

Distal Radius NonUnion : A Case Report

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Abstract

Non union of the distal radius fracture is extremely rare. It may occur in cases of unstable distal radius fracture associated with ulnar involvement, and in cases of inadequate immobilization. Clinically, it is characterized by persistent pain and movement at the fracture site on dynamic radiographs taken in flexion and extension. A CT scan confirms the diagnosis. Treatment is surgical, with the aim of achieving bone consolidation after bone grafting and stabilization by osteosynthesis. We report a case of pseudarthrosis of the distal radius in a 48-year-old female patient initially treated orthopedically with a cast immobilization.

Keywords: Distal radius, Fracture, non union.

Introduction:

After fracture of the distal end of the radius, reduction must be anatomical. These fractures, which are considered unstable, may lead to callus in the event of inadequate management, and to osteoarthritis in the long term. Pseudarthrosis is a rare complication, and is treated surgically.

Obsevation:

We report the case of a 48-year-old female patient who was involved in a low-energy road traffic accident, resulting in a posterior comminuted and tilted distal radius fracture associated with ulnar styloid tearing. She was treated orthopedically with cast immobilization for 06 weeks.

Functional rehabilitation began as soon as the cast was removed.

Pseudarthrosis developed, with pain and radial boot deformity.

Standard radiological assessment and CT scan Fig.2 confirmed the diagnosis of pseudarthrosis of the distal radius.

The patient underwent surgical treatment using Henry's anterior approach, with resection of the pseudarthrosis zone, avulsion of the pseudarthrosis site and filling with a homolateral iliac corticospingiosa autograft, followed by stabilization with an anterior screw-plate.

Post-operative brachio-antebrachiopalmar plaster cast immobilization was maintained until bone consolidation.

Résults :

Bone consolidation was achieved by the third postoperative month.

At 6 months post-operatively, the patient had recovered full range of motion.

At 7 years' follow-up, the patient was pain-free, with recovery of flexion-extension and pronosupination.

Grip strength was identical in both wrists. Radiographs showed bone consolidation of the pseudarthrosis site and the ulnar styloid (Fig.1).



Fig.1



Fig.2

Discussion :

Epidemiologically, the incidence of non union after distal radius fractures is very low. A review of the literature reveals 86 cases published in less than 30 years [6].

Pseudarthrosis of distal radius fractures is rare[3,4].

Bacorn and Kurtzke[1] reported a pseudarthrosis rate of 0.2% in a study of over 2,000 distal radius fractures.

This low incidence may be attributed to a number of factors, including the impact of the fracture, the number of fragments and their displacement.

The results of the various surgical techniques used are sometimes unpredictable.

segalman and Clark [14] treated 12 pseudarthroses of the distal radius in 11 patients over a 24-year period. Nine pseudarthroses had less than 5 mm of subchondral metaphyseal bone, which the authors considered insufficient for internal fixation.

Smith and Wright[15] treated five patients with pseudarthrosis of the distal radius. Four patients had open reduction, resection of the pseudarthrosis and cancellous bone grafting, and internal fixation[12]. One patient was treated with open reduction, bone grafting and external fixator, as also reported by some authors[16].

When the height of the distal fragment is less than 5 mm, a dorsal plate bridging the radiocarpal joint is recommended. This is still appropriate for patients with low functional demand, or after a failed attempt at consolidation [5,6].

However, the rate of consolidation is (58%). Some authors use pedicled vascularized autografts [2,13], or free autografts.

However, functional results are sometimes inadequate despite good bone consolidation.

The posterior interosseous bone flap (PIBF) has been successfully used as a new technique [13] to treat pseudarthrosis of the distal radius.

PIBF offers advantages over conventional bone grafting.

Given the rarity of pseudarthrosis after distal radius fracture, there is no consensus on surgical treatment modalities [8,10,17].

The size of the distal fragment, which may be osteoporotic, an associated soft-tissue lesion, an axial abnormality of the carpal bones, and trophic status at the site of pseudarthrosis are features that can make bone realignment and consolidation difficult [7.9.11].

Some authors recommend wrist arthrodesis as a last resort when the size of the distal fragment is less than 5mm.

Conclusion :

Non union after distal radius fractures is rare, serious and unpredictable.

Pseudarthrosis of distal radius fractures is disabling.

Treatment is difficult, and the results are unpredictable, making this a serious condition. However, surgical treatment depends on a number of criteria.

The treatment of choice is resection of the pseudarthrosis zone, followed by open reduction and stabilization with osteosynthesis and corticospongy grafting. Surgical treatment is not unequivocal, and in some cases involves wrist arthrodesis.

References

1. Bacorn RW, Kurtzke JF. Colles' fracture; a study of two thousand cases from the New York State Workmen's Compensation Board. *J Bone Joint Surg Am.* 1953;35-A(3):643–58. [PubMed: 13069552].
2. Crow SA, Chen L, Lee JH, Rosenwasser MP. Vascularized bone grafting from the base of the second metacarpal for persistent distal radius nonunion: a case report. *J Orthop Trauma.* 2005;19(7):483–6. [PubMed: 16056082].
3. Fernandez DL, Ring D, Jupiter JB. Surgical management of delayed union and nonunion of distal radius fractures. *J Hand Surg Am* 2001;26:201–9.
4. Harper WM, Jones JM. Non-union of Colles' fracture: report of two cases. *J Hand Surg Br* 1990;15:121–3.
5. Jupiter JB, Rüedi T. Intraoperative distraction in the treatment of complex nonunions of the radius. *J Hand Surg Am* 1992;17:416–22.
6. P. Liverneaux *, S. Facca, J.J. Hidalgo Diaz Nonunion after distal radius fracture: A review *Hand Surgery and Rehabilitation* Volume 35, Supplement, December 2016, Pages S120-S12
7. McKee MD, Waddell JP, Yoo D, et al. Nonunion of distal radial fractures associated with distal ulnar shaft fractures: a report of four cases. *J Orthop Trauma.* 1997;11:49–53
8. Prommersberger K-J, van Schoonhoven J, Laubach S. Pseudarthrosen nach distalen Radiusfrakturen. Welche Rolle spielt das distale Radioulnargelenk? *Handchir Mikrochir Plast Chir.* 2000;32:379–389.
9. Prommersberger K-J, Fernandez DL, Ring D, et al. Open reduction and internal fixation of un-united fractures of the distal radius: Does the size of the distal fragment affect the result? *Chir Main.* 2002;21:113–123.
10. Prommersberger K-J, van Schoonhoven J, Laubach S, et al. Corrective osteotomy for malunited, palmarly displaced fractures of the distal radius. *Eur J Trauma.* 2001;27:16–24.
11. Prommersberger K-J, MD*, and Diego L. Fernandez, MD† Nonunion of Distal Radius Fractures (*Clin Orthop* 2004;419:51–56)
12. Saleh M, Ribbans WJ, Meffert RH. Bundle nailing in nonunion of the distal radius. *Handchir Mikrochir Plast Chir.* 1992;24:273–275

13. Hossein Saremi,¹ Reza Shahryar-Kamrani,^{2,3,*} Bahareh Ghane,³ and Alireza Yavarikia¹ Treatment of Distal Radius Fracture Nonunion With Posterior Interosseous Bone Flap Iran Red Crescent Med J. 2016 July; 18(7):e38884.
14. Segalman KA, Clark GL. Un-united fractures of the distal radius: A report of 12 cases. J Hand Surg. 1998;23A:914–919.
15. Smith VA, Wright TW. Nonunion of the distal radius. J Hand Surg. 1999; 24B:601–604.
16. Venu KM, Forder J, Bommireddy R, Skyrme AD, Compson JC, Groom AFG. Ilizarov method for management of chronic non-union of distal radius causing a ‘Z’ deformity of the wrist. Injury Extra 2005;36:346–8.
17. Villamor A, Rios-Luna A, Villanueva-Martínez M, Fahandezh-Saddi H. Nonunion of distal radius fracture and distal radioulnar joint injury: a modified Sauvé-Kapandji procedure with a cubitus proradiustransposition as autograft. Arch Orthop Trauma Surg 2008;128:1407–11.