

Outcome of Internal Fixation of Fractures in a Tertiary Care Hospital in Peshawar

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ABSTRACT

Objective: This study was aimed at reviewing internal fixation in our hospital and attendant complications with a view to identifying measures necessary to improve outcome.

Study Design: Retrospective study

Place and Duration of Study: This study was conducted at orthopedic department of Lady Reading Hospital, Peshawar from March 2012 to February 2014.

Materials and Methods: The operation register was used to identify patients who had undergone internal fixation in the main theatre of the hospital over a Three-year period were collected and their case notes were subsequently retrieved from the medical records unit of the hospital. Data pertinent to study interests were extracted using a questionnaire

Results: One hundred and fifteen patients had internal fixation during the study period but case notes of only 100 patients could be retrieved. Most patients were males with male to female ratio of 2.3:1. The mean age of patients was 32.87 ± 15.2 years and the mean duration of surgery was 2 ± 0.56 hours. Plate and screws constituted the most commonly used implants. Interval between surgery and fracture union was increased by long operation time (> 2 hrs) and occurrence of post operative complications.

Conclusion: Improvement in operating facilities and choice of implants would reduce operation time and post operative complications thereby impacting positively on fracture union time.

Key Words: infection, internal fixation

INTRODUCTION

Open reduction and internal fixation (ORIF) is a commonly used treatment for fractures throughout the body, including the distal femur. Supracondylar fractures of the femur account for approximately 7% of all femur fractures.¹ They occur just proximal to the knee joint, in the terminal 9 cm of the femur between the metaphyseal-diaphyseal junction and the femoral condyles.²

Fractures of the horizontal surface of the distal tibia are known commonly as pilon or plafond fractures. They represent 1–5% of lower extremity fractures and 7–10% of all tibial fractures.³

Operative fixation of pilon fractures has presented a significant challenge to the orthopaedic surgeon as the extensive soft tissue damage associated with such injuries makes surgical intervention hazardous. The traditional approach advocated by Rüedi and Allgöwer^{4, 5} involves an extensive dissection to the distal tibia and has been associated with significant rates of infection and wound dehiscence, ranging from 0–55%.^{6, 7}

Minimal disturbance of the soft tissue envelope is key to the prevention of the common wound problems of dehiscence and infection. The vascularity of the soft tissue sleeve surrounding the distal tibia is tenuous^{8–12} and aggressive handling with extensive periosteal

stripping will disturb the nutrition to the myocutaneous tissue and underlying bone.

Internal fixation is a common method of treatment of skeletal injuries.¹³ The choice of internal fixation as a method of fracture treatment is determined by a number of factors including type of injury, facilities available and expertise of the attending surgeon.¹⁴ Internal fixations like any other modality of fracture treatment can be attended by complications such as implant failure, infection, non-union among others. These are often related to certain factors such as the operation time, operating room conditions and availability of appropriate skills and facilities.¹⁴

This study is aimed at reviewing the internal fixations done in the Lady Reading Hospital, Peshawar with a view to determining the methods of internal fixation used, time taken for fractures to heal, factors influencing this, complications as well as duration of hospital stay post operatively. It is believed that the information so obtained will positively influence the institution of appropriate measures to improve quality of practice with ultimate benefit to the patients.

MATERIALS AND METHODS

This study was conducted at orthopedic department of Lady Reading Hospital, Peshawar from March 2012 to February 2014. The operation register was used to

identify patients who had undergone internal fixation in the main theatre of the hospital over a three-year period were collected and their case notes were subsequently retrieved from the medical records unit of the hospital. Data pertinent to study interests were extracted using a questionnaire. Data obtained from the case notes included patient's demographics, type of injuries, pre-operative prophylactic antibiotics and implants used, rank of surgeon, duration of surgery, type of anaesthesia, post operative complications and treatment, duration of hospital admission post operatively. The data obtained analysis was done using SPSS version 16. Statistical methods such as correlation and regression analyses, and non-parametric test for comparison of means were used to explore relationships between variables. A 0.05 significance level was used. Results are expressed as means, frequencies and tables.

RESULTS

Hundred patients were recorded in the operation register as having had internal fixation over the period of the study. However, case notes of hundred patients could be traced and retrieved for analysis representing a retrieval rate of 77.2%. There were 70 males and 30 females, with a male to female ratio of 2.3:1. Most of the patients (98.1%) had some form of formal education to varying levels. The mean age of patient's was 32.87 ± 15.2 years; mean duration of surgery was 2 ± 0.56 hours; mean pre-operative Packed Cell Volume (PCV) was $36.79 \pm 5.2\%$; mean post-operative PCV was $30 \pm 5.7\%$; mean number of units of blood transfused was 1.57 ± 0.8 . 0.022). In one hundred and one cases (89.0 %), surgery was done by a Consultant while 11 cases (11.0%) were done by resident doctors. Table No. 1. The main indication for internal fixation was fracture (66.1%). The femur was the most operated bone constituting 53.4% of cases followed by the tibia (23.0%). Plate and Screws (59.1%) and Interlocking intramedullary Nail (31.3%) were the most commonly used implants. Table No. 2. Sub-Arachnoid block was the most common anaesthetic technique used (62.6%). The duration of surgery was found to be a statistically significant predictor of the interval between surgery and union of fracture, accounting for 15% of the interval. The mean interval between surgery and union was 10.81 ± 2.66 weeks for upper limb fractures and 18.11 ± 2.11 weeks for lower limb fractures. Mean duration of post operative admission was 18.91 ± 13.98 days. Table No. 3. Thirty eight patients had one or more complications. These were wound infection – 13, osteomyelitis – 13, implant loosening – 3, implant breakage – 6, knee stiffness – 5, non-union – 4, shoulder stiffness – 2, wound dehiscence – 1, limb shortening – 1, wrist drop – 1, exposed implant – 1, pin track infection – 1, common peroneal nerve injury – 1, faulty screw placement – 1. Twelve of the patients (12.0%) had post-operative infection and 88 patients

had not post-operative infection. This constituted the most common complication. Organisms isolated were *Staphylococcus aureus* 7(58.33%), *Pseudomonas aeruginosa* 3(25.0%), *Coliforms* 1(8.3%), *Enterobacteria* 1(8.3%). Table No. 4. Mixed infections were found in 6 patients (50.0%); 5 (41.66%) of which were mixed *Staph. aureus* and *Pseudomonas* infections. The complications were treated by administration of antibiotics in 17 cases (17.0%), wound dressing 13(13.0%), and debridement 1(1.0%).

Table No.1: Percentage Distribution between consultant and resident Doctor in Orthopaedic Department of LRH Peshawar

Operated by	% Cases
Consultant	89%
Resident Doctor	11%

Table No.2: Percentage cases of Surgery in Orthopaedic Department of LRH Peshawar

Surgery	% Cases
Femur	53.1%
Tibia	23%
Plate and screw	59.1%
Intramedullary Nail	31.3%

Table No.3: Mean Interval between Surgery and Union in Orthopaedic Department of LRH Peshawar

Surgery	Mean Duration
Upper Limb Fracture	10.81 ± 2.66 weeks
Lower Limb fracture	18.10 ± 2.11 weeks
Post operative Admission	18.9 ± 13.98 days

Table No.4: Post Operative Infections

Microorganism % Infected		% Non-Infected
12%		88
<i>Staphylococcus aureus</i>	7 (58.3%)	
<i>Pseudomonas aeruginosa</i>	3 (25%)	
<i>Coliforms</i>	1 (8.3%)	
<i>Enterobacteria</i>	1 (8.3%)	

DISCUSSION

Internal fixation is the preferred method of fracture treatment in many cases. Operative fracture treatment results in early mobilization, short hospital stay, and early return to productive economic activities and less social dislocations.¹³⁻¹⁵ The cases of non-union and mal-union treated were mostly in patients who had previously received treatment from the traditional bone setters (TBS) which is a rather common practice in our society.¹⁶⁻¹⁸ This study shows that fractures of the long bones of the lower limb are more frequently treated by internally fixation compared to the upper limb fractures - based on absolute numbers (6.4:1). The finding agrees with that of another study.¹⁹ This

may be due to the need to mobilize the patient early and prevent further complications. The more frequent fixation of femoral fractures (53.4%) compared to the tibia (23.0%) in this study is consistent with results of another local study¹⁹ and may be due to the more common occurrence of severe open fractures in the tibia which makes them unsuitable for internal fixation. Furthermore, non operative method such as casting is widely used in treatment of tibial fractures. This practice is encouraged by the aversion of patients to operative treatment in our society.¹⁶

Even though the trend is changing in recent years, plate and screws was the most common implant used for internal fixation in this study as in many local studies.^{19,20} This may be due to easy availability of the implant and instrumentation as well as lower cost. All the interlocking intramedullary nails (IM Nails) inserted in these patients were done open due to the non-availability of intra-operative imaging facilities. This has greatly limited the use of the IM nails even in the treatment of femoral and tibial shaft fractures where it is the preferred method.

Post operative infection was 13%. Even though very high compared to results from developed societies²¹ the figure is consistent with finding of another local study in which a rate of 12% was recorded following internal fixation.²⁰ This may be partially attributed to extensive soft tissue dissection and periosteal stripping involved in insertion of plate and screws^{13,14} the most common method of internal fixation in our centre. This study shows that the union time of the fractures was directly proportional to the operation time and occurrence of post operative complications. In other words, it would take much longer time for a fracture treated by internal fixation to heal if the operation time is long (>2.1hrs) and there being associated post operative complication. A long operation time may actually reflect difficulty at surgery as a result of the complex nature of the fracture being treated. Even though it would be desirable to drastically reduce operation time without compromising accuracy and safety, it is also expedient that measures to prevent post operative complications are instituted

CONCLUSION

Complications following internal fixation especially infection, as shown by this study, is still unacceptably high and limits the benefits derivable from internal fixation. This may be attributed to many factors including inadequate operating environment and facilities as well as the lack of choice of appropriate implants. It is therefore imperative that measures be taken by relevant authorities to improve on the facilities in our hospitals and ensure access to appropriate

implants for more effective and result-oriented treatment of fractures in our society. This calls for a paradigm shift in allocation of health resources

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Corrigendum

Name and designations of the authors in the articles published in Med Forum Vol. 25 No.11 at pages mentioned against each, may be read as follows:

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2. Significance of Hepatic Profile and Malondialdehyde as Marker of Lipid Peroxidation in HCV Patients: A Perspective Study from Local Population of Punjab-Pakistan (Pages 31-34)

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molecular Medicine (CRiMM), The University of Lahore, Lahore-Pakistan

3. Response of Antiretroviral Therapy (Ziduvodine, Lamivudine and Niverapine) in Patients Suffering from Acquired Immuno Deficiency Syndrome (Aids) (Pages 56-59)

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4. Inter-Relationship of Viral Load and CD⁴⁺ Cells in Patients Suffering from Acquired Immuno Deficiency Syndrome (Aids): Update from Punjab-Pakistan (Pages 80-82)

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