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The importance of patient compliance in nonunion of forearm fracture

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ABSTRACT

INTRODUCTION: Studies on radius ulna shaft fractures are very important. Surgical treatment is generally administered due to the instability caused by the dynamic effect of forearm muscles. Surgical technique, implant, osteoporosis, patient compliance can affect the surgical treatment and healing.

PRESENTATION OF CASE: An 86-year-old female patient was admitted to emergency service with the complaint of protrusion of forearm implant from the skin. Physical examination revealed that 80° nonunion developed on the radial side. Therefore, protruded and exposed internal fixation materials were excised under axillary block. We used zoledronic acid as a treatment of osteoporosis with the value of −3.2 DEXA score.

DISCUSSION: Complication rate is reported to be 25% in patients treated with plate fixation. Patient compliance is very crucial in forearm fractures as in all surgical procedures. Presence of comorbidities and socioeconomic status of the patient are important factors in fracture healing.

CONCLUSION: This case emphasizes the importance of compliance of the patient to the follow-up after surgical treatment of forearm fracture.

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1. Introduction

Studies on radius ulna shaft fractures are very important because they are directly related with wrist and elbow functions. Forearm and hand fractures constitute 15% of all emergency service admissions. 44% of these fractures are located at the radius and/or ulna.¹ Surgical treatment is generally administered due to instability caused by dynamic effect of the forearm muscles. Malunion and nonunion is frequent because of supinator and pronator muscles.² Surgical technique, implant, osteoporosis, and patient compliance can affect the surgical treatment and healing. Elbow and wrist function cannot be accomplished as a result of these complications and surgical correction is needed.

2. Case report

An 86-year-old female patient was admitted to emergency service with the complaint of protrusion of forearm implant from the skin (Picture 1). The history of the patient revealed right radius and ulna fracture 30 years ago after falling. Internal fixation with plate and screw was applied to both radius and ulna. Patient did not

attend any of the postoperative follow-up visits. Hypertension and Alzheimer disease were the present comorbidities. Physical examination revealed that 80° nonunion developed on the radial side (Picture 2). Despite evident deformity on the forearm patient had no complaints of pain or activity limitation. Patient was independent for activities of daily living and personal hygiene. Active range of motion on the affected upper extremity were as follows: elbow flexion: 30°, wrist flexion: 15°, shoulder flexion: 90°, shoulder abduction: 70° and full extension for all joints. Forearm supination and pronation could not be accomplished.

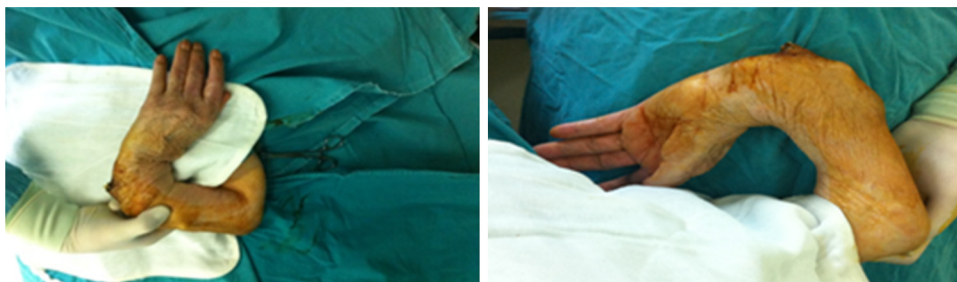
Surgical treatment was recommended to the patient. However patient and her relatives did not approve surgery. Therefore protruded and exposed internal fixation materials were excised under axillary block (Picture 3). No surgical intervention was applied to nonunion of ulna and radius. A forearm brace was prescribed to achieve a proper realignment postoperatively. We used zoledronic acid (5 mg/I.V.) as a treatment of osteoporosis with the value of −3.2 DEXA score.

3. Discussion

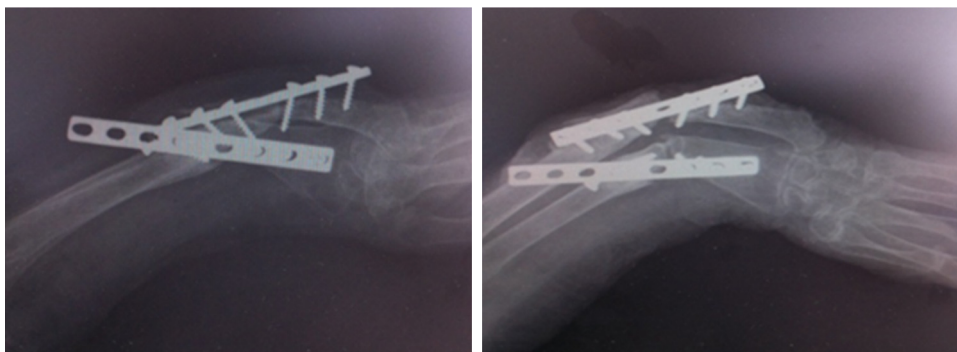
Anatomical structure of the forearm is unique. Proximally biceps brachii and supinator muscles as well as distally pronator teres and pronator quadratus muscles apply a rotation and angulation force in forearm fractures and disrupt the stabilization of the fracture.² Therefore forearm should be evaluated as a joint in the case of a

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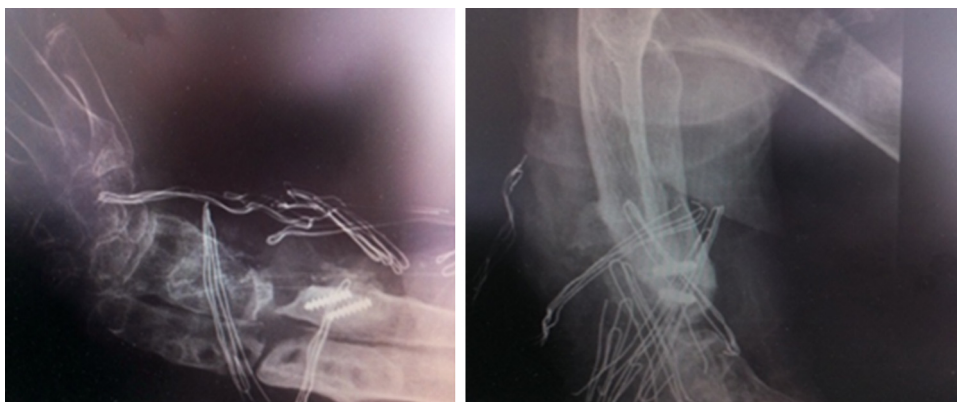
E-mail address: ersinkuyucu@yahoo.com.tr (E. Kuyucu).



Picture 1. Radial massive nonunion.



Picture 2. Preoperative X-rays.



Picture 3. Postoperative X-rays.

fracture. Anatomical alignment should be preserved surgically and rigid fixation should be applied postoperatively. Nerve injuries, nonunion, malunion, and infections are possible complications of forearm fractures. Complication rate is reported to be 25% in patients treated with plate fixation.³ Nonunion rate is between 4.3% and 20% according to the type of the surgery after forearm fractures.^{3,4} These high rates of nonunion are mostly related with type of surgery. Fracture healing rate of intramedullary nail is about 80% whereas locking compression plate (LCP) has higher healing rate at 91.5% and therefore causes more acceptable fracture healing.^{5–7}

Patient compliance is very crucial in forearm fractures as in all surgical procedures. Up to our knowledge there is no reported case of forearm fracture nonunion with 80° angulation and who came for first follow-up visit 30 years later. This case emphasizes the importance of regular follow-up and patient compliance postoperatively. If plate fixation is applied splint then it is prescribed for 3 weeks for soft tissue healing. If fixation is not sufficient, the splint should be used for 6 weeks.⁸ Controlled motion with active-assistive and

active range of motion exercises is then started for early functional results.

Presence of comorbidities and socioeconomic status of the patient are important factors in fracture healing. Fracture healing is a complex biological process that is affected by nutritional status, general health status and many other factors.⁹ Patients with nutritional defects or with mental impairment like Alzheimer disease should be under close follow-up.

Alzheimer disease is related with lower bone mineral density values and hip fracture risk is reported to be increased in patients with Alzheimer disease.¹⁰ In patients with fracture and Alzheimer disease bone mineral density of the patient must be evaluated and if present osteoporosis treatment should be started. In our patient we used zoledronic acid (5 mg/I.V.) as a treatment for osteoporosis.

4. Conclusion

This case emphasizes the importance of compliance of the patient to the follow-up after surgical treatment of forearm

fracture. Especially the patients with mental impairment may be lost on follow-up and may present with rare complications decades later.

Conflict of interest

None.

Funding

None.

Ethical approval

We obtained a written and signed consent for the case, prior to submission.

Author contributions

Ersin Kuyucu performed the data collections and writing the manuscript; Figen Koçyiğit performed writing the manuscript and data analysis; Lügen Çiftçi performed the data analysis.

Key learning point

- This case emphasizes the importance of compliance of patient to the follow-up after surgical treatment of forearm fracture.

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