Olecranon Stress Fracture Treated with Headless Compression Screws and Bone Marrow Aspirate Concentrate Augmentation: A Case Report

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INTRODUCTION: An olecranon stress fracture (OSF) is an uncommon phenomenon in the context of sports injuries, with a prevalence of 5.4% among baseball-related elbow disorders. There are a number of mechanistic explanations for the olecranon stress fracture found in the literature. In a baseball player, this most commonly occurs secondary to forces approximating valgus extension overload (VEO), including the olecranon abutting the olecranon fossa, triceps traction imposed on the olecranon during the deceleration phase of throwing, as well as medial impaction of the olecranon onto the fossa due to valgus stress. In most cases, management involves conservative treatment consisting of rest, immobilization, and cessation of throwing with the affected arm. However, in a small subset of individuals, conservative treatment over a period of months is insufficient to return a patient back to his or her baseline, in which case operative treatment is required. A variety of surgical techniques have been described to treat olecranon stress fractures, most commonly of which involves the use of cannulated screws placed perpendicular to the fracture line of the olecranon. Current literature indicates that regardless of the surgical methodology used, hardware removal due to mechanical failure, infection, and pain are commonplace, some studies citing overall complication rate as high as 22.5%, with symptomatic or infected hardware making up the majority of complications.

METHODS: We reviewed a case of a twenty-one-year-old collegiate baseball player who was diagnosed with an olecranon stress fracture. This patient ultimately failed conservative management, requiring surgical intervention. A novel surgical approach consisting of an open reduction internal fixation (ORIF) using headless compression screws augmented with bone marrow aspirate concentrate (BMAC) and cancellous allograft bone was performed, with goal of achieving fracture union while minimizing risk of prominent and symptomatic hardware. The patient was informed, and consent was obtained to publish the details of this case, including imaging.

RESULTS SECTION: The patient was able to begin a collegiate return to throwing program 12 weeks after surgery, with radiographic evidence of union, and was released without restrictions and able to return to his previous level of competition 8 weeks later, with resolution of his symptoms.

DISCUSSION: While the gold standard surgical treatment for olecranon stress fractures is open reduction and internal fixation (ORIF) with compression screws, literature suggests that significant mechanical complications are not out of the ordinary. This novel technique utilizes two headless compression screws rather than standard compression screws, along with bone marrow aspirate concentrate (BMAC). Headless compression screws are advantageous as they allow for less soft tissue irritation and have shown to be less likely to need to be removed in other surgical contexts. Additionally, the use of BMAC has been shown to accelerate tissue repair due to its osteogenic properties, which is important in the case of a collegiate athlete with aspirations to return to the baseball diamond. The objective of this approach is for the combined use of an advantageous screw with BMAC to reduce return to sport (RTS) time and increase patient satisfaction.

SIGNIFICANCE/CLINICAL RELEVANCE: (1-2 sentences): This paper describes a novel surgical approach to treating olecranon stress fractures resistant to conservative management and may assist in minimizing known complication rates associated with prominent olecranon hardware.

IMAGES AND TABLES:

Figure 1: Initial injury plain films

Figure 2: 4-weeks post-op plain films

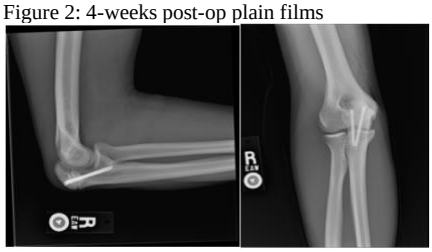

Figure 3: 7-weeks post-op plain films