e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2023; 15(12); 453-457

Original Research Article

Multiple Nonunions / Nerve Palsy / Stiffness Management Difficulties and Strategies - A Case Report

Sandeep V.P[1], Amar M[2], Karthik. V[3], Parithooran S K[4], Ashraf Jamal[5], Ahilan S[6], Roy Arokiam Daniel[7], Balasubramaniyam. R[8]

[1]Junior Consultant, Government Taluk Hospital, Peravoor, Kannur
[2]MBBS DNB Orthopedics, Senior Resident, Vinaya Missions Medical College, Karaikal
[3]Senior Resident, Department of Orthopedics, Sri Venkateshwara Medical College and Hospital, Pondicherry
[4]MS Ortho Registrar, Rex Ortho Hospital
[5]Senior Resident, Sri Manakula Vinayagar Medical College and Hospital, Pondicherry
[6]Senior Resident, Indira Gandhi General Hospital and Post Graduate Institute
[7]Senior Resident, Centre for Community Medicine, All India Institute of Medical Sciences, Delhi
[8]MS Orthopedic Surgery, HOD, Sri Venkateshwara Medical College and Hospital, Pondicherry

Received: 10-09-2023 Revised: 23-10-2023 / Accepted: 26-11-2023
Corresponding author: Dr. Sandeep
Conflict of interest: Nil

Abstract

Background: Humerus Fracture with was operatively treated which complicates to Nonunion are Rare in literature as the incidence for operative nonunion rate is about 3-33%.Nonunion in segmental fractures.

With onset of Multiple Injuries in a limb, the surrounding muscles go for atrophy and Joints goes for stiffness. Evaluation difficulties in neurovascular Status pose a challenge to the orthopedic Surgeon to rightly identify the injuries which guarantees a higher investigation. In this case report we are gona discuss about a patient who presented to our hospital 4 months after initial surgical procedure at a different hospital without proper rehabilitation and delay in definitive procedure due to COVID crisis , difficulties in addressing this condition and management.

Keywords: Non-union Humerus, Radial nerve palsy, PIN palsy, Stiffness, Fracture.

Introduction

Humerus Fracture with was operatively treated which complicates to Nonunion are Rare in literature as the incidence for operative nonunion rate is about 3-33%. Delay in early stable Internal Fixation due to soft tissue and skin injuries play a vital role in the outcome of this condition. Segmental Fractures occurring in Both Bones fracture complicates this condition. Comminuted Fracture, Soft tissue loss, Intra Medulary Nailing are major risk factors for Nonunion in segmental fractures.

With onset of Multiple Injuries in a limb, the surrounding muscles go for atrophy and Joints goes for stiffness.

Evaluation difficulties in neurovascular Status pose a challenge to the orthopedic Surgeon to rightly identify the injuries which guarantees a higher investigation. Skin, Soft tissue and Bone Injuries Occurring simultaneous possess a challenge to the surgeon to manage this condition. Management of a Delayed Union, Nonunion (post operative), With multiple joint stiffness is a nightmare to majority of the surgeons.

The main purpose of this Report is to provide a collective and informative details and strategies regarding the management of Multiple injuries which includes Bone, soft tissue, Nerve palsy, Joint Stiffness and there is a definite lack in literature regarding the same.

Case Report

History and Examination

58 Years old Male, who is a Astrologer by occupation, presented with c/o Pain over R elbow with Hardware prominence, c/o difficulty in flexing elbow ,shoulder, wrist. C/o deformity over R arm. On examination he had a healed Slit Skin Grafted Scar over Medial aspect of arm near axilla and SSG scar over Medial aspect of elbow with Scars over forearm with prominent hardware over posterior elbow region. External Fixation scars present over lateral aspect of arm. Tenderness over R shoulder joint, Acromion , Coracoid was present. Active and

passive shoulder movements are restricted to <10 degrees. Tenderness over middle of the arm with abnormal mobility was present. Elbow Rom-Restricted 15 degrees FFD with further 10 degrees of active flexion and 25 degrees of passive flexion possible associated with pain over posterior elbow when he tries to flex further. Wrist Rom is restricted. Radial and Brachial Artery palpable, Neurological examination revealed absent active MCP extension and absent active thumb Extension.

Initial Injury was an RTA, windswept injury which occurred when the patient got hit by a bus over his R upper limb when he was sleeping with his limb protruding out through window. He was initially taken up to a nearby hospital (Tertiary care centre) where he was diagnosed to have Type 2 Compound Fracture Humerus shaft / Type 3 Acromion Fracture / Type 3 AC joint Injury / Coracoid Fracture Type 2/Segmental Fracture Both Bones forearm with Posterior Interosseous Nerve Palsy.

Initial management of External Fixation of Humerus with SSG / TENS Nailing Both bones forearm was done as open injury was present in arm (around axilla and near elbow).

Later External Fixator was removed 3 weeks prior when he presented to us. As it was a COVID19 Outbreak Period, he was deferred definitive management at his initially treated hospital and he presented to our hospital. He had pain over posterior elbow due to Hardware Impingement.

Figure 1: Clinical image with post SSG scar - Flail limb

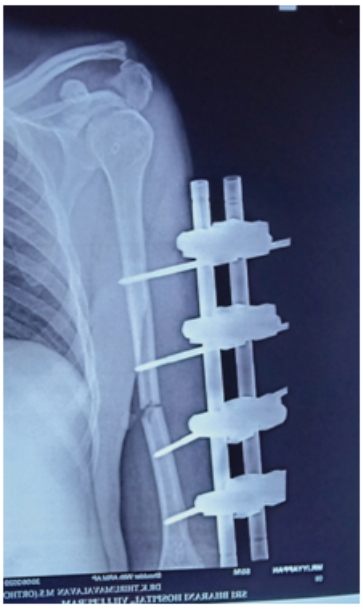

Figure 2: Initial External Fixation for Humerus

Figure 3: Segmental fracture Nonunion with implant insitu

Figure 4: Gap nonunion Humerus with Acromion and COracoid Nonunion

Investigations

Our management started with comprehensive evaluation including Radiographs of Shoulder, Chest, clavicle, Humerus, Forearm and hand. Ct scan-Shoulder (To assess the bony Injury which gave a picture regarding Acromion Non-union and Coracoid Non-union and possible Subacromial Impingement). We planned for MRI shoulder at a later Stage to assess Joint, Rotator cuff muscles and Labrum. We performed NCV to identify the nerve injury pattern and current status. NCV showed absent conduction through Posterior Interosseous Nerve (Axonotemesis).

His diagnosis was 4 months old Operatively treated(External Fixation) Humeral Shaft fracture Gap Non-union / Non-union Acromion Type 2/ Type 3 Acromio Clavicular Joint Injury/ Uniting Coracoid Fracture / Operatively treated (TENS) Delayed Union Segmental Fracture Both Bones Forearm with angulations of radius and ulna / Non Recovering Posterior Interosseous Nerve Palsy / Shoulder , elbow and wrist stiffness.

Patient's prognosis for Non recovery of Nerve palsy, Chances of Non-union , Chances of Neurovascular Injury , Non improvement in function of the limb and delayed treatment of individual conditions explained clearly and consent have been obtained. Staged procedure was planned for this patient.

Treatment

We performed Open Reduction and Internal Fixation with 3.5mm Narrow DCP Humerus Shaft with ICBG / Radial nerve isolation was done and nerve seems to be intact. Under General Anaesthesis, Left Lateral position used. Posterior Approach was used for this patient. After skin and soft tissue dissection Radial Nerve identified isolated adhesions released and non-union site was debrided and ends freshened up and meduallary canal opened and reduction done. Anterior Superior Iliac spine exposed and Bone graft was taken and grafting done at non-union and fracture fixed with 3.5mm Narrow DCP. Postoperative period was uneventful and sutures were removed at 14th post

operative day. Patient was followed up, regular radiographs was taken at 2 weeks, 4 weeks and 8 weeks. Humerus is uniting at 2 months. Intramedullary Nail Removal for Both Bones forearm and plate osteosynthesis was the procedure planned next. 10 weeks post surgery; he was admitted and after routine investigations and radiographs he was taken up for IntraMedullay Nail Removal and Revision Open Reduction and Internal Fixation with Long DCP 3.5mm and his sutures was removed at 12 days Postoperative. He was performed Neurolysis of Posterior Interosseous Nerve as the nerve was not recovering at 5 months post injury. He is undergoing TENS therapy, guided physiotherapy and followed up regularly.

Figure 5: Intra operative picture showing neurolysed radial nerve

Figure 6: Fracture fixed with LCP with Bone grafting

Shoulder Mobilization with Physiotherapy (active and passive Range of Movements exercises, Scapular Strengthening exercises) was done as there was severe shoulder stiffness Mobilization under anaesthesia was performed with Arthroscopic Adhesiolysis.

Elbow Mobilization (Physiotherapy, +/- Arthrolysis), Wrist Mobilization to improve Stiffness was started and it improved at 4 months follow up. We planned to wait for 6-9 months for the Posterior Interosseous to Recover [clinically / NCV (Nerve Conduction Velocity) /EMG

(Electromyography) if not Tendon Transfers will be planned.

Discussion

Humerus Fractures are a common injury accounting for 5%–8% of all fractures [1] In general, they have a good tendency to heal. Nonunion is found with an incidence up to 15 % [2].

In the case of a nonunion the surgeon faces a challenging problem. Depending on the trauma mechanism, the patient's constitution, co morbidities and previous treatment he has to deal with critical soft-tissue, infection, and poor quality of the bone or large bone-defects. After analysis of the underlying problem, the surgeon must decide which operative strategy is appropriate. Different techniques, such as fixed-angle locking plates, intramedullary nailing, allograft, external fixator and combinations are available

The literature shows better results for open revision and locking plating compared to intramedullary nailing [3, 4]

Diaphyseal forearm nonunion are rare but severely disabling as dysfunction extends to the elbow and wrist, which limits the ability to place the hand in space [2, 5]. Risk factors include comminution, high-energy fractures, open fractures and technical shortcomings of surgery. Intramedullary osteosynthesis is often considered a second-order method for treatment of forearm non-union. Healing is observed in 93% in this study. Methods for diagnosing these injuries are based on clinical criteria but may also include imaging methods and electrophysiological studies. [7] These diagnostic criteria vary widely because of both clinical maneuvers and quantitative criteria of imaging examinations [7]

Vulnerability of the PIN at the level of the elbow has been appreciated during surgical exposure of the elbow or proximal radius [8]. Naturally, traumas at this level such as radial head or neck fractures or fractures of the proximal shaft of the radius also carry the risk of PIN injury. However, only few cases of PIN injury after fractures of the radial head or neck have been described. Though surgical indications have been reported, the literature regarding surgical approaches and fixation techniques for management of these factures is limited. Acromion fractures can generally be addressed with a direct posterior approach using either tension band or low profile plating in combination with cortical lag screws to obtain a stable construct [9].

Staged Procedure offers the surgeon to clearly identify patient's improvements and needs as he goes on along with treatment. Single Staged procedure with ORIF Humerus with ICBG and ORIF Both Bones Forearm with ICBG have been considered but chances of infection, Blood loss and more extensive surgery should be avoided as far as possible in this revision situation.

References

1. Volgas D.A., Stannard J.P., Alonso J.E. Nonunions of the humerus. Clin Orthop Relat Res. 2004; 419:46–50.
2. Wenzl M.E., Porté Thomas, Fuchs Stefan. Verfahrenzurrekonstruktion und osteosynthese von pseudarthrosen des humerus. Trauma Berufskrankh. 2003;5: s86–s91.
3. Kumar M.N., Ravindranath V.P., Ravishankar M. Outcome of locking compression plates in humeral shaft nonunions. Indian J Orthop. 2013; 47:150–155.
4. Ilyas I., Younge D.A. Locked intramedullary nailing for difficult nonunions of the humeral diaphysis. IntOrthop. 2003; 27:278–281.
5. Faldini C, Pagkrati S, Nanni M, Menachem S, Giannini S. Aseptic forearm nonunions treated by plate and opposite fibular autograft strut. Clin Orthop Relat Res. 2009;467(8):2125–2134.
6. Rocco De Viti Marco Passiatore Vitale Cilli Jacopo Maffeise Giuseppe Milanoe Giuseppe TaccardocIntramedullary nailing for treatment of forearm non-union: Is it useful? – A case series Journal of Orthopaedics, July–August 2020;20: 97-104.
7. Moradi A, Ebrahimzadeh MH, Jupiter JB. Radial Tunnel syndrome, diagnostic and treatment dilemma. Arch Bone Joint Surg. 2015;3(3):156–162.
8. N. Heidari, T. Kraus, A.M. Weinberg, A.H. Weiglein, W. GrechenigThe risk injury to the posterior interosseous nerve in standard approaches to the proximal radius: a cadaver study Surg. Radiol. Anat., 33 (4) (2011), pp. 353-357.
9. Brian W Hill Jack Anavian Aaron R JacobsonPeter A Cole39.14University of Minnesota Twin Cities Surgical Management of Isolated Acromion Fractures November 2013 Journal of Orthopaedic Trauma 28(5).