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Use of Intramedullary Fibular Graft: A Novel Adjunct in Treatment of Osteoporotic Humeral Shaft Fracture Non - Union

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Abstract: ***The incidence of humeral shaft fractures that undergo non - union after Open reduction and internal fixation accounts for 15 - 30%. Common risk factors for a non - union to develop includes smoking, alcohol consumption, DM, old age, unstable primary osteosynthesis, open fractures, infections and neurovascular injuries. We studied a case of 68 years old lady case of Right humerus shaft fracture atrophic non - union with implant failure who was operated with ORIF with plating 5 years back. Patient presented with complaints of pain and deformity over right arm with difficulty in performing activities of daily living. Patient was posted for implant removal followed by reconstruction with fibular strut and iliac crest bone graft which was stabilized and internally fixed with plating. The patient was followed up for 1 year and showed significant improvement in functional outcomes clinically with satisfactory incorporation of fibular graft and satisfactory alignment of the implant radiologically.***

Keywords: Humerus fracture, Non union, Fibular strut graft, Bone grafting

1. Case

1.1 History

68 years old lady came with complaints of right arm pain and deformity since 2 months. History of lifting heavy weight (bucket of water) present 2 months ago. Patient is previously (5 years ago) operated case of right humerus shaft fracture for which ORIF with plating was done. Patient reported difficulty in performing activities of her daily living due to the pain and deformity over right arm.

1.2 Examination

Healed surgical scar present over anterolateral aspect of right arm
Deformity present over distal half of right arm
Tenderness present over middle1/3rd - distal 1/3rd of right humerus
Hardware palpable
Mobility present at fracture site in both anteroposterior and mediolateral planes
ROM at elbow painful and restricted
No DNVC

Figure 1: Preop clinical images of the deformity

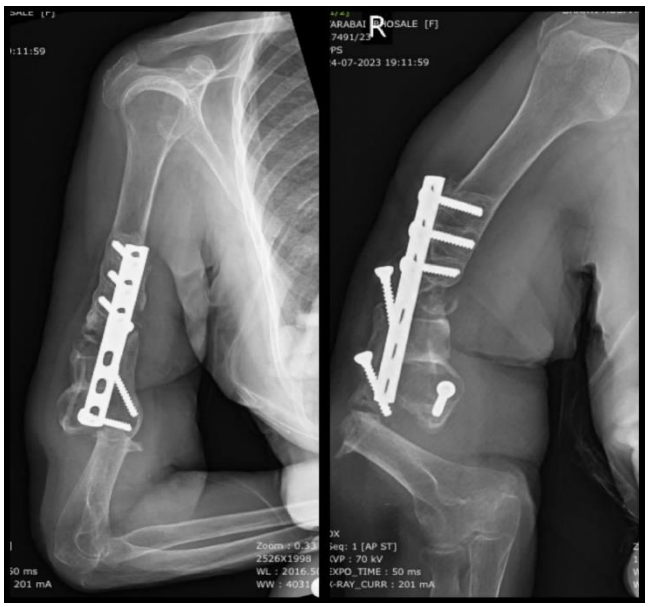

Figure 2: Preop X - Rays showing atrophic non union of humerus with implant in situ

Operative Procedure

Patient was posted for implant removal, reconstruction with fibular strut and iliac crest bone graft which was stabilized and internally fixed with long 11 holes extra - articular locking humerus plate.

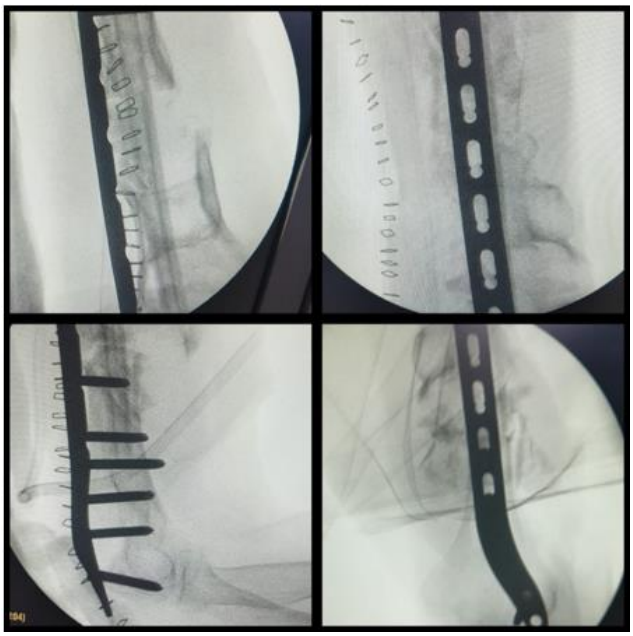

Figure 3: Intraoperative C - arm images

Figure 4: Immediate postop X - Rays

1 Year Follow Up

The patient was followed up for 1 year and showed no recurrence of pain or deformity and significant improvement in functional outcomes and ability to perform activities of daily living.

Radiological evaluation showed satisfactory incorporation of fibular and iliac crest graft with satisfactory alignment of the implant in situ.

Figure 5: 1 year follow up clinical images showing no recurrence of deformity and improved range of motion.

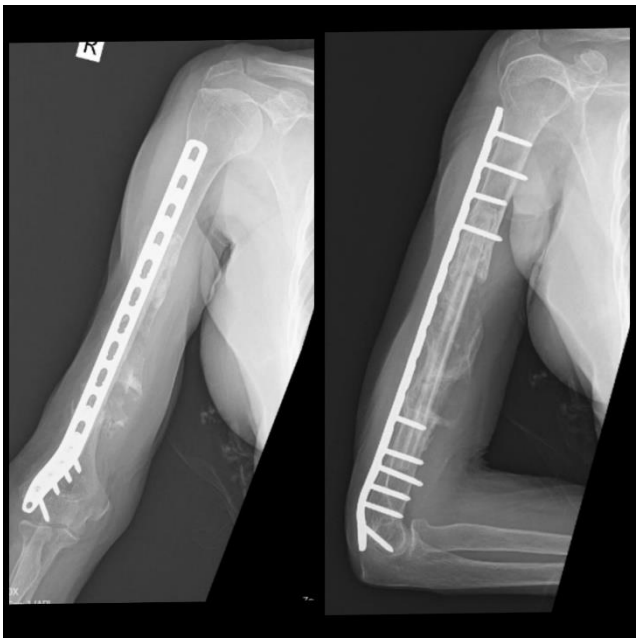

Figure 6: 1 year follow up X - Rays showing satisfactory incorporation of graft with satisfactory alignment of implant in situ.

2. Discussion

Humerus fracture is one of the long bone fractures and is still managed conservatively with a good functional outcome. Osteoporosis significantly reduces the pullout strength of screws thus increasing the chance of implant failure. Fibula

graft is a fresh cancellous autograft with properties of osteo - induction, osteogenesis and osteo - conduction. Bone grafting reduces chances of screw backout and hence prevents implant failure. Treatment goal of non - union fractures of humerus can be achieved with biological stimulation using fibula graft and early mobilization for better clinical outcome. For the fixation, 11 hole long locking plate was used as the bone was osteoporotic and there was a need to fill the bone gap which was covered with fibular strut and iliac crest bone graft. In this case, use of both cortical and cancellous graft to provide stability and biology for atrophic type of non union has shown satisfactory results functionally and radiologically. In conclusion, the use of intramedullary fibular grafts combined with iliac crest bone grafts represents a promising solution for treating osteoporotic humeral nonunion. This case demonstrated significant functional improvement and proper graft incorporation without recurrence of deformity, providing valuable insights into treating complex fracture cases in osteoporotic patients.

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