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Stress Fracture of the Olecranon in an Adult Baseball Player

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Abstract

Background: Stress fractures of the olecranon caused by repetitive stress force have infrequently been reported as a cause of elbow pain in adult athletes, engaged in throwing and pitching sports.

Purpose: We present the clinical and radiological features of a stress fracture of the olecranon in an adult baseball player.

Study Design: a case report

Methods: We diagnosed as a stress fracture of the olecranon by clinical and radiographic findings and treated surgically.

Results: The patient returned to playing baseball at a competitive level and was asymptomatic four months after the first operation. However, the patient re-injured the olecranon and a second surgical treatment was performed almost one year after the first operation. After the second surgery, the patient returned to baseball playing at a competitive level and was free from elbow symptoms.

Conclusions: We presented a stress fracture of the olecranon in a competitive baseball player and suggested that surgical treatment is necessary.

Key words: Stress fracture, Elbow, Olecranon, Throwing athlete

Introduction

Stress fractures are partial or complete fractures of a bone resulting from its inability to withstand stress applied in a repeated manner [1]. Stress fractures of the lower extremity are common injuries in physically active athletes, however, stress fractures of the upper extremity are not common. In this report, we present a stress fracture of the olecranon in an adult baseball player who was treated with open reduction and internal fixation (ORIF).

Case report

The patient, a 25 year-old-man, was a semi-professional baseball player. He is a right-handed outfielder (but bats with his left hand). Prior to injury, he had been repeatedly performing long throws from the outfield to a catcher everyday. At his initial visit, he reported feeling pain in the posterior and lateral aspects of the right elbow during throwing for the previous five weeks. Pain had increased progressively and he was unable to throw. Physical examination revealed swelling and tenderness in the olecranon of the involved right elbow. Flexion and extension of the elbow was limited to 120° and -30° respectively due to elbow pain. Pronation and supination of the forearm was not limited. Anteroposterior view of the radiographs demonstrated an oblique straight fracture line of the

olecranon although the fracture line was unclear in the lateral view. From physical examinations and the findings in plain radiographs, we diagnosed a stress fracture of the olecranon and treated it conservatively with rest and splinting for one week. However, at his second visit, fracture displacement had occurred (Fig. 1), so we selected a surgical procedure. Surgery consisted of ORIF using two Kirschner wires and tension band wiring without bone grafting. The operated elbow was immobilized with a long arm cast for two weeks after surgery. Thereafter, he started rehabilitation for active range of motion and muscles strengthening, while, with activities limited daily routine tasks. During the period of rehabilitation, low-intensity ultrasound exposure using Sonic Accelerated Fracture Healing System ([SAFHS]; Exogen, USA) at the olecranon was carried out for 20 minutes daily for 11 weeks by the patient at home. At 11 weeks postoperatively, bone union was confirmed by radiographs and the internal fixation was removed under general anesthesia (Fig. 2). The patient returned to competitive baseball game without elbow symptoms four months after the ORIF and he had no complaints for eight months after the initial surgery.

However, he again began to feel pain in the posterior and lateral aspects of the right elbow during throwing, almost one year after the surgical treatment.

Although a fracture line in the olecralanon was not detected on the anteroposterior view of the radiographs, a small hairline fracture was detected on the lateral view radiographs (Fig. 3). We diagnosed the patient with a re-injured stress fracture of the olecranon and performed surgical treatment. In order to reduce the invasiveness of the procedure, we made a small incision in the posterior aspect. We inserted an Acutrak screw 4/5 (ACUMED Inc., USA) after drilling at the fracture site and fixed the fracture site. We did not immobilize the elbow with a cast and started rehabilitation for active range of motion one day after surgery. During the period of rehabilitation, low-intensity ultrasound exposure using SAFHS at the olecranon was carried out. At eight weeks postoperatively, the patient returned to competitive baseball playing without elbow symptoms. Bone union was confirmed on the radiographs four months after the internal fixation with the screw (Fig. 4) and the patient had no complaints at the follow-up one year after the second internal fixation.

Discussion

Stress fractures of the olecranon are not common; however they should not be overlooked in the diagnosis of overuse elbow injuries. The usual presentation of stress fractures of the olecranon is the gradual onset of pain in the elbow during

throwing over a period of a few weeks. It is suggested that stress fractures of the olecranon in throwers are caused by the pull of the triceps brachii muscle on the olecranon [2, 5, 6, 8, 9, 11, 12, 13].

There are three main types of stress fracture affecting the olecranon. The first type is a stress fracture of the growth plate preventing the closure of the olecranon epiphysis. Radiographically, a band of irregular calcification develops in a widened growth plate [2, 9, 11, 12]. The second type is a stress fracture of the tip of the olecranon due to impingement of the hypertrophic pitching arm to a decrease in volume of the olecranon fossa [6, 13]. In the third type, a straight or oblique fracture line is detected in the middle third of the olecranon [5, 8]. This type of fracture results from repeated violent pulls of the triceps brachii muscle of the olecranon associated with valgus and extension overload of the elbow [5, 8]. In the present report, the patient had felt pain in the posterior and lateral aspects of the elbow during throwing for five weeks but limitation of range of motion in the elbow was not severe. Radiographs showed a characteristic straight and oblique fracture with slight displacement in the middle third of the olecranon. A stress fracture of the olecranon presented in this report was diagnosed based on these clinical and radiological features, and similar to the case reported by Nuber et al. or Hulkko et al [5, 8].

Nuber et al. reported two cases of stress fractures of the olecranon in baseball players and suggested that a non-displaced stress fracture detected as a straight oblique fracture line at the middle third of the olecranon could be treated conservatively [8]. However, when applying conservative treatment with complete rest and immobilization, the treatment period can be expected to be longer and union cannot be guaranteed, which is of critical concern for professional athletes. Moreover the fracture has the potential to displace due to traction force by the triceps brachii muscle.

Hulkko et al. reported two javelin throwers at international level with oblique stress fractures at the middle third of the olecranon surgically treated with two Kirschner wires and a tension band [5]. The fractures healed in four months and both patients were asymptomatic, however, one patient experienced a re-fracture and was surgically treated again. Hulkko et al. recommended stress fractures of the olecranon should be surgically treated in javelin throwers because of the high risk of delayed union.

In the present report, at the first visit, the fracture line was detected without any displacement, but, at the second visit, fracture displacement had become widely evident. Because the patient was required to return to his team as soon as possible, we chose ORIF combined with low intensity pulsed ultrasound

treatment, which has been found to accelerate the healing of fractures and nonunion [3, 4, 7, 10]. As fracture union was confirmed on the radiographs, the patients could throw without pain at the elbow and return to playing baseball at a competitive level for several months. However, the olecranon was re-fractured again and the fracture was treated with internal fixation with a screw, after which the patient remained asymptomatic. In this report, we presented a stress fracture of the olecranon in an adult baseball player and suggested that stress fractures of the olecranon should be surgically treated in high performance athletes engaged in throwing because of the high risk of re-injury or delayed union.

References

1. Brukner P (1998) Stress fractures of the upper limb. Sports Med 26:415-424
2. Chan D, Aldridge MJ, Maffulli N, Davies AM (1991) Chronic stress injuries of the elbow in young gymnasts. Br J Radiol 64:1113-1118
3. Fujioka H, Tsunoda M, Noda M, Matsui N, Mizuno K (2000) Treatment of ununited fracture of the hook of the hamate by low-intensity pulsed ultrasound. -A case report-. J Hand Surg 25A:77-79
4. Heckman JD, Ryaby JP, McCabe J, Frey JJ, Kilcoyne RF (1994) Acceleration of tibial fracture-healing by non-invasive, low-intensity pulsed ultrasound. J Bone Joint Surg Am 76:26-34
5. Hulkko A, Orava S, Nikula P (1986) Stress fractures of the olecranon in javelin throwers. Int J Sports Med 7(4):210-213.
6. King JW, Brelsford HJ, Tullos HS (1969) Analysis of the pitching arm of the professional baseball pitcher. Clin Orthop 67:116-123
7. Kristiansen TK, Ryaby JP, McCabe J, Frey JJ, Roe LR (1997) Accelerated healing of distal radial fractures with the use of specific, low-intensity ultrasound: a multicenter, prospective, randomized, double-blind, placebo-controlled study. J Bone Joint Surg 79A:961-973

8. Nuber GW, Diment MT (1992) Olecranon stress fractures in throwers. A report of two cases and a review of the literature. Clin Orthop 278:58-61
9. Rao PS, Rao SK, Navadgi BC (2001) Olecranon stress fracture in a weight lifter: a case report. Br J Sports Med 35:72-73
10. Takikawa S, Matsui N, Kokubu T, Tsunoda M, Fujioka H, Mizuno K, Azuma Y (2001) Low-intensity pulsed ultrasound initiates bone healing in rat nonunion fracture model. J Ultrasound Med 20:197-205
11. Torg JS, Moyer RA (1977) Non-union of a stress fracture through the olecranon epiphyseal plate observed in an adolescent baseball pitcher. A case report. J Bone Joint Surg Am 59:264-265
12. Wilkerson RD, Johns JC (1990) Nonunion of an olecranon stress fracture in an adolescent gymnast. A case report. Am J Sports Med 18:432-434
13. Wilson FD, Andrews JR, Blackburn TA, McCluskey G (1983) Valgus extension overload in the pitching elbow. Am J Sport Med 11:83-88

Legends

Figure 1: Radiographs of the elbow before surgery. (A) Anteroposterior and (B) lateral view. The fracture displacement was widely evident. An arrow indicates the fracture.

Figure 2: Radiographs of the elbow after removing Kirschner and tension band wires. (A) Anteroposterior and (B) lateral view. The fracture was united.

Figure 3: Radiographs of the elbow at reinjury. (A) Anteroposterior and (B) lateral view. A small hairline fracture can be seen on the lateral view of the radiographs.

Figure 4: Radiographs of the elbow four months after inserting the screw. (A) Anteroposterior and (B) lateral view. Bone union is confirmed.

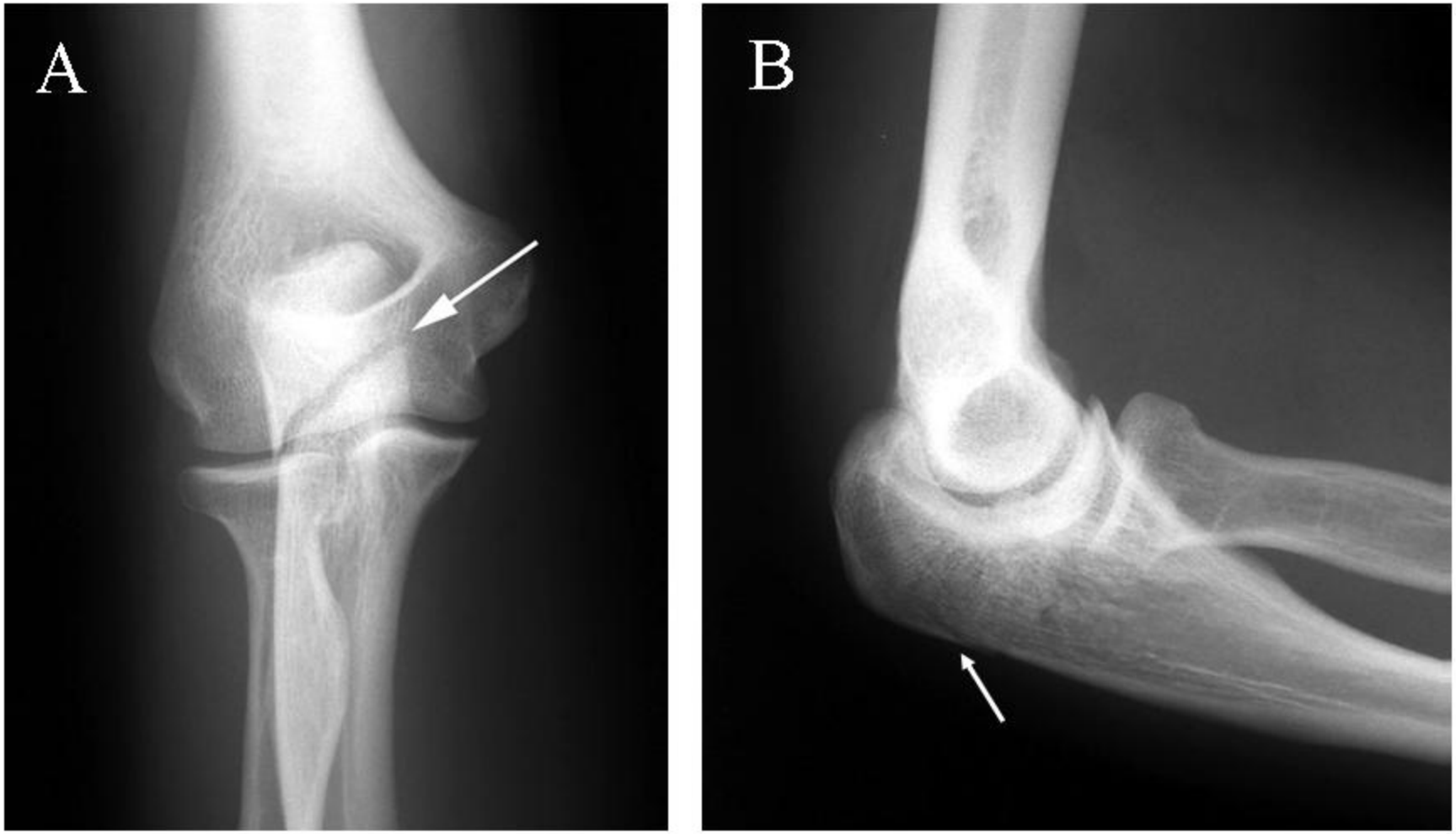

Figure 1

Figure 2

Figure 3

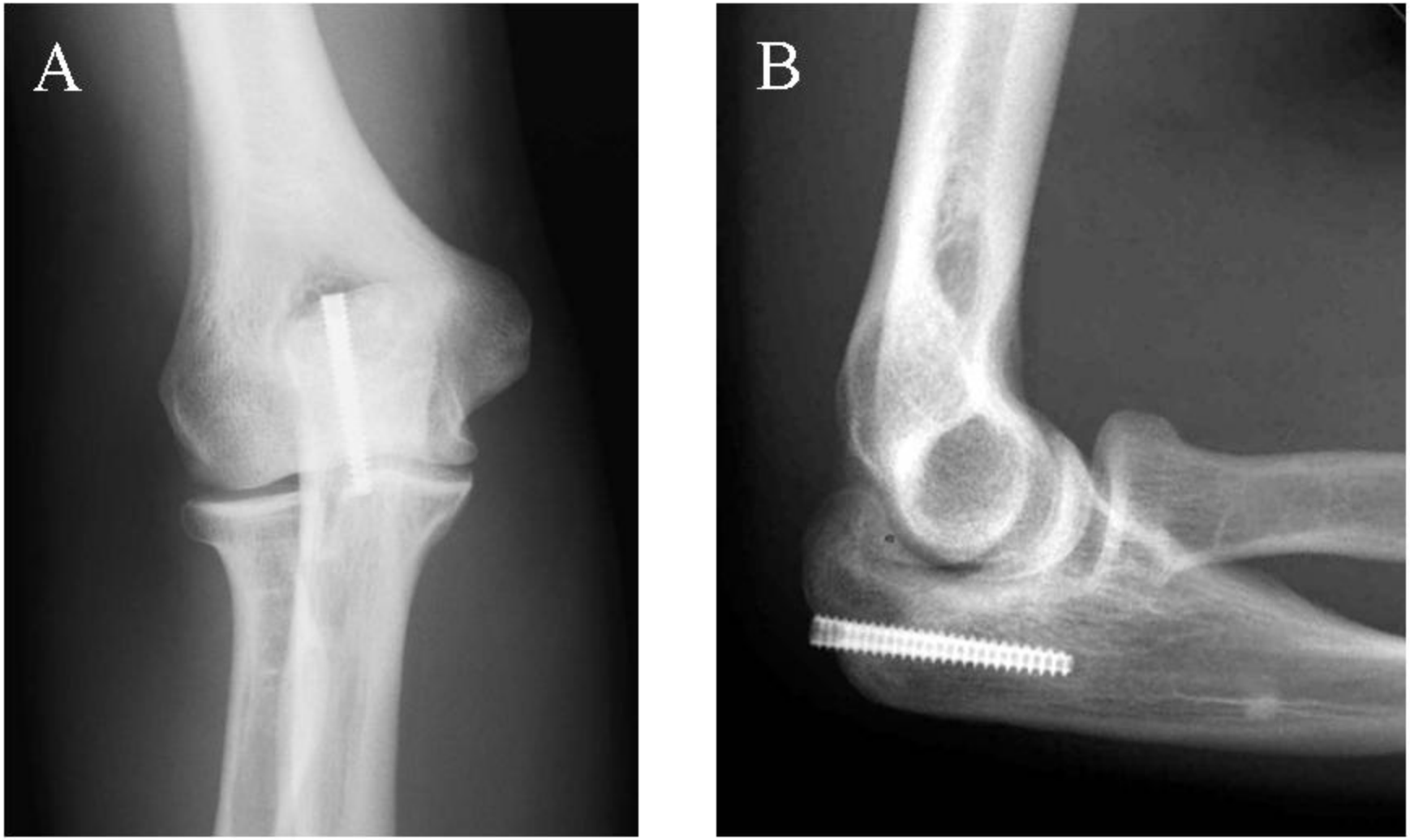

Figure 4