

**Patterns of Fractures and Their Current Hospital Management in Eastern Ethiopia:
A Six-Years Prospective review.**

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Background: *Fracture is a common problem that contributes greatly to the clinical load of a hospital. Their management especially those that require in-patient treatment and operative fixation is becoming a considerable burden on health care systems. There is very little relevant information on the pattern of fractures occurring in developing countries especially from those in tropical zones. The objective of this study was to identify the patterns of fractures and to assess the existing fracture management in Dilchora Referral Hospital, Eastern Ethiopia.*

Methods: *This prospective audit was conducted by the author who recorded the relevant findings on every patient with a fracture admitted to his orthopedic ward from January 2005 - February 2011. Patients who received any neurosurgical or general surgical procedures were excluded from this audit.*

Results: *A total of 1354 patient with one or more fractures, 975 Males (72%), and 379 Females (28%) were admitted during the six year study period. The majority (71%) of the patients were aged between 15-54 years, while 237 (18%) were under 15 Years. Only 154 (11%) were over 54 years. The bones involved included Tibia/Fibula (25%), Femur (22%), Ankle (15%), Pelvis (7%), Radius/Ulna (6%), and humeral shaft (5%). Closed fractures accounted for 1037 (77%) and open fractures for 317 (23%). Plaster was applied for 654 fractures (48.4%), Traction for 241 (17.8%), and open reduction with internal Fixation for 201 (14.4%). External Fixations were used for 43 (3.2%), Debridement for 97 (7.9%) and other techniques for 118 (8.7%).*

Conclusion: *With the shortage of orthopaedic implants and instruments it is possible to achieve very good results for most of the fracture patterns managed conservatively.*

Introduction

Musculoskeletal trauma is the ninth leading cause of death world wide¹⁻⁴ and is the highest in the age group of 18-44 years^{5,14,15,16}. Fractures due to motor vehicles are the foremost cause of morbidity and death particularly in young people^{2,14,15}. Fracture is a common problem that contributes greatly to the clinical load of a hospital^{6,7,14}. With the increasing cost of medical services in general the management of fractures, especially those that require inpatient treatment and operative fixation is becoming a steadily increasing burden on health care systems⁸. Most fractures result in a temporary loss of function for the patient and also a loss of work time for the parents, children or other carers of the injured person. With the growing number of elderly people in the population osteoporotic fractures which are associated with a higher rate of morbidity and mortality have become a real challenge for all concerned^{9,10}. The current literature on the patterns of fractures is based mainly on data collected in developed countries^{11,12} and there is very little relevant information on the patterns of fractures encountered in developing countries especially from those in tropical zones¹³. The objective of my audit was to identify the patterns of fractures and to assess the existing management of patients admitted to Dilchora Referral Hospital in Eastern Ethiopia.

Patients and Methods

Dilchora referral Hospital is the only government health facility providing specialized Orthopedic and Trauma management in the Eastern part of Ethiopia and has a catchment population of about 5 million. The Hospital has 230 beds of which 24 are for Orthopedic and

Trauma patients. There is only one specialist orthopedic surgeon available but general surgeons and general practitioners provide some orthopedic and trauma care. This audit was conducted by the author who recorded the relevant findings on every patient who had been admitted with a fracture from January 2005 - February 2011 and who did not need either any neurological or general surgical management.

Results

A total of 1354 patients with one or more fractures, 975 were Males (72%), and 379 Females (28%) were admitted from January 2005 – February 2011 (Table 1). Of this grand total 963 (71%) who presented were in the age group of 15-54 years, 237 (18%) were younger than 15 years, and 154 (11%) were over 54 years old (Table 1).

Of the fractures 983 (73%) were in the lower limb, 295 (21.5%) were in the upper limb and 76 fractures (5.7%) were in other sites (Table 2). The specific bones involved included the Tibia/Fibula 337 (25%), Femur 303 (22%), Ankle 203 (15%), Pelvis 88 (6.5%), Radius/Ulna 79 (5.7%), Humerus shaft 68 (5%), Olecranon 54 (4%), Supracondylar Humerus 43 (3.2%) and Other bones 179 (13%) (Table 3).

There were 1037 (77%) closed and 317 (23%) compound fractures (Table 3). A closed reduction with the application of plaster was done for 654 fractures (48.4%). Traction was used to treat 241 fractures (17.8%). Open reduction & Internal Fixation was necessary for 201 fractures (14.4%). External fixation was used for 43 fractures (3.2%), Debridement was necessary for 97 fractures (7.2%) and other methods of treatment were required for 118 fractures (8.7%). Tables 4 and 5 show the Distribution of all cases of fracture by age at presentation and gender.

Table 1. Distribution of all cases of fracture by Age of presentation and gender at Dilchora hospital			
Age of presentation in years	Gender		Total
	<i>Male</i>	<i>Female</i>	
<15 Years	173(13%)	64(5%)	237(18%)
15-54 Years	703(52%)	260(19%)	963(71%)
>54 Years	99(7%)	55(4%)	154(11%)
Total	975(72%)	379(28%)	1354(100%)

Table 2. Distribution of all cases of fracture by Age and gross anatomical Location of the fracture at Dilchora hospital				
Age of presentation in Years	Location of fracture			Total
	<i>Upper limb #</i>	<i>Lower Limb #</i>	<i>Other Site #</i>	
<15 Years	135(10%)	102(8%)	-	237 (18%)
15-54 Years	153(11%)	744(55%)	66(5%)	963 (71%)
>54 Years	7(0.5%)	137(10%)	10(0.7%)	154 (11%)
Total	295(21.5%)	983(73%)	76(5.7%)	1354(100%)

Table 3. Distribution of fracture by Specific Anatomical site of fractures and type

Specific Anatomical Site	Severity of the fracture		Total
	Closed	Compound	
Tibia-fibula #	137(10%)	200(15%)	337(25%)
Femoral #	283(20.5%)	20(1.5%)	303(22%)
Ankle #	163(12%)	40(3%)	203(15%)
Pelvic bone#	88(6.5%)	-	88(6.5%)
Radio-ulna #	69(5%)	10(0.7%)	79(5.7%)
Humeral shaft #	56(4%)	12(1%)	68(5%)
Patella Fracture	27(2%)	4(0.3%)	54(4%)
Supracondylar Humerus #	40(3%)	3(0.2%)	43(3.2%)
Olecranon #	54(4%)	-	31(2.3%)
Calcaneal #	17(1.3%)	4(0.3%)	21(1.6%)
Epiphyseal injury	15(1%)	-	15(1%)
Lateral Condylar Humerus #	13(1%)	-	13(1%)
Scapular #	11(0.8%)	-	11(0.8%)
Galeazi #	9(0.7%)	-	9(0.7%)
Montegia #	3(0.2%)	-	3(0.2%)
Spine #	34(2.5%)	-	34(2.5%)
Mandible #	12(0.9%)	20(1.5)	32(2.4%)
Nasal bone #	6(0.4%)	4(0.3%)	10(0.7%)
All #	1037(77%)	317(23%)	1354(100%)

Table 4. Distribution of all Cases of Fracture by Site of Fracture and Management at Dilchora Hospital

Site of #	Applied fracture Management options						Total
	POP	Traction	ORIF	Ex. Fix	Debride ment	Other	
Tibia #	259 (19.1%)	-	5(0.4%)	3(0.2%)	70(5.2%)	-	337(25%)
Femoral #	12 (0.9%)	170 (12.6%)	121 (8.9%)	-	-	-	303(22%)
Ankle #	162(12%)	-	1(0.07%)	40(3%)	-	-	203(15%)
Pelvic bone #	-	56(4.1%)	-	-	-	32(2.4%)	88(6.5%)
Radius-ulna #	67(5%)	-	2(0.2%)	-	10(0.7%)	-	79(6%)
Humerus #	54(4%)	-	2(0.2%)	-	12(0.9%)	-	68(5%)
Patella #	12(0.9%)	-	42(3.1%)	-	-	-	54(4%)
Supracondylar humerus #	25(1.9%)	15(1.1%)	-	-	3(0.2%)	-	43(3.2%)

Key: # = Fractures. Ex. Fix = External fixation.

ORIF =Open reduction and internal fixation

Table 5. Distribution of all Cases of Fracture by Site of Fracture and Management at Dilchora Hospital

Site of #	Applied fracture Management options						Total
	POP	Traction	ORIF	Ex. Fix	Debride	Other Rx	
Calcaneal #	21(1.6%)	-	-	-	-	-	21(1.6%)
Epiphyseal #	15(1%)	-	-	-	-	-	15(1%)
Lateral condylar humerus #	9(0.7%)	-	4(0.3%)	-	-	-	13(1%)
Scapular #	-	-	-	-	-	11(0.8%)	11(0.8%)
Galeazi #	9(0.7)	-	-	-	-	-	9(0.7%)
Montegia #	3(0.2%)	-	-	-	-	-	3(0.2%)
Spine #	-	-	-	-	-	34(2.5%)	34(2.5%)
Mandible #	-	-	1(0.07%)	-	-	31(2.3%)	32(2.4%)
Nasal #	-	-	-	-	-	10(0.7%)	10(0.7%)
All #	654 (48.4%)	241 (17.8%)	201 (14.9%)	43 (3.2%)	97 (7.2%)	118 (8.7%)	1354 (100%)

Key: # = Fractures . POP: Plaster of Paris. ORIF: Open reduction and Internal Fixation.

Ex. Fix : External Fixation. Rx = Treatment. Debride = Debridement

Discussion

This study has revealed that males sustained fractures more commonly (72%) than the females (28%), and that the highest incidence of fracture occurred among those aged 15-54 years (71%). These people are of productive age and had predominantly suffered musculoskeletal trauma. This finding is consistent with many other reports^{1,2,6,14,15}. The lower limb was found to be the commonest site of the fracture necessitating admission to my orthopaedic ward (73%). Injury to the upper limb (21%) was less common and this is in agreement with other studies^{6,14,16}. It was also evident that the incidence of lower limb fractures necessitating admission among people of working age is significantly higher than that of children under the age of 15 years. Hospital studies from Malaysia showed similar findings⁶. More than two-thirds of bone injuries occurred in the Tibia/Fibula, Femur, Ankle, Radius/Ulna and Humerus and other studies also showed similar findings^{1,6,16}. It is interesting that closed fractures were found to be the leading cause of admissions in our ward. A study done at the Mayo hospital in Lahore showed a comparable result¹. The conservative (non-operative) management using plaster casting or traction is the main stay of treatment for most fractures in our ward (66.2%) and this was due to limited facilities for Internal Fixation. This is also comparable to the management used in the Mayo hospital¹.

Most of the closed fractures (48.4%) admitted to our hospital are treated by manipulation and then maintained in the reduced position by the use of plaster. In addition to its application in most closed fractures plaster casts are also of use in our hospital for the management of type I open fractures of Tibia/Fibula. While the insertion of interlocking nails within six hours of the fracture is common practice for this type of injury in high income countries¹. In our area this is not feasible due to unavailability and cost, and as patients often arrives late.

Traction is the second commonest method of non-operative treatment used in 17.8% of our patients. All extra capsular hip fractures and many adult femoral shaft fractures in our hospital were managed by skeletal traction unlike the practice in high income countries where internal fixation with Interlocking nails and dynamic hip screws are the choice of treatment. It is also our custom to use skin traction for Intracapsular hip fractures in the elderly as we do not have materials for either internal fixation or arthroplasty in our hospital. It is clear that the use of such techniques avoids the disadvantages of traction by shortening the length of hospital stay and by allowing early mobilisation of the patient. In addition the lack of additional facilities such as C-arms and Image Intensifiers make operative treatment for such fractures impossible in our hospital and probably throughout Ethiopia.

In fact only 201(14.9%) of our patients with fractures were managed by open reduction and Internal fixation. Although a previous local study showed comparable Incidence of operation (14%)¹⁷ Our fixation rate is lower Compared to the fixation rate (25%) in the Mayo Hospital, Lahore ¹. Thus limited facilities for internal fixation were the main reason for lower fixation rate in our Hospital.

Most of our fractures with associated wounds are treated by debridement and immobilisation with a posterior Gutter Plaster. The 7.2% of all our patients with these fractures requiring debridement is comparable to the proportion of debridement in the Mayo Hospital, Lahore (6%) but the proportion of these patients for whom we were able to use external fixation in our hospital (3.2%) is significantly lower than the rate of application in the Mayo hospital (16%). This is simply due to our shortage of external fixators.

Conclusion

In spite of the shortage of orthopaedic implants and instruments very good results can be obtained for most of the fracture patterns by conservative management.

Recommendation

Conduct a nationwide Study to asses the existing fracture management practice in Ethiopia and its results. Additional effort has to be exerted by the Governments and other stake holders to improve the quality of the existing fracture management in health facilities at all levels.

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