetabulum, up to one-fifth being uncovered. A hip that was not free of symptoms and with restriction of movements was classified as poor. Radiologically a poor outcome was associated with a flattened, broad and irregular femoral head with adaptive changes in the acetabulum and widening of the medial joint space.

Sphericity of the femoral head was evaluated usingthe Mose Index(12), in which anteroposterior and lateral views were studied by superimposing a template of concentric circles on the radiographs. According to this index, the results were classified as good if the head was spherical on anteroposterior and lateral radiographs. Fair results were those in which the head was not spherical but deviated less than 2 mm from the concentric circles and poor if there was more than 2 mm of deviation The Epiphyseal Quotient was measured by dividingthe epiphyseal index (greatest height of the epiphyses divided by its width) of the involved head by that of the uninvolved head. A quotient of 0.6 was classified as good, 0.4 to 0.6 as fair, and less than 0.4 as poor. The articulotrochanteric distance was measured as thevertical distance between the tangent to the highest point of the hip joint to the tip of the greater trochanter. It indicates the overgrowth of the greater trochanter in relation to the femoral head.

RESULTS

The mean age at follow-up was 15.6 years (range: 13.5 to 17 and the mean follow-up was 6.4 years (range: 5 to 11). Preoperatively, 22 patients were classified as having a Herring lateral pillar group B and 7 a group C. Good results were observed in 19, fair in 7, and poor in 3 patients according to Catterall's postoperative classification. Containment was achieved in all patients as recorded on postoperative radiographs. The mean change in the femoral neck-shaft angle was 26° degrees, achieving a mean neck-shaft angle of 112°on the immediate postoperative radiographs.

Table-I

Results after varus derotation osteotomy (VDRO)

Type of cases / Results		Good	Fair	Poor
Herring lateral pillar group B	22	19	2	1
Herring lateral pillar group C	7	3	2	2
Total	29	22	4	3

The mean neck-shaft angle at the time of follow-up was 117° (range: 102 to 125) compared to 128° on the contralateral side. Follow-up radiographs demonstrated adequate re-ossification of the femoral heads and Shenton's line was also maintained in all patients. Nineteen of the 22 patients in the Herring lateral pillar group B had achieved good results, 2 had fair and 1 had poor resultswhereas 3had good, 2 had fair and 2 had poor outcomes out of the 7 patients in the lateral pillar group C. Age of the patient at the time of diagnosis was also found to have a significant bearing on the functional outcome of the disease. Eight children were older than 8 years at the time of diagnosis, and good results were achieved in only 1 child in this group, compared to 19 good results out of29 children who were younger than 8 years.

DISCUSSION

The mostsignificantseparate prognostic issues in Perthes disease are the degree of involvement and the age at presentation. Patients presenting with a higher grade of involvement (Herring C) incline to have a greater collapse of the femoral head, more pronounced deformities of the femoral head and neck, with greater limitation of hip range of motion and a poor prognosis[5,13].

Most authors agree that patients younger than 6 years of age have a good prognosis, and the outcome usually does not vary despite treatment. Children from 6 to 9 years of age are thought to have a variable prognosis and they typically benefit from surgical containment. Patients who are older than 9 years at onset are thought to have apoor prognosis irrespective of the extent of the disease. This may be attributed to the lesser time available for the deformed femoral head to remodel[14]. Literature is quite unclear regarding the best treatment procedure for such patients as there are contradictory studies about the extraadvantage of operative containment in such patients. There are reports in the literature which support the fact that VDRO deliversbetteroutcomes in children older than 9 years of age as compared to the usualhistory or non-containment methods. In agreement with this, we also favour the surgical containment in the form of VDRO at our centre for all patients older than 6 years of age with Herring grade B or C[15].

In developing countries, most ofthe patients usually present quite late after the disease process had started. In our study also the mean age of presentation was 9.2 years. Comparison with the literature regarding the femoral osteotomies is difficult because of the differences in the patients' age, degree of femoral head involvement and various outcome parameters used in previous studies[16]. However, studies which isolated and recorded the data in older patients have demonstrated improved function in older patients up to 10 years of age, compared with historical series and non-operated control subjects. In our study also, children younger than 10 years of age had an improved outcome as compared to those older than 10 years. This is consistent with the report by Noonan et al[15], who studied the results of femoral varus osteotomy in children older than 9 years of age. They also concluded that better results were achieved in patients between 9 and 10 years of age as compared to those older than 10[17].

Similarly, Sponseller et al[18] demonstrated the improved outcome of surgical containment in patients younger than 10 years of age. Hence, it could be suggested that there is an upper age limit for the effectiveness of the operative containment in Perthes disease, which is most likely around 10 years. In general, surgical treatment avoids the prolonged duration of non-ambulation and bracing associated with conservative treatment, which makes it more independent of the patient's and family's compliance[19].

Techniques of surgical containment include varus derotation osteotomy. Intertrochanteric varus derotation osteotomy is a commonly used procedure for surgical containment. According to the literature, there has not been any significant difference in the outcome of patients treated either by varus derotation osteotomy[20].

On the contrary, varus derotation osteotomy is a technically easy procedure with no additional risk to nearby neurovascular structures; so, it can be easily learnt and reproduced, resulting in its wide applicability. VDRO also carries a theoretical advantage of increasingthe venous drainage of the ill perfused femoral headand thereby improving its vascularity. In addition,trochanteric epiphysiodesis can be executed in thesame procedure, if required to prevent the trochanteric overgrowth and associated Trendelenburg gait[20].

The most common complication of VDRO isthe shortening of the affected side. It is however a commonobservation that most of the patients tolerateshortening better than lengthening. Another disadvantageof VDRO is a residual varus of the femoralneck, but the relationship between the residual varus and thefinal outcome at maturity has not been established inthe literature[21]. Although higher coverage of thefemoral head can be achieved using Salter's osteotomy,its impact on the sphericity of the femoral heador the clinical outcome was not found.

In our hands, results of varus derotation osteotomy are fairly encouraging considering the late ageof presentation, thereby decreasing our threshold ofusing this procedure in a larger number of patients.

CONCLUSION

The results from this study and published data support this conclusion that varus derotation osteotomy is an effective and easy surgical containment method for children with Perthes disease.The only limitation of this study is limping due to a mild shortening of the concerned limb(s) due to varus osteotomy, and thus, the full potential of the approach has not been achieved.

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Original Article

Outcome of the Result of Laminotomy and Discectomy in Prolapsed Lumbar Intervertebral Disc

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ABSTRACT

From adolescence to adulthood, 80 to 85% of people suffer from low back pain in the modern world. It results in tremendous loss of time and work productivity costing billions of dollars. Incidence of sciatica is more than forty percent in low backache patients. However clinically significant sciatica due to prolapsed lumber intervertebral disc is only four to six percent. Lumbar disc disease forms the second most common cause for medically authorized absence from work (Rehman, Khattak & Alam 2011 and Sangwan et al., 2006). Symptoms of lumber disc herniation can be divided into segmental and neural symptoms. Segmental symptoms are caused by local disruption of the anatomy. Low back pain comprises the main symptom but pain extending to the buttocks and legs can be caused as well. Pain in the buttocks and legs are believed to be referred pains in this condition (Jho Hae-Dong 1997). The neural symptoms are due to compression of the nerve root adjacent to the disc. When the herniated disc compresses the passing nerve root, it causes electric shooting pain down the leg. It can also cause numbness and weakness in the leg.

Keywords: Laminotomy, Discectomy, Prolapsed Lumbar Intervertebral Disc

BACKGROUND:

Nonoperative care of lumbar disc herniations (LDH) includes a wide range of qualitatively different methods: lumbar supports, bed rest, oral analgesics and muscle relaxants, spinal manipulation, physical therapy, epidural steroid injections, and behavioral therapy.Time also should be spent educating the patient when discussing treatment options (John N. Awad and Ronald Moskovich, 2006).

Since the first publication of intervertebral disc surgery by Mixter and Barr (1934), various operative techniques have been developed.

The techniques are fenestration and discectomy, laminotomy and discectomy, laminectomy and discectomy, microdiscectomy, endoscopic discectomy, percutaneous discectomy, laser discectomy, chemonucleolysis.Open discectomy is still considered the "gold standard" by the spine community for the surgical treatment of prolapsed discs that are causing severe weakness or pain. The aim of this study is to evaluate the effectiveness of laminotomy and discectomy as a surgical modality of treatment for prolapsed lumbar intervertebral disc (PLID).

General Objective:

To evaluate the outcome of laminotomy and discectomy for the treatment of Prolapsed Lumbar Intervertebral Disc (PLID).

Review of Literature

For acquiring the background information, a literature search was conducted from articles published in various national and international journals, reports and books and reviewed thoroughly. There were lots of studies on Laminotomy and discectomy for the treatment of Prolapsed Lumbar Intervertebral Disc (PLID) in all over the world. Studies done in this area were reviewed and summarized in this chapter.

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The intervertebral disc was first implicated as a causative factor in sciatica in the early 20th century. The presence of pain was initially ascribed to pressure on nerve roots. Lindahl and Rexed found evidence of an inûammatory response on lumbar nerve roots at laminectomy leading to the theory that prolapse of an intervertebral disc may provoke an inûammatory reaction in lumbar nerve roots, causing the sciatic type pain (Stafford et al.,2007)

Walter Dandy is credited with the first documented surgical decompression for disc herniation. Patients who undergo decompression will have more rapid resolution of symptoms, especially those who have mild or no LBP and an acute onset of severe sciatica. Patients treated operatively have a shorter recovery period, return to work in less time, and overall, place less of a financial and social burden on the health care system when compared with patients treated nonoperativly (Awad et al.,2006).

Tsai et al. reported retrospectively the clinical results after laminotomy. After a mean follow-up period of 2.25 years, 84% of 50 patients showed good postoperative results. In a prospective study of 21 patients, Nyström et al. observed good outcome in 66% of patients at a mean duration of 2.25 years after surgery. Comparable results with 59 to 91% improvement rates after laminotomy were described by other authors during mean follow-up periods of up to 5.5 years (Oertel et al., 2006). The long-term results of the large sample size reported in their study seem to conûrm that laminotomy is more beneûcial than more invasive operative procedures in terms of patient outcome and neurological improvement. This finding was supported by the meta-analysis of Niggemeyer et al. who found that, the least invasive surgical procedure and decompression without any fusion could obtain the most favorable results in patients with lumber spinal stenosis.

A prospective interventional study was done by Oertel et al.(2006) among 133 patients (73 men and 60 women; mean age, 63 yrs.) with a aim to evaluate the outcome of laminotomy for decompression of lumber spinal stenosis. They found that, 97.7%patients improved immediately after surgery and 85.3% had an excellent-to-fair operative result. The incidence of complications was 9.8%.

Bhuiyan et al.,2012 conducted an observational study in 64 patients (56 were male and 8 were female, age range was 30 to 50 years), who were operated for prolapsed lumber intervertebral disc. They found that, 60(94%) patients had no pain after surgery and only 4 patients had occasional pain.

Bhuya et al.(2019) conducted a prospective interventional study in 75 patients with male to female ratio was 2.12:1 and mean age was 36±8.67 years. Majority cases of disc involvement was found in L5-S1 level. Radicular pain was significantly reduced from preoperative to postoperative status. Disability rate was also reduced postoperatively. After one year follow up it was noted that 53.33% had excellent outcome with only 2.67% pooe outcome and only 5.33% developed postoperative complications.

As described in many literatures, Laminotomy and discectomy had the added advantages of less intraoperative blood loss, rapid convalescence, minimal risk of instability and seldom landed up to postoperative complications like adhesions and arachnoiditis. Lumber discectomy performed by laminotomy stated as a safe,effective and reliable method for treating selected patients with herniated lumber disc.

MATERIALS AND METHODS

This study was done as per the following methodology to evaluate results of Laminotomy and discectomy for the treatment of Prolapsed Lumbar Intervertebral Disc (PLID). This chapter describes the research design, description of research approach, setting and research instruments and different steps used for collecting and organizing the data.

Study design: Prospective Interventional study.

Place of the study: Department of Orthopaedic Surgery, Dhaka Medical College Hospital, Dhaka.

Study Period: From May 2018 to October 2019.

Study population: Patients with clinical and radiological evidence of PLID.

Sampling technique: Purposive sampling and strictly considering the inclusion and exclusion criteria.

Samplesize

Sample size calculated by using following formula

Here, $n = \frac{z^2 pq}{d^2}$

n = Sample size

z = 1.96 (at 5% level of significance or 95% confidence level).

p = Prevalence or proportion of occurrence (the incidence rate of lumber disc prolapse cases undergoing surgery 7%= 0.07 (7/100) (aziz A.I.A., Aziz A.M.A., 2018)

q = 1 - p = 1-0.07 = 0.93

d = Acceptable (allowable) error 10% (0.1)

So, $$n = \frac{z^2 pq}{d^2}$$

$$= \frac{(1.96)^2 \times 0.50 \times 0.50}{(0.05)^2}$$

$$= \frac{3.8416 \times 0.0.1131}{0.0025}$$

= 26

Due to time limitation and financial constraint, a total number of 30 patients were included in this study .

Radiological examination:

- X-Ray of lumbosacral spine A/P and lateral view,
- MRI of lumbosacral spine.
- **Indication of surgery**

1. Cauda equina syndrome.
2. Failure of adequate conservative treatment to relief the symptoms.
3. Progressive neurological deterioration during conservative treatment.
4. Frequent work loss due to repeated rest and admission in hospital.
5. Persistent of sign symptoms despite of adequate conservative treatment in which leg pain more than back pain.

- **Name of operation**

Laminotomy and discectomy.

SURGICAL PROCEDURE

Pre-operative level identification-

Once in the operating room the patient was placed in lateral position on a side trolly for level identification with image intensifier (C-arm). Level was indentified by placing a k-wire or needle horizontally and fixed with an adhesive/ micropore and antero-posterior radiograph was taken under image intensifier. Level was marked by scratching a needle. This facilitates easy identification of level of spine during operative procedure. Prophylactic antibiotics were administered about half an hour before surgery.

Position of the patient-

After marking of level of prolapsed disc and after giving parental antibiotics, general anaesthesia was given on a separate trolly, then patient was transferred into OT table and placed in prone position over the spinal frame with intervening space free for abdominal movement, thus preventing pressure over inferior venacava and pelvic veins.

Surgical scrubbing and draping-

Lumbo-sacral area site to be operated will be scrubbed first by Hexiscrub lotion and then by providone iodine solution. Then entire body will be draped.

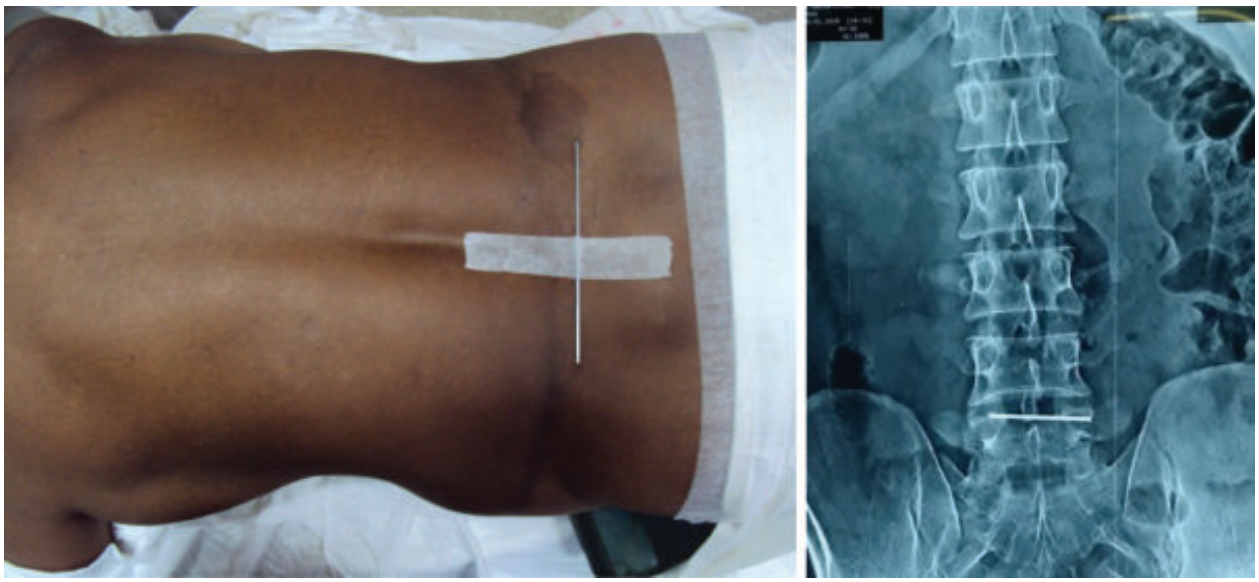


Fig.-1: *Preoperative marking of proposed level*



Figure 02: *Painting and Draping*

Approach

By Posterior midline approach.

Surgical Technique-

Paraspinal and subcutaneous tissue was infiltrated with 1:500,000 epinphrine mixed normal saline which helps in providing haemostasis. A midline incision of about 5 to 6 cm over spinous process centering the affected disc level was put extending down into subcutaneous tissue, lumbodorsal fascia and supraspinous ligament. The supraspinous ligament was cut by unipolar diathermy. Then the paraspinal muscles was subperiosteally stripped from spinous process and laminae of these vertebrae from distal to proximal on the side of the lesion. The muscles was then retracted with a self retaining retractor and then desired interspace was exposed.

The lamina and ligamentum flavum was then denuded with a curette. The ligamentum flavum was grapsed with an Allis or kocher clamp and incised with no.15 B.P. blade, where it fused with the interspnous ligament. During dissection of the ligament ,the point of the blade was kept in view and blade was guided by macdonald. So that the dura was not nicked. The flap of lagamentum flavum was removed by sharp dissection and laminotomy was done using kerrison rongeours.

Next, the dura retracted medially and the nerve root was identified. The nerve root, once identified, was retracted medially so that the underlying extruded fragment or bulging posterior longitudinal ligament could be seen. Occasionally the nerve root adhered to the fragment or to the underlying ligamentous structures and required sharp dissection from these structures.

The nerve root was held by a nerve root retractor or a blunt dissector, thus exposing the herniated fragment or bulging of the posterior longitudinal and annulus. After retraction of nerve root and dural sac, a crisscross incision was made over the disc bulge and gentle removal of disc material was done in piecemeal by pituitary rongeur until the bulge had been decompressed to allow gentle retraction of the nerve root over the defect.

RESULTS

This prospective interventional study was conducted in the Department of Orthopaedic Surgery, Dhaka Medical College & Hospital, Dhaka for a period of 18 months starting from May 2018 to October 2019. A total of 30 patients with prolapsed lumbar intervertebral disc were operated and followed up routinely. The main objective of the study was to evaluate the prognosis of management of prolapsed lumbar intervertebral disc by laminotomy and discectomy.

Demographic information

Table I

Distribution of patients by age (N=30)

Age group (in years)	Frequency	Percentage (%)
17-25	4	13.3
26-35	8	26.7
36-45	12	40.0
46-60	6	20.0100
Total	30	
Range (min-max)	(17- 60) years	

The mean age of the patients, was 38.3 ± 10.39 years and age ranging from 17-60 years. Data indicated that maximum number of the patients was in age group 36-45 years.

Distribution of the patients by complications

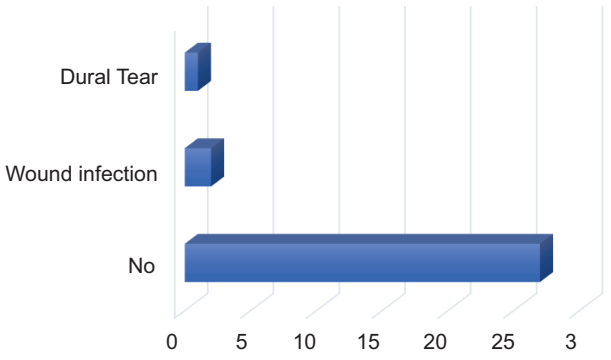


Fig-1: *Complications*

Out of 30 patients, 2 (6.7%) patients had developed post operative wound infection and 1 (3.3%) patients had peroperative dural tear . However, 27 (90%) patients had no complication.

DISCUSSION

There is no uniform agreement among surgeons about the optimal treatment.Open discectomy is still the "gold standard" by the spine community for the surgical treatments of prolapsed disc that are causing severe weakness or pain. This prospective interventional study was carried out to see the outcome of the result of laminotomy and discectomy in prolapsed lumbar intervertebral disc (PLID) .In this study sample size was 30. Low back pain commonly affected the adult population all over the world. It is of prime importance that the cause of low back pain is diagnosed in its early stage since not all cases are innocent.

In my study, the mean age of the patients, was 38.3 ± 10.396 years ranging from 17-60 years. Maximum number of the patients 40.0% was in age group 36-45 years followed by 26.7% in the age group 26-35 years, 20.0% in the age group 46-60 years and 13.3% were in the age group 17-25 years. Similar study conducted byWankhade, et al. (2016) also showed prolapsed disc usually common in adult with mean age 37.96 years, ranging from 24 to 60 years,which is near similar with this study. While in Nabi et al. (1982) series, all the 13 cases were in the range of 30-60 years of age. In Khan et al. (1991) series 91.21% of patients were aged between 21-50 years.

It was seen that disc prolapse occurs in the working age adult population as they are the ones most likely to be exposed to trauma due to mechanical stress and strain. The most likely reason for the earlier age of onset of symptoms of low back pain in our studies is the young age at which our people are exposed to manual labour due to their poor socio-economic condition. In my study 21 (70.0%) patients were male and 9 (30.0%) were female patients. Male female ratio was 2.33:1. The low incidence of female patients in the present series is probably due to conservative life style of the female population in our country.

Brown and Pont (1963) in their series found 72% of patients were male and 28% female. There were 20% female and 80% male in the Raff et al (1959) series. In my study, 13 (43.3%) patients belonged to manual working, 9 (30.0%) were housewife and 8 (26.7%) patients belonged to the sedentary population. Manual workers are affected more as they are subjected to sprain and strain which may cause trauma to spine and predispose to prolapse of disc.

In Khan et al (1991) series 83.80% patients belonged - to the manual worker group and 16.20% belonged to sedentary population .In my study, clinical examination revealed that, 19(63.33%) patients had extensor hallucis longus (EHL) muscle weakness, 8 (26.66%) had flexor hallucis longus (FHL) weakness and 3(10%) had normal motor function. Khan et al. (1991) reported 79.58% of patients in their series with Weakness of foot and toes and 3.52% patients with bladder dysfunction.

In my present study, it was found that, 15 (50.0%) of the patients had prolapse at L4/5 level, 9(30%) at L5/S1 level, 5 (16.7%) had at L4/5 & L 5/S1 and 1(3.3%) at L3/4 & L4/5 level. Brown and Pont (1963) reported in their series that 65.2% patients had prolapse at L4/5 level, 22.4% at L5/S1 level and 12.4% at L3/4 level. Shapiro (1993) reported in his paper that 64.28% patients had prolapse at L3/4 level, 21.42% at L5/S1, level and 14.28% at L3/4 level. Khan et al., (1991) observed in their study that 57.25% patients had prolapse at L4/5 level, 34.78% at L4/5 level and 7.97% at L3/4 level.

Lumbar disc prolapse is common at L4/5 level in this current series and in other published series.Brown and Pont (1963) reported that 36.49% of cases had right sided herniation, 40.17% had left sided herniation and 25.4% had a central type of herniation. In another study, Khan et al (1991) observed 36.29% cases with right sided lesion, 49.27% left sided disc prolapse. In my study, central disc prolapse is in 21(70%) cases.

In my present study, out of 30 patients, 2 (6.7%) patients had developed postoperative superficial wound infection and 1 (3.3%) patients had peroperative dural tear. Khan et al. (1991) reported 7.75% complication rate in their series. The commonest complication was 4.9%, which was disc

space infection and O'Connell et al. (1951) reported that 3.0% patients developed post operative superficial wound infection, haematoma formation in 2.0%, pulmonary embolism in 1% cases.

During follow up, pain score, muscle spasm, mobility of the spine, SLR were assessed. Each of the parameters were assessed at least for 3 visits. Data analysis found that, preoperatively all the patients had pain. However, following operation pain subsided significantly. 56.7% of the patients observed no pain at 2nd visit and 80% patients had no pain at 3rd visit.

All the patients were examined for straight leg raising (SLR) test. Preoperatively, mean SLR was 65 ± 6.823 degree. Following operation, the SLR significantly improved to 88.67 ± 3.457 at 3rd visit. In the comparison of preoperative and postoperative ODI score, Mean preoperative ODI was 30.03 ± 4.04and postoperative ODI 16.93 ± 2.80. Mean difference preoperative to postoperative ODI were statistically significant.

In the comparison of preoperative and postoperative VAS score, mean preoperative VAS 3.0 ± 0.0 and postoperative VAS 0.20 ± 0.407. Mean difference preoperative to postoperative VAS score were statistically significant

In this study, regarding hospital stay, the maximum hospital stay after operation was 12 days and minimum was 5 days, and mean postoperative hospital stay was 6.7 ± 1.78 days. Preoperative maximum hospital stay was 25 days and minimum hospital stay was 5 days, mean preoperative hospital stay was 15.1 ± 5.58 days. Chakrabarty (2015) demonstrated postoperative mean hospital stay 6 days. Wankhade, Umashankar and Reddy (2016) reported average duration of hospital stay for patients were 3 days postoperatively.

In this study, open lumber laminotomy & discectomy were done in all 30 cases. Medical studies have shown that good results are achieved in 80% to 90% of the case treated with open discectomy as surgeon can visualize the vertebrae, disc & other surrounding structures, can remove the disc that is protruding from the disc wall & other disc fragment that may have been expelled from disc. We followed Modified Macnab Criteria to grade the patients' outcomes in 4 categories Excellent, Good, Fair and poor. The outcome based on Pain, restriction of mobility, return to work and level of activity.

Chellarapu et al. (2017) reported in recent study out of 250 patients- Excellent in 223(89.2%) cases, Good in 21(8.4%) cases, Fair in 5(2.0%) cases, and 1(0.4%) cases had poor outcome. Regarding the subjective assessment of patients inmy study, majority 24 (80%) had excellent outcome, 4 (13.3%) had good outcome, 2 (6.7%) had fair outcome and no poor outcome. Thus, results of this study states that the lumber discectomy performed with limited dissection by laminotomy is a safe, effective and reliable method of treating selected patients with herniated lumber discs.

CONCLUSION

Prolapsed lumber intervertebral disc (PLID) surgery is not a routine surgery. Proper selection of the patient must be done before going to operation. Simple indentation by the disc in MRI is not the indication for surgery. Clinical correction must be done before operation for good result. In my study, I found that, PLID that needs surgery are mostly male with a male female ratio was 2.33:1. Mean age of patients was 38.3 years and 43.3% patients are professionally manual worker. Intervertebral disc prolapsed at L4/5 level in 50% cases and in 30% cases prolapse found at L5/S1 level.During surgical procedure, dural tear occurs in one patient and 2 patients had postoperative superficial wound infection.Regarding the subjective assessment of patients in my study, 80% patients had excellent outcome, 13.3% had good outcome and 6.7% patients had fair outcome. From my study, I can conclude that, if the patients are selected properly, operated classically, managed appropriately after operation and discharged with required advice, laminotomy and discectomy can give excellent result.

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Original Article

Outcome of stabilization by anterior pelvic plating & per-cutaneous screw fixation of S-I joint in Young- Burgess APC type-II pelvic fracture

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Abstract

To analyze the effectiveness of anterior pelvic plating and subsequent per-cutaneous sacroiliac joint screw fixation in patients with Young- Burgess APC type-II pelvic fracture. Twenty-two patients were included with seventeen males and five females. The mean age of the patients was 36.4 ± 13.4 years and the youngest and the oldest one were 18 and 60 years respectively. All patients were APC type-II pelvic fracture. The mean interval between injury and operation was 10.6 ± 3.02 days and minimum and maximum interval was 6 and 18 days. Mean hospital stay was 18.04 ± 5.15 days. Majority (95%) of the injury was caused by road traffic accident. SI joint was fixed unilaterally in 21 (95%) patient & bilaterally in one (5%) patient, anterior pelvic plating was done in 22 (100%) patients. Evaluation after 6 months or more showed that 63.63 % of patients had excellent outcome, 27.27 % had good outcome and 9.09 % had fair outcome. Patient's outcome was measured by Majeed score and the mean Majeed score was 85.13 ± 11.42. Five patients developed complications during the follow which includes superficial wound infection in three (13.63%) patients, erectile dysfunction in one (4.54%) patient & implant failure in one (4.54%) patient. No re-operation was required in any patient. The result of the study demonstrates that anterior pelvic plating &per-cutaneous screw fixation of SI joint in APC type-II pelvic fractures provides sufficient stabilization to allow early mobilization and thereby good functional outcome.

Key Words: APC type-II injuries, anterior pelvic plating, sacroiliac joint fixation.

INTRODUCTION

Fracture of the pelvic ring is relatively uncommon but occupies an important place in modern orthopedics practice. The range of pelvic fractures are from (2 - 8) % of all skeletal injuries[1]. In multiple trauma patients, the frequency may rises around 25% & the overall mortality rate is (6-10)[2]%. Pelvic fracture usually occurs in younger patients[3]. Most common causes of pelvic fracture are: road traffic accidents (Holstein, 2012). Various factors affect functional outcome in pelvic fractures such as fracture type, fracture location, Accidents[2]. Various factors affect functional outcome in pelvic fractures such as fracture type, fracture location, associated injury, treatment methods and accuracy of reduction[4].

Lesion in the anterior part of the ring is less critical than posterior lesion & anterior stability is 40% where as posterior stability is 60%[5]. Initial treatment of pelvic fracture start from the scene of injury. In the hospital-immediate resuscitation & pelvic binder/sheet is usually applied. If the fracture is very much unstable then immediate external fixation can be applied.

The definite management of pelvic fracture is related to the degree of instability. After diagnosis, the greatest

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controversy is in the treatment option which may be operative or non-operative. Stable, un-displaced pelvic fractures (Tyle type-A, Young & Burgess types APC-1 and LC -1) do not need operation. The clear indication of operative stabilization is in Tile type-B & type-C fractures[6]. According to Young and Burgess Classification APC-I are stable fracture but APC-II& III are unstable fracture. Management of APC-II fractures i.e. the symphysis gap more than 2.5 cm and posterior displacement of 1 cm is always indicated for open reduction and internal fixation. Open reduction and internal fixation of pubic diastasis using plate facilitates good reduction and is an excellent method of stabilization[7].

For the management of APC type-[22] fracture many types of internal fixation implants have been promoted.In recent years among them the reconstruction plate is mostly used. For posterior disruption- ilio-sacral screw (Partially threaded cancellous cannulated screw) is usually used. The fixation readily eliminates patient's pain and allows early mobilization[8]. Optimal time frame for definitive surgical stabilization has not been clearly defined. Early fixation provides several advantages; improved fracture reduction, early mobilization and pain relief, less risk of pulmonary complication and deep vein thrombosis along with shorter hospital stay.

MATERIALS AND METHODS:

Ethical clearance was obtained from the authority prior to commencement of the study. Keeping compliance with Helsinki Declaration of Research Activities Involving Human subjects 964, all potential subjects were informed about the purpose of the study. Young- Burgess APC type-II pelvic fracture population detailed was prospectively obtained from the patients that were admitted in orthopedic department of Dhaka medical college & hospital from July 2016 to January 2018.

Total a period of 18 months follow up. Twenty-two patients were included with seventeen males and five females fulfilling the inclusion and exclusion criteria. The inclusion criteria were- age 18 to 60 years, both sexes and patient should present within 3 weeks of injury. The exclusion criteria were acetabular fracture & other type of pelvic fracture, active infection, pathological fracture, dysmorphic sacrum & patient with complete spinal cord injury.

The mean ages of the patients were 36.4 ± 13.4. The mean interval between injury and operation was 10.6 ± 3.02 days and minimum and maximum interval was 6 and 18 days respectively. Mean hospital stay was 18.04 ± 5.15 days. Majority (95%) of the injury was caused by road traffic accident. SI joint was fixed unilaterally in 21 (95%) patients& bi-laterally in 1(5%) patient.

Surgical procedure:

After initial resuscitation, when patient became fit for operation, the surgical procedure taken place. After spinal anesthesia (SAB) patient was positioned supine on a radiolucent table with maintaining the legs in internal rotation position. The approach was Stoppa approach.

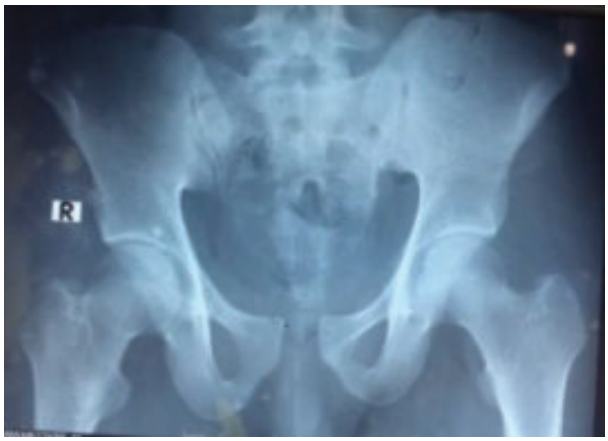


Fig.-1: *X-ray Pelvis (A/P view)*

A curvilinear transverse incision was made 2 cm cephalad to the superior pubic ramus. Incise the external oblique aponeurosis parallel to the inguinal ligament.

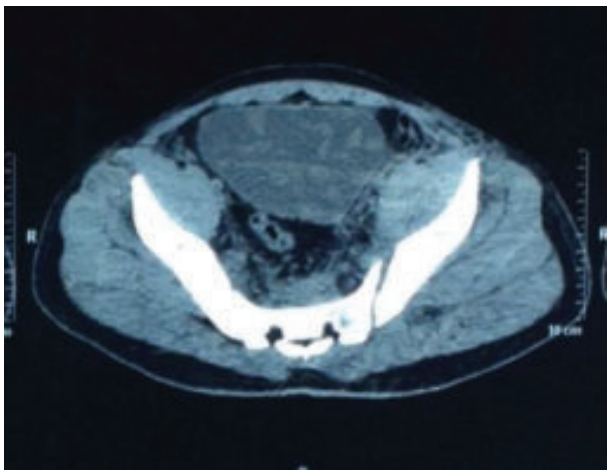


Fig.-2: *CT Scan Pelvis (Axial section)*

Identify the spermatic cords or round ligaments and adjacent ilioinguinal nerve. Release the aponeurotic insertion of both heads of the rectus abdominis from the superior pubic rami. Expose sub-periosteally the superior, anterior, and posterior surfaces of both rami laterally for 4 to 5 cm or as necessary.



Fig 3: *CT scan Pelvis with 3D reconstruction*

During this dissection, identify the urethra and base of the bladder by manual palpation of the Foley catheter.

Narrow sharp Hofmann retractor is used underneath the rectus & over the pubis to expose the symphysis.

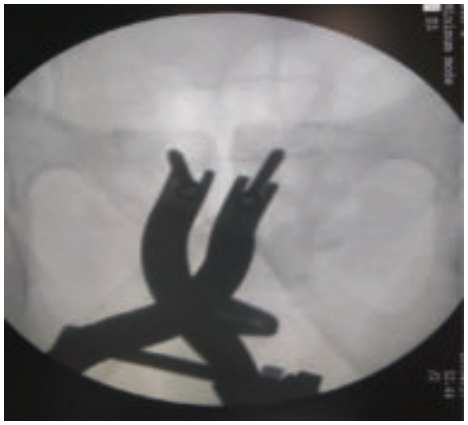


Fig.-4: *Per Operative C-arm view (Symphysis Pubis)*

A Weber pointed reduction clamp is used on to the body of the pubis for reduction. A curve 3.5 mm reconstruction plate is placed on the superior surface of the symphysis.

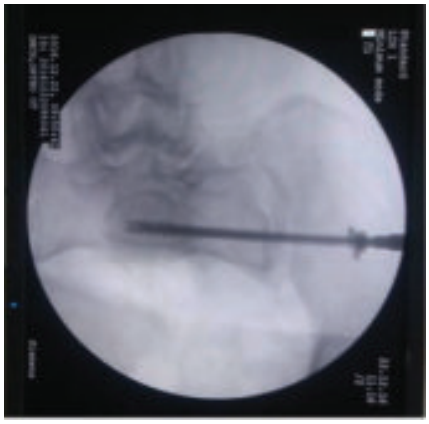


Fig.-5: *Per Operative C-arm view (S.I joint)*

Drilling was done eccentrically to yield a small amound of compression. Reduction &fixation was confirmed by fluoroscopy (A/P, inlet & outlet view). A closed suction drain was placed in the space of Retzius. Wound was closed in layers.

Technique of S-I joint fixation:

The SI joint of affected side was fixed per-cutanously under fluoroscopic guidance with patient in supine position. Obtain A/P, inlet, outlet & lateral sacral views to ensure accurate entry point.



Fig 6: *Post Operative X-ray (A/P view)*

A guide pin is inserted perpendicular to the SI joint through the alar cortical density.



Fig 7: *Post Operative X-ray (Lateral view)*

Drilling done and a 7.0 mm partially threaded cancellous cannulated screw with a washer inserted over the pin. Screw position was confirmed by fluroscopy.



Pic 1 : *Post operative Follow up at 3 months*



Pic 2 : *Post operative Follow up at 6 months*

RESULTS:

The mean age of the patients was 36.4 ± 13.4 years and the youngest and the oldest one were 18 and 60 years respectively. Majority of the patients were male and worker. All patients were APC type-II pelvic fracture. The mean interval between injury and operation was 10.6 ± 3.02 days and minimum and maximum interval was 6 and 18 days respectively. Mean hospital stay was 18.04 ± 5.15 days. 95% of the injury was caused by road traffic accident. SI joint was fixed unilaterally in 21(95%) patients & bilaterally in 1(5%) patient. Anterior pelvic plating in pubic symphysis done in 22(100%) patients. Evaluation of the outcome after 6 months or more showed that 63.63% of patients had excellent outcome, 27.27% patients had good outcome and 9.09% had fair outcome. Mean Majeed[9] score was 85.13 ± 11.42. Five patients developed complications during the follow up period. Complications included wound infection in 3(13.63%) patients and erectile dysfunction in 1(4.54%) patient & implant failure in 1(4.54%) patient. No reoperation was required in any patient.

DISCUSSION

In this current study it was observed that highest number 12(54.54%) of patient was in 3rddecade and lowest number 4(18.18%) patients was in 4th decade. The mean age was 36.41±3.4 years with range from 18 to 60 years. Avilucea[10] observed the mean age was 36 years which is closely resembled with the current study.

In this present series it was observed that male female ratio was 2.5:1, which indicates that male was predominant in this study, this may be due to male member usually working outside and more prone to road traffic accident. Turfan[11] showed that male patient was 64%.

Regarding the occupational status it was observed that 36.36% were worker, 27.27% service holder, 18.18% student, 9.09% businessman and 9.09% driver.

In this series 95.% of fractures were caused by RTA and the rest 5.0% were due to fall from height. Kwon[5] showed that RTA 69.6%, pedestrian 37.37%, driver 10.1%. Holstain[2] also showed that the most frequent region for injury were RTA & fall from high altitude. Miranda[12] found that 78.9% of the fractures are due to motor vehicle accident, 10.5% due to pedestrian versus car and 10.8% due to fall from height.

Regarding the associated injury14(63.63)% patients had associated injuries, out of which 18.18% lacerated wound, 4.54% fracture shaft of femur, 9.09% Colles' fracture and 31.81% urethral tear. Trikha[13] reported the incidence of genitourinary injury of 4.6%. Zamzam[14] included 38 patients in his study and 84.2% patients had associated injury.

In this study 95.45% patients underwent unilateral SI joint fixation & 1 patient(4.54%) bilateral fixation. All the patients were treated by symphysial reconstruction plate. Avilucea[10] state that posterior fixation of APC type -II pelvic ring injuries decreases rate of anterior plate failure & malunion. They totally managed 134 patients among

them 92 patients (69%) underwent combined anterior & posterior fixation & 42(31%) patients had only anterior fixation. Anterior plate fixation failed in5% of patients of combined group & 40% in the anterior only group. The results obtained in present study and above authors findings indicates that both anterior and posterior fixation is necessary for satisfactory stabilization as well as good mobilization postoperatively. Regarding the time interval between injury & operation it was observed that 40% of the patient was operated within 10 days of injury and the rest 60% of the patients were operated between 11-18 days. In the study of Oh[15] the time interval was 17.4 days and ranges from 11 to 30 days. Tornetta[16] found the mean duration of time interval between injury & operation was 14 days, which is consistent with the present study.

In this study the mean duration of hospital stay was 18.04±5.15 days with range from 09 to 33. In the study of Holstein[2] the average hospital stay was 13 days (ranges, 0 to 17 days).

In this study, postoperatively13.63% patients had wound infection, 4.54% had erectile dysfunction and(4.54%) had implant failure. Similarly, Bosch[17] found that 8.1% patients developed ARDS, 8.1% patients received treatment for an ileus, 10.8% patients had a pulmonary atelectasis or pneumonia and there were 8.1% other complications, which is comparable with the present study.

Regarding the functional assessment of pain, it was observed that (9.09%) of the patients had slide occasional or no pain, most 68.18% had mild intermittent pain with normal activity, 13.63% had pain with moderate activity abolished by rest. 9.09% had pain which was tolerable but limits activity. Pain continuous at rest and intense with activity- was not observed. Tornetta[16] have showed 63.0% patients had no pain or pain only on strenuous activity. In another study, Tile[18] found that 36.0% patients had no pain, 52.0% had moderate pain and 62.0% had severe pain.

According to functional assessment of work, most of the patients (68.18%) of the study involved with same job with reduced performance, 36.36% patients in same job with same performance, 9.09% had to change the job and none was found not to do regular work group. Similarly, Tornetta[16] found in their study that two thirds of the patients returned to their original jobs and 16.0% changed jobs because of an associated injury. Miranda[12] have showed that 58.3% returned to previous occupation. Van[17] found that 5.4% patients reported to be unable to work and 16.2 patients had to change jobs because of their injuries, 51.4% patients were able to work as before and 24.3% of them had physically demanding work. The results obtained in the above studies are closely support the current study.

According to functional assessment of sitting- 54.54% patient could sit pain free and 13.63% was uncomfortable, 31.81% found painful if prolonged or awkward sitting. Van[17] found in their study that sitting was clearly limited in 39.0%, which is a lower with the present study.

Regarding the functional assessment of sexual intercourse, it was observed that 63.63% patients record pain free sexual intercourse, 27.72% painful if prolonged sexual intercourse, 4.54% uncomfortable during sexual intercourse and 2 patients (9.09%) were unmarried. On the outcome scale of Majeed[9], mentioned that 40.0% patients reported a change in sexual intercourse.

Regarding the walk - 77.72% patient used no stick during walking, 13.63%use one stick & 9.09% patients walk with two crutches which is consistent with Van[17] study, where23.0% patients used walking aids.

Regarding the functional assessment of gait,40.90%had slight limp, 45.45%had normal gait, 13.63% had moderate limp & none of the patient found in gross limp, shuffling small steps and can't walk group.

Regarding the assessment of walking distance 63.63% of the patients could walk normal for age and general condition, in 18.18% of the patient can walk one hour with a stick limited without,9.09% limited with sticks, difficult without prolonged standing possible& none of the patient found very limited time and distance or bed ridden. Tornetta[16] found that 63.0% patients ambulated without restriction and 12.0% had a limp which support the present study.

In this series it was observed that the mean Majeed[9] score was 85.13±11.42 with range from 55 to 100. According to score grading it was found that 63.63% excellent, 27.27% good and 9.09% fair. According to functional assessment similar findings obtained by Zamzam[14], where the investigators found 29% excellent, 42.0% good, 18.0% fair and 11.0% poor outcome.

In this study it was observed that satisfactory result was found 90.90% and unsatisfactory 9.09%. Matta[19] evaluated clinical results at follow-up and found that 86.0% satisfactory and 14.0% unsatisfactory, which support the present study. In this study 5 factors were assessed and scored: Pain, standing, sitting, sexual intercourse& work performance[9].

CONCLUSION

It is concluded that stabilization of APC type-II pelvic ring fractures by reconstruction plate and SI joint by per-

cutenous screw is a satisfactory and effective method of management for early mobilization, good functional outcome and rehabilitation of the patients.

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Original Article

Outcome of Lateral Calcaneal Artery Flap in Resurfacing of Posterior Heel Defects

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ABSTRACT

Resurfacing of soft tissue defects of the posterior heel presents challenging problems due to limited availability of local tissue and bony prominence. To observe the outcome of the lateral calcaneal artery flap in resurfacing of posterior heel defects. This prospective observational study was conducted at the Department of Orthopaedic surgery and Department of Burn & Plastic Surgery, Sylhet M.A.G. Osmani Medical College Hospital, Sylhet from October 2019 to March 2021. A total of 15 patients with posterior heel defects were selected by purposive sampling according to selection criteria. All the defects were resurfaced with lateral calcaneal artery flap. Post-operative complications, flap viability and flap survivability were assessed. Most of the patients belong to 31-40 years (33.3%) with male predominance (66.7%). Maximum defects were found in posterior heel with exposed tendoachilles 09 (60.0%). Wound dehiscence was predominant 09 (60.0%) followed by chronic ulcer 04 (26.7%) and acute trauma 02 (13.3%). At donor site loss of sensation was found in 15 cases (100%), partial loss of skin graft was in 1 case (6.7%) and at flap site marginal necrosis was found in 2 cases (13.3%) and dog ear deformity in 1 case (6.7%). Complete flap survivability was found in all cases (100%). According to pre-set criteria, out of 15 cases, 13 (86.7%) cases had excellent outcome and 2 (13.3%) cases had good outcome. The lateral calcaneal artery flap is a reliable flap in resurfacing of small soft tissue defects over posterior heel. It is relatively thin, sensate and easy to harvest in a single stage with minimal donor site morbidity.

Key words: Lateral calcaneal artery flap, posterior heel defects, flap survivability.

INTRODUCTION

Soft tissue defects of the posterior heel presents a difficult reconstructive problem because of osseous or tendinous bed, poor area vascularization, limited availability of local tissue and the limitations imposed by donor site morbidity[1]. This area is subjected to higher weight-bearing and shearing forces than any other area of the body[2]. Therefore, a defect of the heel can be a difficult problem for the patient because of the inability to wear normal shoes[3]. So any defects here require well

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vascularized reconstruction with good durability and sensation[4].

The etiology of heel defect includes trauma, infection, chronic ulcer, vascular disease, wound dehiscence after repair of tendoachilles etc[5]. As a basic principle, "tissue defect should be replaced with like tissue". This is very difficult in case of the heel because there is a paucity of expendable local tissue, and skin grafts may not take or may be inappropriate[3].

There are many options in resurfacing posterior heel defect, e.g., skin graft, local flaps, cross-leg flap, muscle flaps, musculocutaneous flaps, neurovascular free flaps etc[2].

Among these procedures, the lateral calcaneal artery flap which was first described by Grabb and Argenta is frequently used[6]. Since then it has been used with different modifications by different surgeons for the coverage of soft tissue defects of the ankle and foot[7].

The present study was aimed to observe the outcome of the lateral calcaneal artery flap in the cure of posterior heel defects with minimal donor site morbidity.

METHODS AND MATERIALS

This prospective observational studywas conducted in the Department of Orthopaedic Surgery and Department of Burn & Plastic Surgery at Sylhet M.A.G. Osmani Medical College Hospital, Sylhet from October 2019 to March 2021. A total of 15 patients with posterior heel defects, irrespective of age and sex were enrolled in this study. Purposive technique was applied as a sampling method according to inclusion and exclusion criteria.

Surgical technique :

After complete preoperative evaluation, course of the lateral calcaneal artery was outlined with Doppler ultrasound. Under sub arachnoid block, above knee tourniquet was applied. Three landmarks were identified and marked properly. First landmark was origin of Lateral Calcaneal Artery (LCA) from peroneal artery approximately 6 cm above the middle of the line connecting lateral malleolus and insertion of Achilles tendon. Second landmark was the middle of the line connecting between lateral malleolus and insertion of Achilles tendon. Third landmark was 1cm proximal to the tuberosity of the fifth metatarsal. The position and course of the Lateral Calcaneal artery was marked on the skin. Then the flap was measured and marked properly. The flap can be designed as a short vertical flap or a long flap that curves forward to the base of the fifth metatarsal.

Dissection begun at the lateral aspect of the calcaneal region and is carried out distally to the periosteum of the calcaneus. The plain was then developed leaving the periosteum intact. The anterior incision was made immediately behind the lateral malleolus and carried down through the subcutaneous tissue. Finally, the distal incision was made, and the neurovascular bundle was identified and divided. The flap was raised in a retrograde fashion. Dissection was carried out up to the level of the lateral malleolus. The base of the flap was kept at least 40 mm wide. Rotation to the defect was then performed and the flap is inset with 4 – 0 prolene. A split thickness skin graft was placed over the donor defect and a separate dressing was applied for the skin grafted area. An anterior short leg cast was applied.

Postoperatively the patient is kept in bed with the leg elevated for 5 to 7 days. Flap was followed up daily and the final outcome was assessed according to preset criteria.

Flap Outcome [8,9]

Excellent:

- Flap loss – No.
- Flap adhesion – Adequate.
- Complications – No.

Good / Satisfactory:

- Flap loss – Marginal/ Epidermal.
- Flap adhesion – Adequate.
- Complications - Yes; managed conservatively.
  - If present any one or more.

Poor:

- Flap loss - Partial/ Complete.
- Flap adhesion – Inadequate.
- Complications - Yes; managed surgically.
- Secondary procedure needed for donor site management under regional anaesthesia.
  - If present any one or more**.**



Measurement & designing of flap

Neurovascular structures



Elevation of the flap

After inserting the flap

Fig.-1: *Per-operative pictures of LCA flap*

RESULTS :

The results were assessed after 2 weeks, 4 weeks and 12 weeks postoperatively. Total 15 patients with posterior heel defects were included in this study. Most of the patients belong to 31-40 years (33.3%) with male predominance (66.7%) where the mean age of the patients was 34.80 ± 10.08 years.

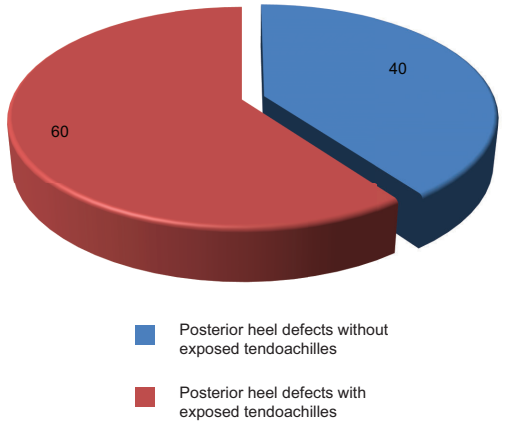


Fig.-2: *Distribution of the study cases according to site of defect (N=15).*

Pie chart showing distribution of the study subjects according to site of defect. Out of 15 cases, posterior heel defects with exposed tendoachilles were 09 (60.0%) and without exposed tendoachilles were 06 (40.0%).

Table I

Distribution of the study cases according to nature of injury (N=15)

Nature of injury	Frequency (n)	Percentage (%)
Acute trauma	2	13.3
Chronic ulcer	4	26.7
Wound dehiscence	9	60.0

Table I showing nature of injury of the study subjects. Among 15 cases, 09 (60.0%) cases were due to wound dehiscence, 04 (26.7%) cases caused by chronic ulcer and 02 (13.3%) cases were due to acute trauma.

Table II

Post-operative complications among study cases (N=15)

Post-operative complications	Frequency (n)	Percentage (%)
Marginal necrosis	2	13.3
Partial loss of skin graft (Donor site)	1	6.7
Loss of sensation (Donor site)	15	100
Dog ear deformity	1	6.7

Table II showing post-operative complications among study cases. Marginal necrosis was found in 2 cases (13.3%) at flap site. Loss of sensation was found in all the 15 cases (100%) and partial loss of skin graft was in 1 case (6.7%) at donor site. In only 1 case (6.7%) dog ear deformity was found.

Table III

Distribution of flap survivability among study cases (N=15)

Flap survivability	Frequency (n)	Percentage (%)
Complete flap survival	15	100.0
Marginal flap Necrosis	2	13.3
Partial flap loss	0	0
Total flap loss	0	0

Table III shows flap survivability among study cases. Complete flap survivability was found in all cases (100%). Marginal flap necrosis was found in 2 cases (13.3%).

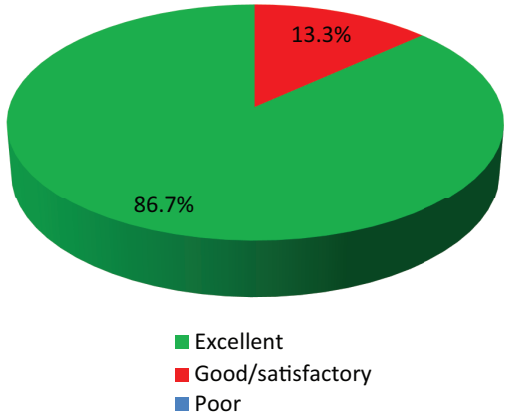


Fig.- 3: *Final outcome of flap based on pre-set criteria among study cases (N=15).*

Pie chart showing final outcome of the study cases. Out of 15 cases, 13 (86.7%) cases had excellent outcome and 2 (13.3%) cases had good / satisfactory outcome.

CONCLUSION

For the coverage of small soft tissue defects behind the foot with or without exposed tendoachilles, the Lateral Calcaneal Artery Flap is a good and reliable option. Its benefits include adequate coverage of posterior heel, low perioperative complications, good functional results and high success rate. At the same time; it is relatively thin, sensate, short learning curve, easy to harvest in a single stage with acceptable morbidity at the donor site and does not sacrifice any major artery of the leg or foot.

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Original Article

Musculoskeletal problem among security guards

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Abstracts:

Aim of the study was to identify musculoskeletal problem among security guards. A security guard's job is important for safeguarding both private property and the people who live or work on the premises they are tasked with watching over. Due to the different ergonomic risk factors prevalent in their workplace, between 50 and 70 percent of the workforce is at risk for getting a musculoskeletal illness. This study was performed in a cross-sectional study design. This study's sample was collected through convenience sampling procedure and total sample 120. The data was collected from the different areas across Dhaka. The data collection process was a questionnaire with a face-to-face interview. Data was analyzed with Microsoft Office, Excel 2019 using SPSS 26 version software program and test use of study chi-square test. This study's participant means and Standard deviation of participant age where are mean± SD = 37.58±11.840; about (55.8%) participants was 25-44 years; (26.7%)participants was more than 45 years; (17.5%) participants was less than 25 years. Educational level among participants PSC n=14 (11.7%), JSC n=26 (21.7%), SSC n=49 (40.8%), HSC n=19 (15.8%), Graduated n=4 (3.3%), and Illiterate n=8 (6.3%). From the database, it was found that 20.8% participants had neck pain, 12.5% participants had shoulder pain, 4.2% participants had upper back pain, 6.7% participants had elbow pain, 8.3% had wrist pain, 26.7% participants had low back pain, 3.3% participants had hip pain, 34.2% participants had knee pain and 18.3% participants had ankle pain in last 12 months. Therefore, most affected parts of the body were neck, lower back, knee and ankle.

Key words: Musculoskeletal Injuries; Security guards; Nordic questionnaire

INTRODUCTION:

Musculoskeletal disorders are a broad category that includes inflammatory and degenerative conditions that affect muscles, tendons, joints, peripheral nerves, etc. It affects several joints, resulting in long-term discomfort, exhaustion, and physical handicap, which increases employment restrictions, absenteeism, and job switching in developing nations. Due to the different ergonomic risk factors prevalent in their workplace, between 50 and 70 percent of the workforce is at risk for getting a musculoskeletal illness (Bhandare et al., 2020). A security guard's job is important for safeguarding both private property and the people who live or work on the premises they are tasked with watching over. Security officers frequently run the risk of a number of hazards at work, most commonly attacks. A strategy to creating and monitoring compliance with safe working practices and protecting the health and wellbeing of persons employed in a certain occupation or workplace is known as occupational safety (Manandhar et al., 2021). Musculoskeletal problems are strongly influenced by occupational exposures such external loads, psychosocial work environments, and organizational issues. The strongest predictors of multisite musculoskeletal pain are physical aspects like high loads, bending or twisting, vibrations, and uncomfortable postures, potentially as a

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result of the direct mechanical tissue stress imposed on joints. The majority of current biomechanical etiology research focuses on work-related musculoskeletal diseases that often affect security guards of all ages (Adnan et al., 2017). Security guards frequently suffer from musculoskeletal conditions. It is the primary reason why absence rates are rising. When people are positioned incorrectly while working in their daily lives, musculoskeletal diseases eventually develop. Considering that, the security officers spend the majority of their time standing still. Over time, musculoskeletal disorders develop gradually, and this may have a significant influence on a person's personal, social, and family life (Karande et al., 2021)

Musculoskeletal disorders are injuries to the human musculoskeletal system that can result from a variety of factors, including stress, muscle dystrophy or atrophy, musculoskeletal injury, repetitive motions, or any underlying systemic pathology. Carpal tunnel syndrome, sprains and strains, adhesive capsulitis, and others are common musculoskeletal conditions (Muntaha et al., 2018). Multiple places can experience musculoskeletal pain at once. Compared to single-site pain, the effects of multi-site pain appear to be worse. Localized low back pain by itself was not associated with long-term job disability in a population study with a 4-year follow-up, but when low back pain was a component of a broad pain condition.In a significant increase in the probability of disability was discovered.In contrast, having a single site of pain had no effect on functional status. In another study, problems with functioning, as judged by physical fitness, moods, daily activities, and social activities, rose almost linearly with the number of pain sites. Additionally, additional investigations have revealed widespread discomfort that has an impact on daily activities and quality of life (Miranda et al, 2009). Musculoskeletal problems can be acquired or congenital in origin, depending on the culture. Adult musculoskeletal problems are the leading cause of disability and one of the most important indicators of the state of the public health (Ekinci et al, 2015).

Employees who suffer from work-related musculoskeletal problems typically have stiffness in one or more body regions as well as joint pain, tingling, and edema. Employees who spend more than half of their working hours standing, on the other hand, are at risk of suffering an injury at work. According to study,standing for more than four hours a day promotes low back discomfort, and after just two hours of extended standing, 50% of stable persons experience back and leg stiffness (Bhure et al., 2021).

Research Methodology: The aim of the study is to find out musculoskeletal problems among security guards in Dhaka city. The design of the study will be cross sectional. The cross sectional study design is usually cheaper and quicker and confounding variables can be controlled for during data analysis.Data was collected among security guards from Dhaka city.And study population was security guards.

Results: This was a cross sectional study. The main objective of this study was to identify musculoskeletal problem among security guards,to explore Socio demographic characteristics of study population,to analyze the frequency musculoskeletal pain in upper and lower quadrant among security guards,Association between age and most affected area of the body.Total 120 data were collected from security guards who lives in Dhaka city.Data were numerically coded and captured in Microsoft Excel,using an SPSS 25 version software program.The investigator collected the descriptive data,calculate as percentages,and presented by using bar charts.

Socio Demographic Information: This study's participant means and Standard deviation of participant age where are mean± SD = 37.58±11.840; about (55.8%) participants was 25-44 years; (26.7%) participants was more than 45 years; (17.5%) participants was less than 25 years. In this study sex of the participants (n= 115) 95.80% were male and (n= 5) 4.20% were female. In this survey, majority participants were (65%) nuclear family and minor participants were (35%) extended family. In this study shows that educational level among participants PSC n=14 (11.7%), JSC n=26 (21.7%), SSC n=49 (40.8%), HSC n=19 (15.8%), Graduated n=4 (3.3%), and Illiterate n=8 (6.3%).A total 120 participants were respondent. Among them 83.3% were married and 16.7% were unmarried. This survey is ninety-three-point three percent (93.3%) religion Islam; five-point eight percent (5.8%) Hindu; zero-point eight percent (0.8%) works Christian. In this survey, (55.8%) participant's monthly income was 10001-25000/- taka; and (44.2%) participant's monthly income was less than 10000/- taka.

General health related information: This study's participant means and standard deviation of security guards BMI where are Mean ±SD= 23.392±2.9429; about (5.8%) participants less than <18.5 kg/m2; (63.3%) participants was 18.5-24.9kg/m2 and (30.8%) participants was more than 24.9kg/m2. It is found that 30.8% security guard have smoking habit and 69.2% security guard have no smoking habit. In this survey, total participants was

n=120 where (7.5%) participants was diabetics problem and (92.5%) participants was not any diabetics problem. Among all participants (82.5%) participants was not hypertension and (17.5%) participants was hypertension. In this study shows that, (23.3%) participants was arthritis problem and (76.7%) participants was not any arthritis problem.

Nordic musculoskeletal questioners: Among 120 participants n=25; (20.8%) participants was neck pain in last 12 months and n=95; (79.2%) participants was not neck pain in last 12 months. Among 120 participants n=25; (20.8%) participants was neck pain in last 12 months and n=95; (79.2%) participants was not neck pain in last 12 months. Among all participants n=104; (86.7%) participants was not create any problem in normal activities for neck pain in last 12 months and n=16; (13.3%) participants was create problems in normal activities for neck pain in last 12 months. Among all n=11; (9.2%) participants seen a doctor for neck pain in last 12 months and n=109; (90.8%) participants was not seen a doctor for neck pain in last 12 months. Among all n=16; (13.3%) participants was neck pain in last 7 days and n=104; (86.7%) participants was not neck pain in last 7 days. Among 120 participants n=15; (12.5%) participants was shoulder pain in last 12 months and n=105; (87.5%) participants was not shoulder pain in last 12 months. Among all participants n=115; (95.8%) participants was not create any problem in normal activities for shoulder pain in last 12 months and n=5; (4.2%) participants was create problems in normal activities for shoulder pain in last 12 months. Among all n=8; (7%) participants seen a doctor for shoulder pain in last 12 months and n=112; (93%) participants was not seen a doctor for shoulder pain in last 12 months. Among all n=6; (5%) participants was shoulder pain in last 7 days and n=114; (95%) participants was not shoulder pain in last 7 days. Among 120 participants n=5; (4.2%) participants was upper back pain in last 12 months and n=115; (95.8%) participants was not upper back pain in last 12 months. Among all participants n=2; (1.7%) participants was create problem in normal activities for upper back pain in last 12 months and n=118; (98.3%) participants was not create problems in normal activities for upper back pain in last 12 months. Among all n=118; (98.3%) participants was not seen a doctor for upper back pain in last 12 months and n=2; (1.7%) participants was seen a doctor for upper back pain in last 12 months. Among all n=3; (2.5%) participants was upper back pain in last 7 days and n=117; (97.5%) participants was not upper back pain in last 7 days. Among 120 participants n=8; (6.7%) participants was elbow pain in last 12 months and n=112; (93.3%) participants was not elbow pain in last 12 months. Among all participants n=1; (0.8%) participants was create problem in normal activities for elbow pain in last 12 months and n=119; (99.2%) participants was not create problems in normal activities for elbow pain in last 12 months.Among all n=119; (99.2%) participants was not seen a doctor for elbow pain in last 12 months and n=1; (0.8%) participants was seen a doctor for elbow pain in last 12 months. Among all n=2; (1.7%) participants was elbow pain in last 7 days and n=118; (98.3%) participants was not elbow pain in last 7 days. Among 120 participants n=10; (8.3%) participants was wrist pain in last 12 months and n=110; (91.7%) participants was not wrist pain in last 12 months. Among all participants n=5; (4.2%) participants was create problem in normal activities for wrist pain in last 12 months and n=115; (95.8%) participants was not create problems in normal activities for wrist pain in last 12 months. Among all n=115; (95.8%) participants was not seen a doctor for wrist pain in last 12 months and n=5; (4.2%) participants was seen a doctor for wrist pain in last 12 months. Among all n=4; (3.3%) participants was wrist pain in last 7 days and n=116; (96.7%) participants was not wrist pain in last 7 days. Among 120 participants n=32; (26.7%) participants was low back pain in last 12 months and n=88; (73.3%) participants was not low back pain in last 12 months.

Low back pain in last 12

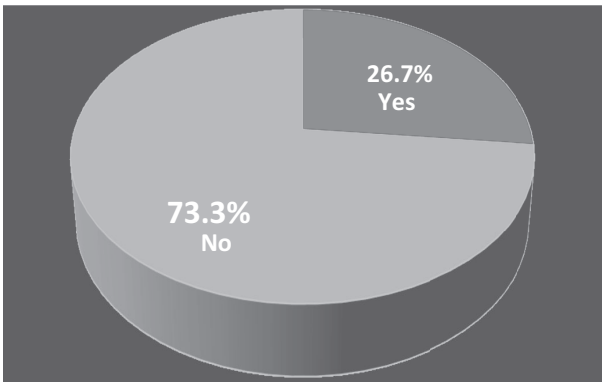


Fig.-1: *Low back pain in last 12 months*

Among all participants n=22; (18.3%) participants was create problem in normal activities for lower back pain in last 12 months and n=98; (81.7%) participants was not create problems in normal activities for lower back pain in last 12 months. Among all n=108; (90%) participants was not seen a doctor for low back pain in last 12 months and n=12; (10%) participants was seen a doctor for low back pain in last 12 months. Among all n=20; (16.7%) participants was low back pain in last 7 days and n=100;

(83.3%) participants was not lower back pain in last 7 days. Among 120 participants n=4; (3.3%) participants was hip pain in last 12 months and n=116; (96.7%) participants was not hip pain in last 12 months. Among all participants n=3; (2.5%) participants was create problem in normal activities for hip pain in last 12 months and n=117; (97.5%) participants was not create problems in normal activities for hip pain in last 12 months. Among all n=118; (98.3%) participants was not seen a doctor for hip pain in last 12 months and n=2; (1.7%) participants was seen a doctor for hip pain in last 12 months. Among all n=1; (0.8%) participants was hip pain in last 7 days and n=119; (99.2%) participants was not hip pain in last 7 days. Among 120 participants n=41; (34.2%) participants was knee pain in last 12 months and n=79; (65.8%) participants was not knee pain in last 12 months. Among all participants n=21; (17.5%) participants was create problem in normal activities for knee pain in last 12 months and n=99; (82.5%) participants was not create problems in normal activities for knee pain in last 12 months.

Normal activities problem in last 12 months for knee pain

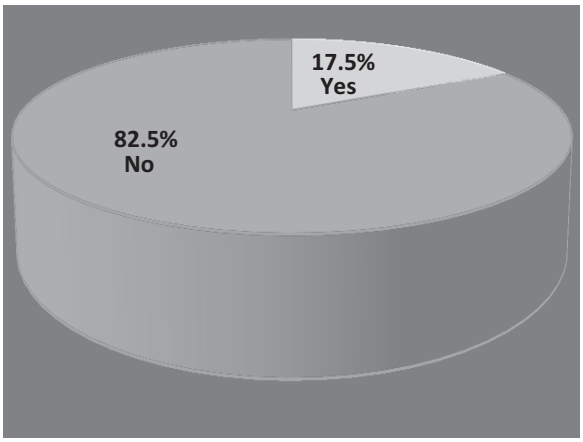


Fig.-1: *Normal activities problem in last 12 months for knee pain*

Among all n=106; (88.3%) participants was not seen a doctor for knee pain in last 12 months and n=14; (11.7%) participants was seen a doctor for knee pain in last 12 months. Among all n=23; (19.2%) participants was knee pain in last 7 days and n=97; (80.8%) participants was not knee pain in last 7 days. Among 120 participants n=22; (18.3%) participants was ankle pain in last 12 months and n=98; (81.7%) participants was not ankle pain in last 12 months. Among all participants n=8; (6.7%) participants was create problem in normal activities for ankle pain in last 12 months and n=112; (93.3%) participants was not create problems in normal activities for ankle pain in last 12 months. Among all n=113; (94.2%) participants was not seen a doctor for ankle pain in last 12 months and n=7; (5.8%) participants was seen a doctor for ankle pain in last 12 monthsAmong all n=14; (11.7%) participants was ankle pain in last 7 days and n=106; (88.3%) participants was not ankle pain in last 7 days.

DISCUSSION

This study aims to provide a comprehensive survey of the musculoskeletal problem among security guards in Dhaka city. This study's participant means and standard deviation of participant age where are Mean ±SD= 37.58±11.840; about (55.8%) participants was 25-44 years; (26.7%) participants was more than 45 years; (17.5%) participants was less than 25 years. Another similar study was found that their mean and SD was 45.22 ±9.819 years (Muntaha et al., 2018).

In this study shows that, according to the gender there was total 120 participants (n= 115) 95.80% was male and (n= 5) 4.20% was female. The greater number of participants were males rather than females because of least opportunities to females in the security center, jobs and cultural. Another survey also shows that, there was total 134 participants among which 74% are male and 26% are female (Bhandare et al., 2020).In this study found that out of 120 participants n=15; (12.5%) participants was shoulder pain and n=5; (4.2%) participants was upper back pain. Another similar study reveals out of 231 participants 91 (39.1%) security guards reported shoulder pain. Where 67 (28.8%) out of total 233 participants, reported pain in the upper back region of the body (Muntaha et al., 2018). A cross sectional study in 2010 was conducted by Alrowayeh HN et al., using a self-made questionnaire that was distributed to threehundred and fifty physiotherapists. Of the 212 responders incorporated into the examination, the one-year frequency of WMSDs was 21% in neck, 19% in upper back, and 13% in shoulder. This study found out of total 120 participants n=25; (20.8%)participants was neck pain. However, n=15; (12.5%) participants was shoulder pain (Alrowayeh HN et al., 2010).

According to this study means and standard deviation of security guards BMI where are Mean ±SD= 23.392±2.9429; about (5.8%) participants less than <18.5 kg/m2; (63.3%) participants was 18.5-24.9kg/m2 and (30.8%) participants was more than 24.9kg/m2. Another survey found that their mean and standard deviation of body mass index (BMI) 23.84 ± 3.84 kg/m2 (Rufa et al., 2019). This survey finds that out of 120 security guards n=32; (26.7%) participants was low back pain and out of 120 security guards

participants n=41; (34.2%) participants was knee pain in last 12 months. Another study found that a greater value of (29.7%) recorded pain in the lower back region, and (15.8%) in knee region in the previous 12 months (Khalid et al., 2021).In this study shows that total 120 security guards participated where educational level among participants PSC n=14 (11.7%), JSC n=26 (21.7%), SSC n=49 (40.8%), HSC n=19 (15.8%), Graduated n=4 (3.3%), and Illiterate n=8 (6.3%). Another study found that total 253 participated and a majority of the participants had secondary level of education 127 (54.2%) percent (Rufa et al., 2019). This study finds that majority of security guards were Muslim by religion ninety-three-point three percent n=112 (93.3%); five-point eight percent n=7 (5.8%) Hindu; zero-point eight percent n=1 (0.8%) works Christian. Another similar survey responded, that Majority of security guards were Hindu by religion, 55(91.67 %), 2(3.33%) were Muslims and 3(5 %) belonged to others (Rocque et al., 2021). In this survey shows that total 120 participants where (n=37)30.8% security guard have smoking habit and (n=83)69.2% security guard have no smoking habit. Majority of security guards was not any smoking habit. Other study result shows that out of 150 security guards 49(32.7%) of the participants was smoking habit and 101(67.3%) of the participants was not any smoking habit. So, majority of the participants was not any smoking habit in other survey (Renitha et al., 2015).An institution based cross sectional study was conducted in February and March 2020 among 60 security personnel working in shifts at AIIMS Raipur. Of 60 participants 32(53.33%) were from nuclear family and 28 (46.67%) were from joint family. According to this survey majority participants were n=78 (65%) nuclear family and minor participants were n=42 (35%) extended family (Rocque et al., 2021).The cross sectional survey of 101 security personnel was conducted in Hayatabad Peshawar from February to August 2020. Out of 101 security guards the most affected region of pain in last 12 months was lower back having frequency of (n=18) and age limit50-60years, followed by knee frequency of (n=9) and age limit of 40-50years. There was correlation of age with upper back, lower back and knee pain because their p-value (0.047) was less than 0.05, while no correlation was found between age and rest of the body regions because of greater p-value than 0.05 (Khalid et al., 2021).In this survey found that, among 120 participants in last 12 months there were 2.5%(3) participants had knee pain among less than 25 years, 16.7%(20) participants had knee pain in between 25-44 years, 15.0%(18) had response with knee pain more than 45years,p-value was .004 < 0.05. 2.5 % (3) participants had neck pain among less than 25 years, 10.0% (12) participants had neck pain in between 25-44 years, 8.3%(10) had response with neck pain more than 45 years, was p=.223 > 0.05. 2.5%(3) participants had low back pain among less than 25 years, 15.0% (18) participants had low back pain in between 25-44 years, 9.2%(11) had response with low back pain more than 45 years, was and p=.270 > 0.05. 1.7%(2) participants had ankle pain among less than 25 years, 10.0% (12) participants had ankle pain in between 25-44 years, 6.7%(8) had response with ankle pain more than 45 years, was and p=.359 > 0.05. There was no correlation of age with neck, lower back and ankle pain because their p-value was more than 0.05. There was correlation of age with knee pain because their p-value was less than 0.05. In this study out of 120 participants were respondent. Majority of the security guards (n=100) 83.3% were married and (n=20) 16.7% were unmarried. Another survey found that total 130 security guards majority 8.20% was single and 2.79% was married (Zamanian et al., 2012).

RECOMMENDATION:

The purpose of the study was to estimate the musculoskeletal problem among the security guards in Dhaka city. In this study researcher only took the security guards from Dhaka city to show the ratio of the musculoskeletal problem among the security guards. However, due to time limitations, the investigator was not able to gather a huge number of participants and this result cannot be generalized all over Bangladesh. So, for further study, it is strongly recommended to increase the sample size to generalize the result in all of the security guards in Bangladesh. This study can be considered as a groundwork for the physiotherapy service provision for the security guards with symptoms they usually suffered. Proper physiotherapy can reduce symptoms and prevents post complications. There are few studies on security guards. These cannot cover all aspects of the vast area. Therefore, it isrecommended that the next generation of physiotherapy members continue study regarding this area as well as a different area such as common musculoskeletal problems, the effectiveness of physiotherapy and should take necessary steps.

CONCLUSION:

This study aims to provide a comprehensive survey of the musculoskeletal problem among security guard in Dhaka city. This study focused on musculoskeletal problem symptoms in security guards. Musculoskeletal disorders have a great impact causing severe long-term

pain, physical disability and give rise to huge costs for society. The investigator used a questionnaire. Participants was given a questionnaire to identify the musculoskeletal problem among them. From the database, it was found that 20.8% participants had neck pain, 12.5% participants had shoulder pain, 4.2% participants had upper back pain, 6.7% participants had elbow pain, 8.3% had wrist pain, 26.7% participants had low back pain, 3.3% participants had hip pain, 34.2% participants had knee pain and 18.3% participants had ankle pain in last 12 months. Therefore, most affected parts of the body was neck, lower back, knee and ankle. In addition, since this sample size was small to generate adequate evidence to support decision making processes at the national level, there should be more studies among the security guards in Bangladesh. Appropriate, adequate and timely information is needed to build awareness among them.

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Original Article

Present Assessment Status of 'Allied Subjects of Surgery' in Undergraduate Medical Education of Bangladesh: Teachers' views

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ABSTRACT

Effective assessment system is one of the most important component of better outcome in medical education which is an integral part of clinical teaching-learning process. This cross sectional study was conducted to identify the views of teachers of Surgery and its Allied Subjects about the present assessment status of 'Allied Subjects of Surgery' in undergraduate medical education of Bangladesh. The study was conducted from January 2021 to December 2021. A self-administered semi-structured questionnaire was administered to collect data from 160 teachers of Surgery and its Allied Subjects. Convenience sampling technique was adopted for selection of eight medical colleges and the respondents were selected from the colleges purposively. Study revealed that the conditions of different issues like formative assessments, summative assessments (Professional examinations) , short answer questions (SAQ), multiple choice questions (MCQ), structure oral examinations (SOE) , objective structured clinical examinations (OSCE) and short cases were poor and in case of long cases were very poor in most of the Allied Subjects of Surgery compared to General Surgery, Otolaryngology and Ophthalmology and these differences were also statistically highly significant in all cases. It was also observed that Orthopedics and Casualty were in slightly better condition in few assessment areas than other new Allied Subjects of Surgery included in the Undergraduate Curriculums of Bangladesh in 2002 and 2012. Hence it can be recommended that most of the Allied Subjects of Surgery should get optimum importance during the assessment procedures in undergraduate medical education of Bangladesh according to the health needs of the community.

Keywords: Allied Subjects of Surgery, Assessment, Evaluation, Undergraduate Medical Education of Bangladesh.

INTRODUCTION

Clinical teaching is the teaching and learning focused on and usually directly involving patients and their problems.[1] Clinical teaching lies at the heart of medical education.[2] At undergraduate level, medical and dental schools strive to give students as much clinical exposure as possible.[3] The purpose of assessment is to meet the public anticipation about the quality graduates, to give feedback to the educational directors about the class, to separate the scholars according to their gift and to cover their own literacy. Assessment also provides a high degree of fairness and neutrality in testing and produces data to enable nonstop quality enhance ment.[4] The welfare and indeed the future health of people depend on the quality of medical graduates and the quality of medical graduates depends on quality of medical education. Educationists believe that just by changing the assessment style for the learners can affect the way students engage with the topic

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contents.[5] The process of medical education in Bangladesh began with the establishment of the Mitford school of medicine and Hospital at Dhaka within the early 20th century. The medical education system inherited the standard features of colonial education, which is extremely much on the normal pattern: lecture-based, teacher-centered, discipline-based, examination-driven and hospital-oriented. Till 1988, there was no formal medical curriculum except a syllabus, published by Bangladesh Medical and Dental Council.[6] Medical education should be always moving sort of a river otherwise it'll not reach deal with new health issues. But curriculum change is not an easy work and 'turf battles' are expected.[7] According to MBBS curriculum, 2012 Allied Subjects of Surgery are Orthopedics, Radiology, Radiotherapy, Transfusion medicine, Anesthesia, Neurosurgery, Pediatric Surgery, Urology, Burn Plastic Surgery, Emergency & casualty, Dentistry, Ophthalmology, and Otolaryngology. It is believed that due to more time and effort given for General Surgery, Ophthalmology & Otolaryngology and lack of different facilities, the teaching and learning of Allied Subjects of Surgery are relatively neglected at undergraduate level which is reducing the competency of MBBS doctors in Bangladesh to manage the basic surgical problems in practical field.

METHODOLOGY

This cross-sectional descriptive study was conducted was conducted from 01 January 2021 to 31 December 2021 (01 year) after approval from Intuitional Review Board (IRB) of Centre for Medical Education of Bangladesh (CME) as a part of thesis of Masters in Medical Education (MMEd) under Bangabandhu Sheikh Mujib Medical University (BSMMU). Data were collected from purposively selected 160 teachers of General Surgery and its Allied Subjects from conveniently selected eight medical colleges of Bangladesh after getting permission from the concerned authorities and respondents. Their comments regarding assessment were collected in a self-administered semi structured questionnaire that contained eleven questions on this issue in Surgery and its Allied Subjects in undergraduate medical education of Bangladesh. The questionnaires were distributed to the teachers of General Surgery and its Allied Subjects and were collected with the responses face to face; in some cases these were collected by online (WhatsApp) procedure due to restrictions in COVID 19 pandemic situation. Data were entered, processed and analyzed by using SPSS software program version 26.

RESULT

Table 1 showed that distribution of teachers by their opinion about different issues of assessment in 'Surgery and Allied subjects' in MBBS course. From the opinion of teachers of the department of 'Surgery and its Allied subjects' it was found that out of maximum score 4 the mean scores of 'Marks allocated in final professional examination in SAQ', 'Marks allocated in final professional examination in SOE', 'Total number of short cases in final professional examination of Surgery', 'Total number of specimen/ patient/ stations in OSPE/ OSCE in final professional examination' ,'Marks allocated in formative examination', 'Marks allocated in final professional examination in MCQ' were in between 2.5 to 3. In case of 'Total number of long cases in final professional examination of Surgery' mean score was below 2.

Table 1 *Distribution of teachers by their opinion about different issues of assessment in Surgery and Allied subjects in MBBS course (n=160)*

Issues of the curriculum	Number (%) of agreement with corresponding score				
	HIAdq 1	IAdq 2	Adq 3	HAdq 4	Mean(±SD)
Marks allocated in formative examination	16(10.0)	74(46.3)	32(20.0)	38(23.8)	2.58(.962)
Marks allocated in final professional examination in MCQ	3(1.9)	17(10.6)	73(45.6)	67(41.9)	2.68(.921)
Marks allocated in final professional examination in SAQ	5(3.1)	61(38.1)	56(35.0)	38(23.8)	2.79(.840)
Marks allocated in final professional examination in SOE	10(6.3)	55(34.4)	57(35.6)	38(23.8)	2.77(.885)
Total number of long cases in final professional examination of Surgery	108(67.5)	28(17.5)	7(4.4)	17(10.6)	1.61(1.022)
Total number of short cases in final professional examination of Surgery	20(12.5)	73(45.6)	27(16.9)	40(25.0)	2.74(1.847)
Total number of specimen/ patient/ stations in OSPE/ OSCE in finalprofessional examination	2(1.3)	66(41.3)	49(30.6)	43(26.9)	2.83(.841)

HIAdq = Highly Inadequate, IAdq = Inadequate, Adq = Adequate, HAdq = Highly Adequate

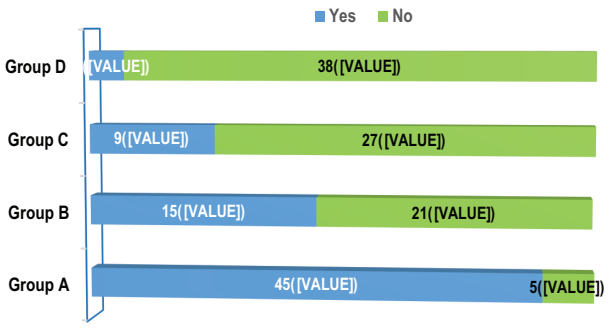
Table II

Comparing opinion of teachers about different issues of assessment in 'Surgery and its Allied Subjects' in MBBS course (n = 160)

Issues of the curriculum	Mean (±SD) of the level of agreement of different groups				
	Group A (n=50)	Group B (n=33)	Group C (n=36)	Group D (n=41)	P Value
Marks allocated in formative examination	3.80(.404)	3.30(.467)	3.08(.732)	2.95(.740)	.000*
Marks allocated in final professional examination in MCQ	3.76(.517)	3.30(.467)	3.08(.732)	2.83(.771)	.000*
Marks allocated in final professional examination in SAQ	3.76(.431)	2.55(.506)	2.39(.494)	2.17(.629)	.000*
Marks allocated in final professional examination in SOE	3.76(.431)	2.70(.467)	2.22(.637)	2.10(.625)	.000*
Total number of long cases in final professional examination of Surgery	2.50(1.233)	1.03(.174)	1.31(.525)	1.15(.422)	.000*
Total number of short cases in final professional examination of Surgery	3.76(.517)	1.88(.740)	2.25(.439)	1.85(.527)	.000**
Total number of stations (OSPE) in final professional examination of Surgery	3.82(.482)	2.45(.506)	2.28(.566)	2.41(.499)	.000**

*One way regular ANOVA done due to homogenous variances, ** Welch ANOVA done due to heterogeneous variances
Group A includes the opinion of teachers of Surgery, Ophthalmology and Otolaryngology
Group B includes the opinion of teachers of Orthopedics, Emergency and Casualty
Group C includes the opinion of teachers of Neurosurgery, Pediatric Surgery, Urology and Burn & Plastic surgery
Group D includes the opinion of teachers of Radiology, Radiotherapy, Transfusion Medicine and Anesthesia.

Table 2 comparing opinion of teachers about different issues of curriculum about assessment in 'Surgery and its Allied subjects' in MBBS course. The mean scores were higher in case of Group A compared to other groups. P value was calculated by one way regular ANOVA were the variances among the groups were not statistically different and by Welch ANOVA when variances among the groups statistically different. In all cases Post Hoc Dennett 2-sided t test was done to examine the difference between Group A and other groups. It was found the differences were statistically highly significant in all cases.



Group A (n=50), Group B (n=33), Group C (n=36), Group D (n=41).

Figure 1 Comparing opinion of the teachers about seperate viva board of their respective subjects in final professional examination (n=160)

Figure 1 showed comparing opinion of the teachers about separate viva board of their respective subjects in final professional examination. Maximum teachers of group A (90%) agreed to have a separate viva board in final professional examination. 46% teachers of Group B and 25% of Group C were agreed for a the separate viva board. Only 7% teachers of Group D were agreed for separate viva board in final professional examination.

DISCUSSION

From the overall mean scores of the opinions of the teachers it was found that no issue about assessment can be considered as satisfactory because in all cases the scores were less than 3 out of 4 point score. It was worst in cases of long cases. So the teachers of most of the Allied Subjects of Surgery were not satisfied with the assessment both formative and summative in final professional examination. So our present assessment systems in MBBS course of Surgery and its Allied subjects should be strengthened for achieving desired competencies by graduate doctors of Bangladesh.

The mean scores of all issues of assessments of Group A was better than other groups and these differences were statistically highly significant. From these findings it can be assumed that Surgery, Ophthalmology and Otolaryngology were in better position regarding

assessment than other subjects. This findings probably Surgery, Ophthalmology and Otolaryngology had separate viva board and written questions from beginning of MBBS course in Bangladesh. In another study in India it was recommended that Pediatric Surgery should be included as a separate subject in the medical curriculum with independent evaluation similar to Pediatric Medicine, Orthopedics, ENT etc. The examination process must be more relevant, practical oriented and these changes will eventually translate in to raise patient care.[8]

About separate viva board in final professional examination 90% teachers (Figure 1) of group A agreed to have a separate viva board in final professional examination which still had separate viva board in final professional examination. So maximum teachers of group A (General Surgery, Ophthalmology and Otolaryngology) did not want to give up their right about separate viva board. Large number of teachers of group B (46%) agreed to have separate viva board who do not have a separate viva board at present. Due to higher demand of the subjects according to the need of the community the teachers of the subjects were demanding separate viva board as it will enhance the teaching learning of the subjects in MBBS course. As there is an unavoidable truth that assessment drives learning.[9] In a survey of family physicians, it was found that half of them thought that their training in orthopedics in undergraduate level was inadequate.[10] Teachers of group C (Neurosurgery, Pediatric Surgery, Urology and Burn & Plastic surgery) and group D (Radiology, Radiotherapy, Transfusion Medicine and Anesthesia) were less interested about separate viva board in final professional examination. Probably the cause were these subjects have importance in practical fields of treatment but not so vast in undergraduate level.

CONCLUSION

The newer Allied subjects of Surgery that were included in the MBBS curriculums in 2002 and 2012 are neglected in present assessment procedures compared to Surgery, Ophthalmology and Otolaryngology in MBBS course of Bangladesh. Now we should give adequate emphasis during assessments on these Allied Subjects according to the curricular contents which were definitely formulated considering the country health need.

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Original Article

Osteoid osteoma of calcar of femur in child: prophylactic fixation using DCP and excision

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Abstract:

Osteoid osteoma (OO) affects proximal femur in 20%–25% of cases.When they are intra-articular, they can mimic inflammatory synovitis and be difficult to diagnose.CT scan is the imaging modality of choice.Various treatment modalities have been described in literature but surgical excision remains gold standard.Here we present two cases of OO of proximal femur-treated enbloc resection after prophylactic fixation with Small Dynamic Compression(DCP) plate in child and adolescence. This type of fixation provides complete removal and the plate is found to be countered to the bone as illustrated.

Keywords: Prophylactic fixation, Osteoid osteoma

INTRODUCTION:

Osteoid osteoma is the most commonly seen benign bone-forming lesion, accounting for 10% to 12% of all benign bone tumors and 3% of all primary bone tumors.This lesion commonly occurs in persons aged 5 to 25 years, with a male to female ratio of 2:1.In more than 50% of the cases, the lesion occurs in the metaphysis and diaphysis of long bones, especially the femur and tibia.

Clinical symptoms of osteoid osteoma classically include the presence of local pain that is more frequent and severe at night and that is relieved with nonsteroidal anti-inflammatory drugs. Other signs and symptoms include local swelling and tenderness, bony deformity, gait disturbances, and muscle atrophy.

Plain radiograph is the initial examination of choice. Osteoid osteoma has a characteristic oval radiolucency representing the nidus as well as a surrounding area of reactive bone sclerosis with or without periosteal bone formation. CT is considered to be the imaging method of choice for visualizing the anatomic position of the nidus and aiding in the differential diagnosis.On thin slice CT the lesion appears as a low-attenuation nidus with central mineralization and varying degrees of sclerosis surrounding the nidus.

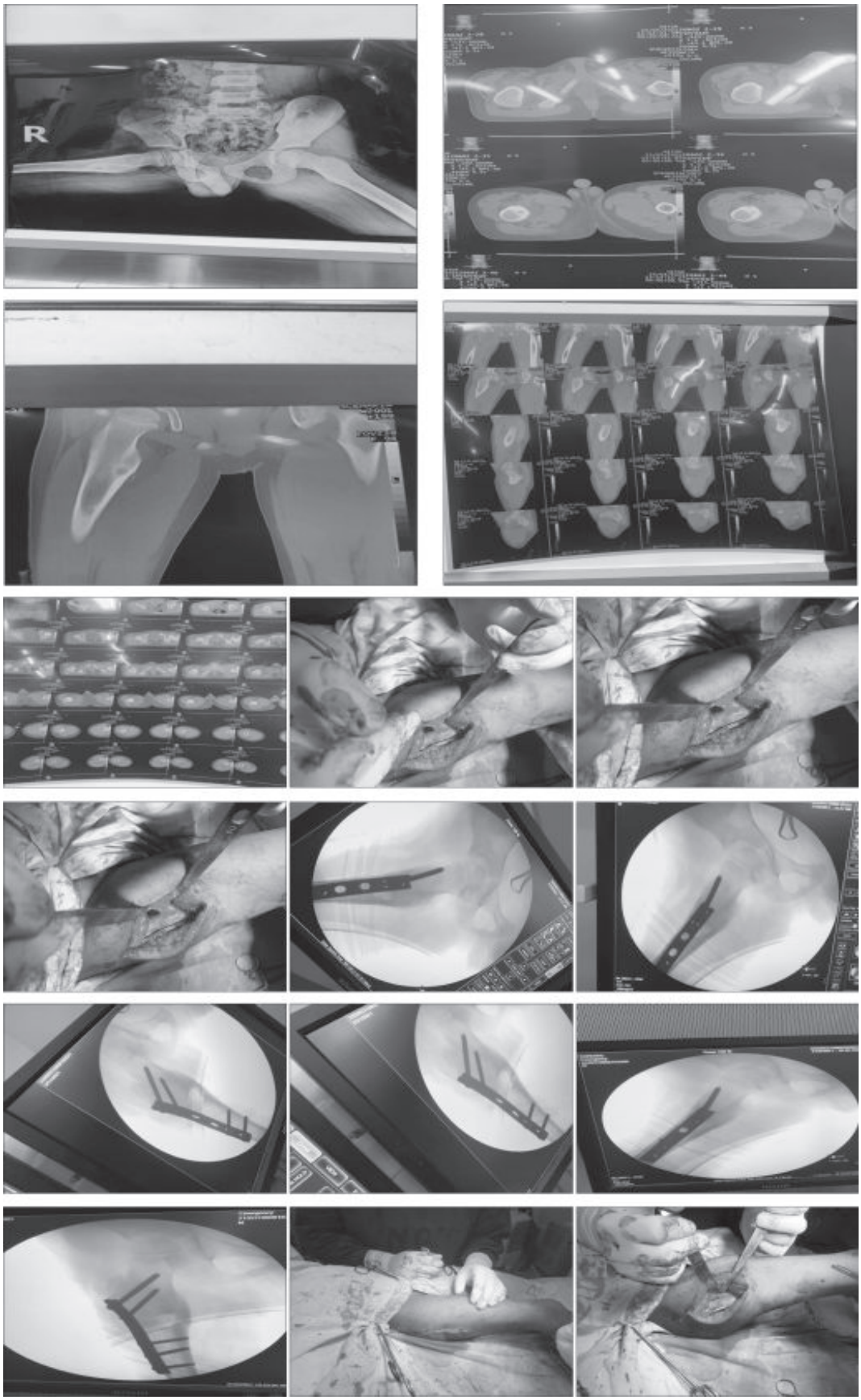
Nonsurgical management with salicylates or NSAIDs is a justifiable therapeutic option because these drugs can effectively relieve pain. However few published studies have evaluated the effects of prolonged medical management and reported complete resolution of symptoms with discontinuation of NSAIDs.Surgical treatment options include open excision of the lesion, CT-guided percutaneous excision, and CT-guided radiofrequency ablation. Surgical management is warranted in cases in which the pain is severe and unresponsive to medication, or for patients who are unwilling to accept potential gastrointestinal complications associated with the use of NSAIDs. En bloc excision of the tumor, and cortical shaving and curettage of the nidus cavity, are frequently used conventional techniques with successful outcomes.CT-guided percutaneous excision uses a cannulated curette that is inserted into the lesion over a Kirschner wire under CT image guidance to excise the nidus. In CT-guided radiofrequency ablation, heat is applied locally to destroy the nidus.

CASE PRESENTATION:

An 08-year-old boy weighing 20 kg was diagnosed as Osteoid osteoma of calcar region after clinical and radiological examination .Antero-posterior and lateral

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radiographs of the left hip child showing sclerosis in the anteromedial aspect of the left lesser trochanter, nidus surrounded by the reactive bone of sclerosis ; CT scan images showing eccentric lytic lesion with reactive bone sclerosis extending below lesser trochanter

Using a Watson-Jones approach the Small dynamic compression plate was slides and fixed. The limb was then external rotated and the periosteum was incised longitudinally. Two Hohman's retractor was placed superior and inferior to lesser trochanter and psoas tendon was displaced away from the working field. A cortical window was created and the lesion was curetted. The biopsy confirmed OO. The patient was kept non-weight bearing for a month after which he started to mobilize. At his last follow-up at 8 months, he could stand painless on operated limb, radiographs show bridging callous and CT scans show reduction in cavity's size were satisfactory .

The aim of the treatment is to complete removal of the lesion. Latest technical modalities thermo/radiofrequency ablation are available in sophisticated centers and unaffordable to majority of poor patients in developing countries like ours.Recently, percutaneous drilling of the nidus either image intensifier- guided/CT-guided has been described to safe, minimally invasive and cost-effective method though technically demanding. An enbloc surgical excision is gold standard technique but chances of iatrogenic fracture and use fixation devices particularly in the children remain a concern.The Small dynamic compression plate used for fixation and allowing for surgical manoeuvre medially. This can be done with a single or two incisions . We have not done bone grafting in any of the cases.

CONCLUSION :

Osteoid osteoma of calcar is rare and difficult to diagnose. Surgical excision can be associated with iatrogenic fracture requiring prophylactic fixation The case presented is a good example of how surgical management of osteoid osteoma in structurally vital locationsshould include removal of the lesion, as well as prophylactic fixation. This approach helps maintain support of these high stress areas.

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Original Article

Short segment fixation by pedicle screws and rods with unilateral postero lumber fusion of dorsolumber vertebral injury with incomplete spinal cord lesion is an effective method of treatment

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Abstract

Dorsolumbar spine region comprises almost 90% of all spinal fractures and some injuries hold a high propensity leading to permanent disability. As definitive management of various spectrums of injuries still remains in a diffuse controversy, a study on short-segment fixation with unilateral dorsolumber fusion can be a reference for these management options. Therefore, this study aims to assess the radiological and functional outcome of short-segment fixation of dorsolumbar vertebral injury with incomplete spinal cord injury. This is a prospective observational Study. A total of 24 cases were included in the study from July 2018 to Jun 2020 through non randomized purposive sampling. All the patients were between 19 to 60 years of age and operated within 7-30 days of fracture by short-segment pedicle screw fixation with unilateral posterolateral fusion by autogenous cancellous bone graft. Postoperative functional outcome was assessed both clinically by Denis pain scale, Denis work scale, ODI, VAS and ASIA impairment grade, and radiologically by Cob s kyphotic angle, kyphotic deformation, Beck index & Bridwell fusion scale. Postoperative follow up was conducted at 2nd, 6th, 12th and 24th weeks. The mean age found in 50.5 years with male dominancy (75.80%). In this present series, 6 (25.0%) of patients were of ASIA grade B pre-operatively followed by 9 (37.5%) both for ASIA grade B and ASIA grade C. Post operatively 1 ASIA grade improvement occurred in 10 (41.67%) patients and 2 grade improvement also occurred in same number of patients. Regarding ODI, Bridwell fusion grade II was found at final follow-up mostly 15 (62.50) in minimum disability group. Short-segment fixation with unilateral postero lumber fusion of dorsolumbar vertebral injury with incomplete spinal cord injury is an effective method of treatment. An acceptable improvement of neurological and functional state with remarkable fusion can be achieved method.

Key words: Short segment fixation, dorsolumber vertebral injury, pedicle screws

INTRODUCTION

Dorsolumbar spine region comprises almost 90% of all spinal fractures and some injuries hold a high propensity leading to permanent disability. As definitive management of various spectrums of injuries still remains in a diffuse controversy, a study on short-segment fixation with unilateral dorsolumber fusion can be a reference for these management options. Therefore, this study aims to assess the radiological and functional outcome of short-segment fixation of dorsolumbar vertebral injury with incomplete spinal cord injury.

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MATERIALS AND METHOD

This is a prospective observational study. A total of 24 cases were included in the study from July 2018 to Jun 2020 through non randomized purposive sampling. All the patients were between 19 to 60 years of age and Operated within 7-30 days of fracture by short-segment pedicle screw fixation with unilateral posterolateral fusion by autogenous cancellous bone graft.

Postoperative functional outcome was assessed both clinically by Denis pain scale, Denis work scale, ODI ASIA impairment grade and radiologically by Cob s kyphotic angle, Beck index &Bridwell fusion scale. Postoperative follow up was conducted at 2nd, 6th, 12th and 24th weeks.

Surgical technique

The patient is placed in prone position on a radiolucent spine table. Fluoroscopy is used to locate the fractured vertebral body. A posterior midline straight incision centered on the affected level is made to expose the laminae 1 level above and below the affected level. Subperiosteal dissection is carried out with an electric cuter until the facet joints on both sides are visualized.Pedicle screws are introduced 1 level below and above the affected level and also the fractured vertebral body if the pedicles are intact and not expected to be removed for the purpose of decompression.Spinal process and both lamina of the affected level are removed to decompress the posterior aspect of the thecal sac. Once posterior decompression was completed, the screws of both sides were distracted axially with contoured longitudinal rods to restore the segmental height and realign the spinal columns, which are verified by C-arm . Dura mater is repaired if it is lacerated. Any adhesions between the posterior longitudinal ligament and the anterior surface of the thecal sac are released, thus, the thecal sac can be easily retracted to provide better exposure of the posterior portion of the vertebral body and the intervertebral discs. Then the thecal sac and nerve root are gently retracted and protected with a nerve retractor, and the adjacent intervertebral discs are completely removed.The retropulsed fragment of the fractured vertebral body are hammered anteriorly back into the corpus using an 'L' angle dissector to recontour the posterior wall of the fractured vertebral body, at the same time decompressing the anterior aspect of the thecal sac. Then granulated bone graft made from removed bone tissue is packed into the intervertebral space, some of the bone graft is packed into the vertebral body through the fractured endplate. The same decompression procedure is done on the contralateral side if it is necessary, and before that the longitudinal rod is changed to the other side.When the decompression procedure is finished by a recheck of all the neural elements involved, a second rod is placed and tightened. A final verification of the screws and cages positioning, alignment of the spinal columns and vertebral body height is done using posteroanterior and lateral fluoroscopy, then a drain is placed and the muscle, fascia and skin are closed in standard fashion.

Follow-up :

During the postoperative period, walking and rehabilitation (in the rehabilitation center) were started as soon as the patients could withstand the pain and associated lesions of the patients permitted. The patients wore a corset for 12 weeks during the postoperative period, and heavy exercise was avoided within three months. All patients were evaluated according to clinical, radiologic, and functional parameters before surgery, one week after surgery, and the latest follow-up. The clinical parameters evaluated were the neurologic deficit according to Frankel motor score system, pain and work Scale of Denis

RESULTS:

The mean age found in 50.5 years with male dominancy (75.80%). In this present series, 6 (25.0%) of patients were of ASIA grade B pre-operatively followed by 9 (37.5%) both for ASIA grade B and ASIA grade C. Post operatively 1 ASIA grade improvement occurred in 10 (41.67%) patients and 2 grade improvement also occurred in same number of patients. Regarding ODI, Bridwell fusion grade II was found at final follow-up mostly 15 (62.50) in minimum disability group.

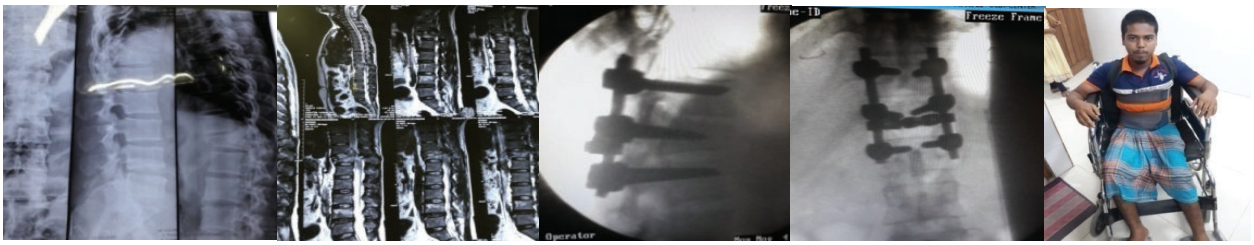
CASE REPORT:

Name : Rokonuzzaman
Age : 30 yrs.
Diagnosis : Burst fracture L1 with Asia Grade-C
H/O fall from height



Pre and post operative follow up.

Case 2:
Name: Safiqul Islam
Age: 18 yrs
Diagnosis:
Burst fracture D12 with asia grade-B
H/O -RTI



Pre and post operative follow up

Pre and postoperative ASIA grading:

	Minimum	Moderate	Severe	Crippled	Bedridden	*Mean*
Preoperative	-	-	13	9	2	62.75
			54.17%	37.50%	8.33%	±10.74
Final follow up	13	8	3	-	-	21.42
	54.17%	33.33%	12.50%			±10.23

Functional status of the study patient according to Owestry Disability index

In this series : pre and post operative vas score was 60.33 and 18.29 and pre operative distressing pain was 15 patients that ended up with mild or no pain in 18 patient 90% of which end up with mild pain.

Post operative pain intensityu acording to visual analogue score (VAS)

	0-20	21-40	41-60	81-100	Mean	
Preoperative	-	-	15	7	2	60.33
			62.50%	29.17%	8.33%	±10.70%
Final followup	18	5	1	-	-	18.29
	75.00%	20.83%	4.17%			±7.30%

Post operative fusion was evaluated by BHridwell fusion grading : to interpret the posterolateral fusion of dorso lumbar spine AP radiograph is used. Continuous intertransverse bony bridge at minimum one of the two sites indicate fusion at the level.

Grade I Facet fusion unilaterally

Grade II Thick fusion mass in one side

Grade III Defect in the fusion mass

Grade IV Definitive resorption of graft

DISCUSSION:

This current study was carried out between July 2018 to Jun 2020 at National Institute for Traumatology and Orthopaedic Rehabilitation (NITOR), Sher-E-Bangla Nagar, Dhaka. A total of 24 patients of throcolumbar burst fracture with incomplete spinal cord injury were selected. The patients were either managed at emergency department accordingly and then admitted at NITOR, or admitted from OPD being first managed outside NITOR. After proper resuscitation and investigation, the selected patients were treated by short segment pedicle screws & rods fixation and followed up. After an average of 06 months follow-up for each patient, the findings were recorded and compiled for research. All the relevant findings obtained from data analysis are presented in tables, figures, charts etc.

Before Roentgen s discovery of X-ray in 1895, clinical observation was the only diagnostic tool for fractures. In 1992 Bohler recognized the importance of injury mechanism and argued for anatomical reduction in all spinal fractures. (Rudol and Gummerson 2014)

Neurological injury complicates 20-36% of fractures at the thoracolumbar junction in different studies (Magrel 1994, Kraemer 1996). Hsu et al. 2003 showed that about one third of the thoracolumbar vertebral fractures had concomitant spinal cord injury and variable (21%-40%) neurological deficit.

Rajasekaran et al. 2015 discussed in details the management of thoracolumbar spine truma pointing out that involvement of three columns, progressive neurological deficit, significant kyphosis and canal compromise with neurological deficit are accepted indications for surgical stabilization through anterior, posterior or combined approaches. Disadvantages of conservative treatment are deterioration in neurological status in about 17% cases (Denis et al., 1984), both local kyphosis angles and height loss percentage values increased significantly upto 81% with intractable back pain (Cankaya et al. 2015), decubitus ulcer and deep vein thrombosis (Hartman et al. 1995). These complications can be avoided by early mobilization and decreased hospital stay by early surgery. The mean age was around 50.5 years (rnge 19-60 years). Nearly half of the patients 11 (45.8%) were in the age group of 31-45 years. It is clear from many studies that young people suffer from injuries more often than any other age group. In a study of Court-Brown CM and Caesar B (2006), the age distribution curve showed a unimodal fashion in older women, while in younger ages, the incidence is higher in men, but still much lower in absolute numbers. Out of 24 cases, maximum patients were male 18 (75.80%) and 6 (25.0%) patients were female. Male female ratio was 3:1. Feng Z, 2015 showed 81.25% male and 18.75% female in his study. Similarly in other studies males are supposed to be more exposed to trauma than females (McLain, Sparling and Benson, 1993). Samelson et al. 2006 studied 704 men and women from the Framingham cohort study who were followed by 25 years. The reported the incidence of thoracolumbar fractures in 24% women and 10% in men.

In this study, most of the injuries were due to fall from height 14 (58.33) and 7 (29.1%) due to motor vehicle accident. Pneumaticos 2013 showed that high energy trauma, like motor vehicle accidents and falls, is the main cause of vertebral injuries in younger patients. Khare et al. 2013 found that the most common modes of thoracolumbar fractures were fall from height (48%), road traffic accidents (32%) or weight falling on the back (20%). That study mentioned differences in mode of injury in the Western studies where road traffic accident accounted for the majority of cases. Concomitant injuries with vertebral fractures were head injury, long bone fractures and calcaneal fractures.

Most common vertebral level of injury was L1 14 (58.33%) and followed by 7 (29.17%) at L2 level and 3 (12.50%) in D12 level respectively in this current study.

In a study at BSMMU, Dhaka Ahsan et al. 2016 found fractured vertebral body at L1, T12 and L2 level were 74.93%, 54.83% and 12.90% respectively. Kanna R M (2014) found that among the vertebral fractures, L1 (37.50%) was the most commonly affected vertebra, followed by L2 (25.00%), T12 (18.75%) and others.

In my study patients, pre-operative ASIA grade B was 6 (25%), C was 10 () and D was 14 (46.67%). Aono et al. 2016) found 51.58% (14 of 27) of patients had a neurological deficit: 2 patients had an ASIA grade of B5 4 had a grade of C, and 8 had a grade of D. Post operatively, at final follow-up, 1 ASIA grade improvement occurred in 10 (41.67%) patients and 2 grade improvement also occurred in same amount of patients..

In this current study, patients were evaluated radiologically during post operatively and final follow-up. Radiological interpretation shows good alignment repositioning and restoration of the spinal column and post-operative correction of kyphotic deformity. The mean ODI at final follow up was severe 3(12.50%)which was 9 (Crippled: 37.50%%) pre operatively. Glassman S (2006) in a retrospective review of prospectively collected patient based outcomes data study on 497 patients in various parameters mentioning ODI preoperatively 54.4 to 7.2 postoperatively in posterior decompression group. In this data series, mean pre and post operative VAS is 62.50% and 29.17&respectively, 75% (18) of which end up with mild pain. VAS scores at final follow up was 16 according to Ahsan et al. 2016. But pain intensity according to VAS was pre op 40±1.8 post op 4.0±7 observed by Yang et al. 2012. Sun 2016 reported the pre-operative VAS score for back pain was 8.6±1.2, which was improved to 4.9±0.7 for one week after surgery. Association between radiological outcome and post-operative functional outcome were measured by Bridwell fusion grade and Owestry disability index respectively. In my study, average operative time was 145 minutes (Range, 100-210 min) average blood loss was 900 ml. According to Sapkas, et al., 2010 the average operative time was 220 min (Range, 190-300min) and 1000ml (Range, 550-2000ml) for the LS pedicle instrumentation. Post operative fusion was evaluated by Bridwel fusion grading: to interpret the posterolateral fusion of dorso lumber spine AP radiograph is used. Continuous intertransvers bony bridge at minimum one of the two sites indicate fusion at the level. were nearly similar to this current study. Regarding the post-operative complication, wound infection was found in 2. (8.3%) patients, UTI in 1 (4.16%) patients and bed sore in 1 (4.17%) patient which responded to antibiotics. 1 (4.17%) patient also complained of reduced libido post-operatively. Tazeren and Kuru 2005 in a study of 18 patients, found 1 (5.55%) superficial infection at wound site.

LIMITATIONS:

Too small sample size to represent the actual scenario of NITOR or the whole country.

Too limited follow-up period to evaluate long-term outcome which is important.

Variation among the operating surgeons and long delay from injury to operation .

Patients poor understanding and awareness led to inability in properly following post-operative advices and regular follow-up.

Regarding this study, we have reached some recommendations. Some are as follows:

RECOMMENDATIONS:

1. More multi-centric study with lager sample size may obtain valuable information in this regard.
2. Long- term follow up needs to be ensured.

CONCLUSION:

Short-segment fixation with unilateral postero lumber fusion of dorsolumbar vertebral injury with incomplete spinal cord lesion is an effective method of treatment.

An acceptable improvement of neurological and functional state with remarkable fusion can be achieved by this method.

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