ORIGINAL RESEARCH

Comparison of antegrade versus retrograde nailing in humeral shaft fractures

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ABSTRACT

Background: A humeral shaft fracture refers to a fracture that occurs in the shaft or body of the humerus, which is the bone of the upper arm. The present study was conducted to assess antegrade versus retrograde nailing in humeral shaft fractures.

Materials & Methods: 48 patients of humeral shaft fractures of both genders were selected. The antegrade nailing techniquewere included in group I while the patients with retrograde nailing were in group II. Parameters such as surgical time (mins), time for radiological union (weeks), duration of hospital stay (weeks), intra-operative bleeding (ml), fracture type, and complications were recorded

Results: In group I, males were 13 and females were 11 and in group II, males were 12 and females were 12. Surgical time was 82.4 mins and 94.2 mins, time for radiological union was 15.2 weeks and 16.4 weeks, duration of hospital 5.4 weeks and 6.1 weeks and intra-operative bleeding was 42.5 ml and 42.8 ml in group I and II respectively. The difference was significant ($P< 0.05$). Complications were delayed union in 1 in group I, shoulder stiffness in 2 in group I and 1 in group II and infection in 1 in group I. The difference was significant ($P< 0.05$).

Conclusion: Retrograde nailing is an option for patients with wider medullary canals and more distal fractures due to its ease of insertion and superior stability. Antegrade nailing is an option for more proximal fractures at the meta-diaphyseal junction, particularly in a younger population with smaller medullary canal and polytrauma.

Key words: bleeding, humeral shaft fracture, Surgical time

INTRODUCTION

A humeral shaft fracture refers to a fracture that occurs in the shaft or body of the humerus, which is the bone of the upper arm.[1,2] These fractures can range from simple, non-displaced fractures to more complex fractures with significant displacement and comminution (fragmentation of the bone). Humeral shaft fractures can result from various causes, including falls, direct trauma, and high-energy accidents.[3] From its early idea of non-surgical treatments like functional bracing and coaptation splint to operational therapies like plate osteosynthesis and intramedullary nailing, the treatment of humeral shaft fractures has come a long way.[4,5] Although nonoperative treatment options produce a range of outcomes, they are also associated with drawbacks such prolonged immobilization, non-anatomical union, and a reduction in daily life activities. Although considered the gold standard, plate osteosynthesis has drawbacks including substantial soft tissue dissection, radial nerve palsy, non-union, and infection.[6] The advantages of closed reduction, preservation of the fracture hematoma, and minimally invasive procedures can now be achieved with the introduction of intramedullary nailing for humerus shaft fractures. Depending on the fracture geometry, bone quality, underlying pathology, presence of co-morbid disorders, and surgeon preference, these nails can be implanted either antegradely or retrogradely.[7,8] The present study was conducted to assess antegrade versus retrograde nailing in humeral shaft fractures.

MATERIALS & METHODS

The present study consisted of 48 patients of humeral shaft fractures of both genders. All gave their written consent to participate in the study. Data such as name, age, gender etc. was recorded. The antegrade nailing technique were included in group I while the patients with retrograde nailing were in group II. Parameters such as surgical time (mins), time for radiological union (weeks), duration of hospital stay (weeks), intra-operative bleeding (ml), fracture type, and complications were recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table: I Distribution of patients

Groups	Group I	Group II
Method	antegrade nailing	retrograde nailing
M:F	13:11	12:12

Table I shows that in group I, males were 13 and females were 11 and in group II, males were 12 and females were 12.

Table: II Comparison of parameters

Parameters	Group I	Group II	P value
surgical time (mins)	82.4	94.2	0.04
time for radiological union (weeks)	15.2	16.4	0.92
duration of hospital stay (weeks)	5.4	6.1	0.85
intra-operative bleeding (ml)	42.5	42.8	0.96

Table II, graph I shows that surgical time was 82.4 mins and 94.2 mins, time for radiological union was 15.2 weeks and 16.4 weeks, duration of hospital 5.4 weeks and 6.1 weeks and intra-operative bleeding was 42.5 ml and 42.8 ml in group I and II respectively. The difference was significant (P< 0.05).

Graph I Comparison of parameters

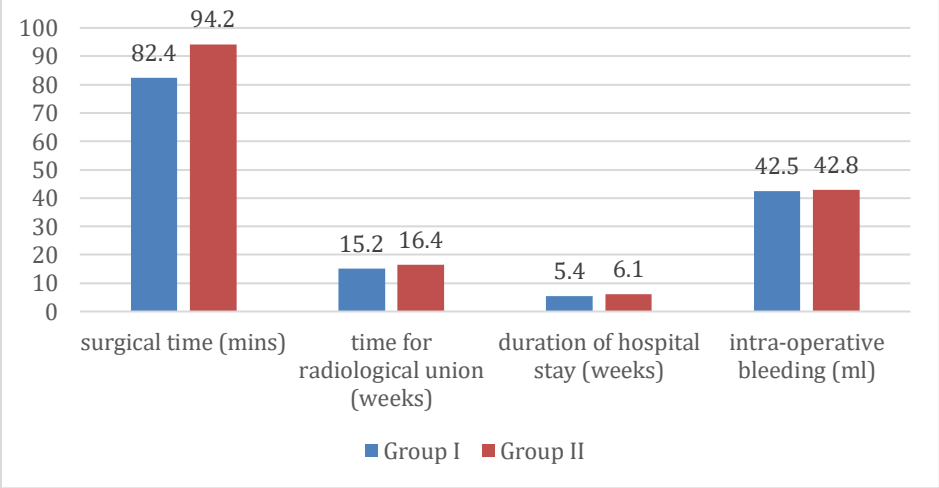

Table: III Complications

Complications	Group I	Group II	P value
Delayed union	1	0	0.05
Shoulder stiffness	2	1	
infection	1	0	

Table III shows that complications were delayed union in 1 in group I, shoulder stiffness in 2 in group I and 1 in group II and infection in 1 in group I. The difference was significant (P< 0.05).

DISCUSSION

The range of available therapies for humeral shaft fractures has increased throughout time.[9,10] Since the humerus's healing potential was thought to be very good in terms of speed and fracture healing rates, restoration of anatomy is not a requirement for a good functional outcome, and patients are not subjected to operative risks like iatrogenic radial nerve palsy, postoperative infections, and implant failure, non-operative treatment has long been the method of choice.[11,12] The present study was conducted to assess antegrade versus retrograde nailing in humeral shaft fractures. We found that in group I, males were 13 and females were 11 and in group II, males were 12 and females were 12. Sharma et al[13] found that the mean age of the patients was 42.4 ± 1.8 and 44.1 ± 2.4 in group A and B respectively. There were 19 (44.18%) females and 24 (55.9%) males in the present study. Dominant side was involved 27 (62.7%) cases. The commonest mechanism of injury was road traffic accident accounting for 24 (55.8%) cases. Thirty-seven (86%) cases had closed fracture humerus. As per the AO-OTA classification system and there were 21 (48.9%) cases of type 12-A, 10 (23.2%) cases of type 12-B and 12 (27.9%) cases of type 12-C. Majority of the cases 24 (55.8%) had middle third shaft fracture, which was followed by lower third 12 (27.9%) and proximal third 7 (16.3%) fractures respectively. Five (11.6%) patients had associated head injury, and 3 (6.9%) patients had either a chest or abdominal injury while 12 (27.9%) patients had multiple fractures among both the groups. We found that surgical time was 82.4 mins and 94.2 mins, time for radiological union was 15.2 weeks and 16.4

weeks, duration of hospital 5.4 weeks and 6.1 weeks and intra-operative bleeding was 42.5 ml and 42.8 ml in group I and II respectively. Bergen et al[14] compared non-operative and operative treatment of a humeral shaft fracture in terms of fracture healing, complications, and functional outcome. A total of 173 studies, describing 11,868 patients, were included. The fracture healing rate for the non-operative group was 89%, 94% for the IMN group and 96% for the plating group. The rate of secondary radial nerve palsies was 1% in patients treated non-operatively, 3% in the IMN, and 6% in the plating group. Intraoperative complications and implant failures occurred more frequently in the IMN group than in the plating group. The DASH score was the lowest in the minimally invasive plate osteosynthesis group. The Constant–Murley and UCLA shoulder score were the highest 93/100 and 33/35 respectively] in the plating group. We found that complications were delayed union in 1 in group I, shoulder stiffness in 2 in group I and 1 in group II and infection in 1 in group I. Cheng et al in their series of 92 fractures observed that the retrograde nailing is associated with longer operative duration as compared to the antegrade nailing technique which was statistically significant. Li et al[15] found that the mean follow-up period was 31.2 months. Antegrade intramedullary nailing had significantly less blood loss than that in retrograde intramedullary nailing (P=0.002). The differences in operation time, complications, healing time and bone healing rate between he two groups had no statistical significance. Complications in the antegrade intramedullary nail group included 4 patients with non-unions, 1 patient with radial nerve palsy, and 8 patients with shoulder pains and decrement in shoulder range of motion. Complications in the retrograde intramedullary nail group included 1 patient with radial nerve palsy and 3 patients with iatrogenic fractures. For shoulder joints, the difference in the average Constant-Murley shoulder score between the two groups was statistically significant. For elbow joints, the average postoperative Mayo elbow performance score between these two approaches did not differ significantly. The limitation of the study is small sample size.

CONCLUSION

Authors found that retrograde nailing is an option for patients with wider medullary canals and more distal fractures due to its ease of insertion and superior stability. Antegrade nailing is an option for more proximal fractures at the meta-diaphyseal junction, particularly in a younger population with smaller medullary canal and polytrauma.

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