Case report

An unexpected healing of an established non union of the radial neck through teriparatide: A case report and review of literature

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1. Introduction

In recent years Teriparatide is gaining attention in literature regarding its role in fracture healing.¹ Some authors have also described successful use of Teriparatide in non-union mostly in lower extremity only.² We wish to present our successful experience of Teriparatide use in upper extremity for an established non-union of radial neck.

2. Case report

A 60 year old female patient presented to us with persistent pain and tenderness around her elbow joint following a fall one day back. Patient's radiograph revealed displaced radial neck fracture. Surgery was performed with open reduction and internal fixation with a 2.00 mm T plate (Synthes) [Fig. 1]. However the fracture failed to unite ever after one year [Fig. 2]. The patients had persisted pain around the elbow. The patient was given the option of revision surgery with bone grafting, but patient refused. Meanwhile, we also investigated the patient for factors responsible for non-union. Her personal history was negative in terms of any other medical illness, smoking, alcohol intake or any other form of drug intake. Her serum biochemistry parameters, PTH and Vitamin D level were within normal range. However, her DEXA Scan reveals severe osteoporosis, for which she was started on injection Teriparatide 20 µg s/c daily. To our surprise, when patient reported after 3 months for follow-up, her pain had resolved and fresh X-ray revealed union of radial neck fracture [Fig. 3] at final follow up at 2 year,

patient remained asymptomatic and had full range of motion at elbow joint. Since the proximal radius is not a common site for fragility fracture, no anti-osteoporotic regimen was started when the fracture was initially treated

3. Discussion

Fractures are a common event and they have an important role in any health care setting. Fracture healing occur in two ways either by primary when the fracture ends are close and secondary when there is micro motion between the fracture fragments and callus bridges the gap. But some fractures still undergo into non union and are a cause of pain and functional limitations to the patient.^{1,3}

Teriparatide, a systemic recombinant form of parathyroid hormone was approved by FDA in the treatment of osteoporosis and it has been shown to increase bone mass by increasing osteoblast activity. Its role in fracture healing has been proven in animal studies as well as in few randomized studies in humans. Multiple studies have shown the anabolic effect of Teriparatide in bone repair.^{4,11,12,13}

Bukata et al.¹⁰ studied on fracture healing and found that mesenchymal stem cells play an important role in cartilage formation and osteogenesis, and PTH/PTHrP have been shown to be required to prevent the depletion of progenitor mesenchymal stem cells to allow growth plate expansion and fracture callus formation. Because both chondrogenic and osteogenic precursor cells seem to be targets of PTH signalling and thus PTH play an important role in fracture healing.

Malhotra et al.⁵ showed successful use of teriparatide in tensile type of stress fracture femur in 62 year old postmenopausal women which are highly unstable otherwise. Atypical femoral

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Fig. 1. Post operative X ray after immediate fixation.

Fig. 2. Non-union at the end of 1 year.

fractures occurring following bisphosphonate therapy have also been treated by Teriparatide.⁶

Few case reports demonstrating role of teriparatide in non union [Table 1].¹

Brunemann et al.⁹, reported successful use of teriparatide (20–60 μ g daily) in 3 cases of delayed union; two femoral diaphysis and one radius in women aged 71, 53 and 18 years respectively that healed completely after 10 weeks of treatment.

Although being expensive, there is growing interest in the use of teriparatide as an adjunct in bone healing process, but more studies are required before labelling its efficacy in non union. Randomized trials may provide the real answer.

4. Conclusion

Based on the clinical experience of this case, teriparatide seems to be suggested as an alternative therapy for non-union especially in osteoporotic patients. Further studies designated to verify efficacy and cost effectiveness of this drug in the treatment of non-unions are needed to support this evidence.

Conflict of interest

None.

Fig. 3. United radial neck fracture after teriparatide treatment.

Table 1

Role of Teriparatide in Non-Union (Case Report).

S. No.	Author	Age/Sex	Region	Duration of Non Union	Months of Treatment	Dosage/ μ g/daily
1.	Chintamaneni et al. [7]	67/M	Sternal	6 months	3	20
2.	Lee et al. (Operated cases) [2]	38/M	Femoral Diaphysis	12 months	3–9	20
		64/F	Distal Femur	6 months		
		29/M	Femoral Neck	10 months		
3.	Angel Oteo et al. (Operated case) [8]	32/M	Diaphyseal Humerus	5 months	5	20
4.	Our Study (Operated case)	60/F	Radial Neck	15 months	3	20

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Compliance with ethical standards

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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