

**OUTCOME OF EXTERNAL FIXATION IN CASE OF OPEN FRACTURE SHAFT OF TIBIA-FIBULA****Dr. Md. Harun-Or-Rashid<sup>\*1</sup>, Dr. Md. Nazmul Huda<sup>2</sup>, Dr. Mohammad Kamal Hossain<sup>3</sup>, Dr. Md. Ashik Salauddin<sup>4</sup>, Dr. Md. Mizanur Rahman<sup>5</sup>, Dr. Dilruba Kabir<sup>6</sup>**<sup>1</sup>Assistant Professor, Department of Surgery, Chandpur Medical College, Chandpur, Bangladesh.<sup>2</sup>Assistant Professor, Department of Orthopaedic Surgery, Shaheed Suhrawardy Medical College, Dhaka, Bangladesh.<sup>3</sup>Assistant Professor, Department of Orthopaedic Surgery, Chandpur Medical College, Chandpur, Bangladesh.<sup>4</sup>Junior Consultant, Department of Orthopaedic Surgery, 250 Bedded General Hospital, Gopalganj, Bangladesh.<sup>5</sup>Junior consultant, Department of Orthopedic surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh.<sup>6</sup>BCS (Health), FCPS (Gynae & Obs) Part-2 Student, Dhaka Medical College Hospital, Dhaka, Bangladesh.**\*Corresponding Author: Dr. Md. Harun-Or-Rashid**

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**ABSTRACT**

**Objective:** In this study our main goal is to observe the outcome and results of external fixation in case of open fracture shaft of tibia-fibula. **Method:** This prospective study has been carried out at Casualty and Orthopaedics department of Comilla Medical College Hospital. A total number of 50 patients were studied from April 2012 to November 2012 to evaluate the management of open fracture shaft of the tibia-fibula by simplest External Fixator. Patients undergoing external fixation for open fracture shaft of tibia-fibula were the target population. **Results:** To evaluate the results of external fixation in this series, each of the patient was studied elaborately from the day of admission in CoMCH upto the final follow up. It is very difficult task to choose an unique parameter for analysis of results of this study. These injuries are associated with moderate to severe complications which contributed to the final outcome of the results. **Conclusion:** Evaluating the merits and demerits of different methods of treatment, it can be concluded that, this external fixator can be recommended as the method of choice for stabilization of severe open fracture shaft of the tibia-fibula for the developing countries like us.

**KEYWORDS:** Tibia-Fibula, fracture shaft, internal fixation, medullary fixation.**INTRODUCTION**

Trauma is the leading cause of mortality and disability during the first four decades of life and third most common cause of overall death.<sup>[1]</sup> With the advent of modernization the incidence of trauma is increasing day by day. Trauma includes industrial accidents, road traffic accidents, warfare injuries, physical violence and others. For each trauma death, there are more than 10 other persons that are seriously injured and some of these are permanently disabled.<sup>[2]</sup> Among the trauma victims fracture shaft of tibia fibula comprises a major part which requires careful attention to prevent mortality as well as morbidity. Because of its subcutaneous position, the tibia is more commonly occurring open fracture than any other long bones. Among all the long bone fracture, management of fracture tibia requires the widest experiences, greatest wisdom and nicest of clinical judgment in order to chose most appropriate treatment for a particular pattern of injury.<sup>[3]</sup>

In our country 85% of total population lives in the rural areas. Due to illiteracy, poverty and under developed

communication facilities most of the patients with open fracture tibia fibula come to a tertiary level of hospital lately ranging from days to weeks. Wound becomes infected by this time. Internal fixation during that time carries disastrous consequences. In this situation external fixation is the treatment of choice to stabilise the fractured bone.<sup>[4]</sup> In our context, majority of the patient cannot afford or bear the expenses of standard external fixator like AO/ASIF tubular fixator, Hoffman and Ilizarov external fixator which are very costly. Considering the cost benefit ratio, the normal external fixator with unilateral frame which is the cheapest, locally made and easily available in the country is selected for this study in the management of open fracture shaft of tibia-fibula.

**METHODOLOGY**

Type of study	It was a Prospective randomized control trial study.
Place of study	Casualty and Orthopaedics department of Comilla Medical College Hospital, Comilla
Study period	April 2012 to November 2012
Study population	Total population of the study was 50
Sampling technique	Consecutive sampling method

**Criteria for selection of Patients:** Open tibia-fibula fractures are one of the most common injuries attended at casualty and Orthopaedics department of CoMCH. The management of each case is individualised. Open tibia-fibula fractures has been managed by external fixation in selective cases. The criteria adopted for selection of cases in this series were:

**Inclusion criteria**

- Only open fracture - Gustilo type II (unstable) and type III A & III B were selected irrespective of fracture configuration viz oblique, transverse, spiral, segmental, comminuted or with loss of bone.
- Fracture of any side, right or left or both, involving both tibia and fibula or only tibia.
- Fracture shaft of the tibia and fibula exclusive of the proximal and distal end of the tibia and its malleolus.
- Cases were randomly selected irrespective of age & sex.

**Exclusion criteria**

- Open fracture shaft of tibia-fibula Gustilo type-I, type-II (stable) and type-III C.
- Patient with associated head injury, spinal injury, chest injury, abdominal injury, fracture pelvis.
- Patient with systemic diseases like DM, CKD.

**RESULTS**

In this study the following observations were noted:

**Age incidence:** In this study there were fifty patients with age ranging from 11 to 60 years. Mean age 34 years. Maximum incidence was in 31-40 years age group.

**Table I: Showing Different Age Group.**

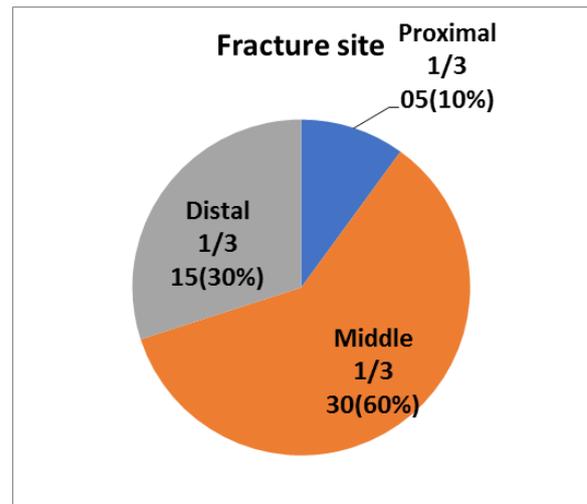
Age in year	Number of patients	Percentage (%)
11-20	10	20%
21-30	12	24%
31-40	20	40%
41-50	06	12%
51-60	02	04%
<b>Total</b>	50	100%

**Sex distribution:** In this study 45 (90%) cases were male and 5 (10%) cases were female. Male female ratio 9:1.

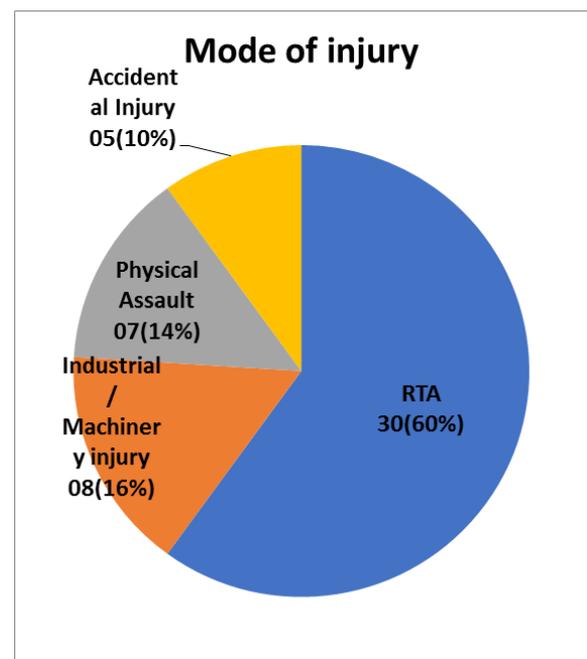
**Table II: showing sex distribution in patients.**

Sex	Number of patients	Percentage(%)
Male	45	90 (%)
Female	05	10 (%)
N=50		

**Fracture site:** In the present series fracture of the middle third of the shaft of tibia-fibula were observed the maximum 30 (60%), where as proximal third in 05 (10%) and distal third in 15 (30%).

**Figure I: showing involvement of fracture site.**

**Mode of injury:** Maximum injury occurred due to road traffic accident. Out of 50 patients, 30 (46%) injured due to RTA, 08 (16%) due to industrial/machinery injury, 07 (14%) due to physical assault and 05 (10%) due to accidental injury.

**Figure II: showing Causes of injury.**

**Gustilo variations in fracture:** In this study, 10 (20%) cases were type II (unstable), 29 (58%) cases were type IIIA and 11 (22%) cases were type IIIB.

**Table III: showing Gustilo Type of open fracture.**

Type of fracture	Number of patient	Percentage
Type II(unstable)	10	20 %
Type IIIA	29	58 %
Type IIIB	11	22 %
N=50		

**Lay period to reach hospital:** The majority of patients arrived in this Hospital within 24 hours (64%). 20% reported between 24-48 hours of incidence. A large number number of patients attended in CoMCH between 48 hours to several days. These patients were usually referred from other upazilla and district hospitals to CoMCH.

**Table IV: Showing lapsed period for reaching hospital.**

Time lapsed	Number of patients	Percentage
Within 24 hours	32	64%
Between 24-48 hours	10	20%
After 48 hours	08	16%
N=50		

**Incidence of complication:** In this study various complications were observed. Infection occurred in 20 cases, delayed union in 08 cases, nonunion in 02 cases, restriction in joint movements(ankle and knee) in 15 cases, valgus angulation in 02 cases, mild equinus in 01 cases and leg length discrepancy in 02 cases.

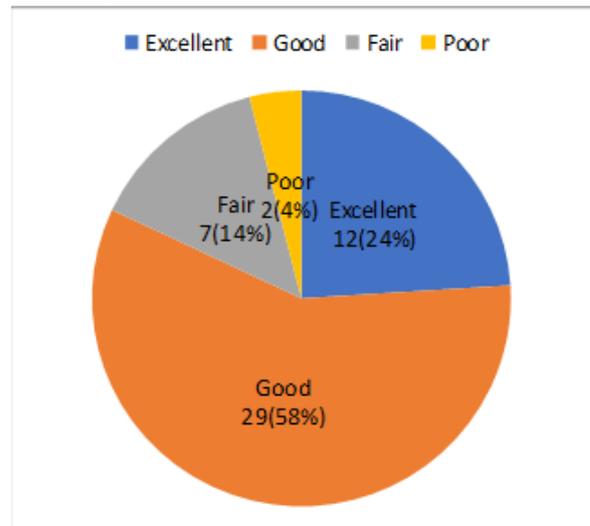
**Table V: Showing complications of External Fixation.**

Complications	Number of patient	Percentage
Soft tissue infection	08	16 %
Pin tract infection	08	16 %
Bone infection	04	08 %
Delayed union	08	16%
Non union	02	04%
Joint movement restriction	15	30%
Valgus angulation	02	04%
Mild equinus	01	02%
Leg length discrepancy	02	04
N=50		

The final result was analysed by observing the results of treatment of 50 cases which were included in this study. Excellent and good results were accepted as satisfactory results of the study.

By analysing all results acceptable(Excellent and good) results were found in 82% cases and unacceptable (Fair and poor) results were in 18 % cases.

## Final Result



**Figure III: The final result of the study.**

## DISCUSSION

Open fracture shaft of the tibia-fibula is one of the common injuries attending in casualty and orthopaedics department of the hospitals throughout the country. As a tertiary hospital like CoMCH, the incidence of open fracture shaft of the tibia and fibula are not negligible encountered in daily practice in the casualty and orthopaedics department. Their management could not be followed with a simple set of rules.<sup>[3]</sup> With the exception of intracapsular fracture of the neck of the femur, no fracture arises more controversy in regarding the method of treatments than a open tibial fracture. Infact, the management of the open fracture shaft of tibia & fibula still remains a challenge to the trauma surgeon.<sup>[5]</sup> The prognosis of the open fracture tibia & fibula depends largely on the mechanism of injury, fracture configuration, degree of contamination & time elapsed since the injury. High energy trauma which causes extensive soft tissue damage, comminution with displacement of fracture fragments certainly impair the blood supply to the fracture fragments and predisposes high rate of infection, delayed union & non union.<sup>4</sup> The open fractures shaft of the tibia and fibula are classified after Gustilo (1993). Out of selected 50 cases, type - II (unstable) comprises 10 (20%), type - IIIA 29 (58%) & type - III B were 11 (22%). In this types of open fracture management cast immobilisation is very troublesome and difficult to maintain. Most of our patients reported to hospital after golden hours (>8 hrs.). Internal fixation, in this situation by intramedullary nailing or plating carries serious consequences of high risk of bone Infection.<sup>[6]</sup>

Though type I and type II stable fracture can be well managed by cast immobilization but for type II unstable and type III. - External fixation is the treatment of choice for easy wound care, sequential debridement and early wound coverage.<sup>[4,5]</sup> When flap coverage of the wound required - Ilizarov fixator requires modification (using half ring with pins) or removal during the time of surgery

(Catagnj, 1991). But the fixator used in the present series devoid of such disadvantages.

Open tibial shaft fractures were found more in male than in female. In the present series 45 cases (90%) were male & 05 cases(10%) were female. Male female ratio 9:1. This may be due to the fact that females are less exposed to road traffic accidents in this country because of their frequency of traveling is considerably less than that of male. Road traffic accidents were found to be the most common cause of injury in this series - 30 cases (60%). Among them 22 were pedestrian motor vehicle encounters, 5 motor cycle accident, 3 crush Injury. In this series most fracture occurred in middle third of the shaft of the tibia fibula (60%) followed by distal third (30%). In this study most of the fracture were comminuted (50%) followed by oblique (28%) indicating high energy trauma which carries poor prognosis.<sup>[4]</sup> Comminuted fractures are difficult to treat by plate and also by intramedullary nailing. Closed comminuted fracture can be treated by cast immobilization, but in open comminuted fracture-external fixation is the treatment of choice.<sup>[7]</sup> In this type of fracture complications like infection, delayed union, non union are common. None of the patient developed neurovascular or compartment injury during the study of this series. Stability at the fracture site depends on the rigidity of the frame, distance between the skin and metallic bar. Closer the distance between skin & side bar more the rigidity of the frame, more the stability at the fracturesite.<sup>[8]</sup>

## CONCLUSION

Restoration of function, bone union and prevention of infection are the primary objectives in the treatment of all open fractures. Open fracture- shaft of the tibia fibula are common injuries which are considered as surgical emergency. Early wound toileting and adequate debridement are very important for prevention and elimination of infection. In our country as most of the patient come to tertiary hospital lately from the time of injury. By this time, they are all, considered infected or potentially infected.

So, evaluating the merits and demerits of different methods of treatment, it can be concluded that, this external fixator can be recommended as the method of choice for stabilization of severe open fracture shaft of the tibia-fibula for the developing countries like us.

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