Clinical Management of Olecranon Bursitis: A Review

Nzuekoh N. Nchinda, BA,* Jennifer Moriatis Wolf, MD, PhD†

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Learning Objectives

Upon completion of this CME activity, the learner will understand:

- How to diagnose nonseptic and septic olecranon bursitis.
- Nonsurgical and surgical management options for olecranon bursitis.
- Comparative efficacies of the different treatment options for nonseptic olecranon bursitis.

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Olecranon bursitis is a disease characterized by inflammation of the olecranon bursa, most often due to microtrauma. Although it is a common condition, there is a lack of evidence-based recommendations for the management of nonseptic olecranon bursitis. The condition is often self-limited and resolves with conservative methods such as rest, ice, compression, orthosis wear, and nonsteroidal anti-inflammatory medications. Older studies have shown

*From the *Pritzker School of Medicine; and the †Department of Orthopaedic Surgery, University of Chicago, Chicago, IL.*

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Corresponding author: Jennifer Moriatis Wolf, MD, PhD, Department of Orthopaedic Surgery and Rehabilitation, UChicago Medicine and Biological Sciences, 5841 S. Maryland Ave, Room P-211, MC 3079, Chicago, IL 60637; e-mail: jwolf@bsd.uchicago.edu.

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resolution of symptoms with intrabursal corticosteroid injections and surgical bursectomy. More recent literature has demonstrated adverse effects of intrabursal injections and surgery compared with noninvasive management for initial treatment of nonseptic olecranon bursitis. In order to better tailor decision-making, it is important that hand surgeons understand the comparative efficacies of each option for management of nonseptic olecranon bursitis. *(J Hand Surg Am. 2021;46(6):501−506. Copyright © 2021 by the American Society for Surgery of the Hand. All rights reserved.)*

Key words Aspiration, bursectomy, olecranon bursitis.

THE OLECRANON BURSA IS a fluid-filled sac lined by a synovial membrane that is superficial to the olecranon bone at the dorsal aspect of the elbow; it allows for smooth movement of the soft tissues over the olecranon during joint movement. Because of its superficial location in the subcutaneous tissue and limited vascularity, the olecranon bursa is susceptible to tissue damage due to pressure, trauma, and infection.[1] Olecranon bursitis is characterized as inflammation of the olecranon bursa. Bursitis can be nonseptic or inflammatory, as opposed to infected or septic olecranon bursitis. Two-thirds of olecranon bursitis cases are nonseptic, defined as accumulation of fluid without infection.[2] Sports activities and occupational demands with prolonged pressure on the posterior elbow can result in nonseptic olecranon bursitis.

Septic bursitis is nearly always preceded by direct trauma to the soft tissues.[1] Owing to poor vascularity at the olecranon bursa, infection is most often due to a transcutaneous process rather than hematological spread. Infectious agents are thus usually from skin flora, most often *Staphylococcus aureus* or *S. epidermidis.*[3]

Systemic inflammatory conditions such as gout, pseudogout, rheumatoid arthritis, and systemic lupus erythematosus and chronic medical conditions such as diabetes, obesity, and human immunodeficiency virus can predispose a patient to development of chronic olecranon bursitis.[4,5] Rheumatoid arthritis and systemic lupus erythematosus, as well as crystalline arthropathies, can cause inflammation in the bursa with proliferative bursitis[6] (Fig. 1). Anatomical conditions such as a prominent olecranon process or bony spur (Fig. 2) can also increase susceptibility to olecranon bursitis, by increasing the likelihood that trauma irritates the tissues overlying the olecranon.[7]

Limited estimates of incidence for olecranon bursitis are available. A retrospective study reported the incidence of nonseptic olecranon bursitis incidence at 10 per 100,000 persons in the ambulatory setting,[8] and a military study showed overall incidence of 29 per 100,000 person-years.[9] The actual prevalence is thought to be higher because many individuals may not seek medical attention for milder chronic cases of olecranon bursitis.[6] Affected patients are usually between 30 and 60 years of age, with higher occurrence in men than women.

The diagnosis of olecranon bursitis is largely clinical, based on history and physical examination. Signs and symptoms of nonseptic and septic olecranon bursitis often overlap, with a tender, fluid-filled bursa seen in both conditions. However, septic olecranon bursitis has overlying erythematous skin and warmth, with elevated erythrocyte sedimentation rate and C-reactive protein, which are not typical of nonseptic olecranon bursitis.[10] The gold standard of diagnosis is fluid aspiration and analysis from the affected bursa. Examination of bursal fluid color, cell counts, glucose concentration, crystal content, and gram stain enable the clinician to rule out infectious etiologies. With the risk of formation of sinus tract after aspiration (Fig. 3), some recommend making the diagnosis purely based on clinical and laboratory criteria.[10]

Plain radiographs can demonstrate a prominent olecranon spur but are otherwise not useful for diagnosis. Similarly, magnetic resonance imaging is reserved for imaging of the underlying elbow joint if there is suspicion for osteomyelitis.[5,11] Differentiation between nonseptic and septic etiologies is important for indicated management.

NONSURGICAL MANAGEMENT

There is not a standardized approach to management of nonseptic olecranon bursitis because evaluation and treatment are mainly based on the clinician's experience and preference.[12] Most studies addressing treatment are small retrospective case series.

Compression and orthoses

Initial non-operative management of nonseptic bursitis includes compressive bandaging (ACE wrap or elbow sleeves/pads) or orthosis wear.[13] These

FIGURE 1: Example of a large aseptic olecranon bursal mass.

FIGURE 2: Lateral radiograph demonstrates the olecranon tip spur, which can cause bursitis by irritating the overlying bursa.

methods compress the bursa, allowing absorption of the excess fluid within the synovial cavity or preventing movement of the affected joint. Additional non-surgical measures along with compression and orthoses include rest, application of ice, and nonsteroidal anti-inflammatory drugs (NSAIDs) for symptomatic pain relief. In a prospective, randomized study of 90 patients with nonseptic olecranon bursitis, Kim et al[14] compared compression combined with oral NSAIDs to aspiration and intrabursal corticosteroid injection, with no statistically significant differences in efficacy between compression and more invasive treatments. The time to resolution with compression was 3.2 weeks, compared with 3.1 weeks in the aspiration group and 2.3 weeks in the corticosteroid group.

FIGURE 3: Example of a chronic sinus overlying olecranon bursa, which developed after aspiration in the emergency department.

Aspiration

Aspiration may be performed as part of either diagnosis or treatment. This allows for bursal fluid analysis and can also alleviate pain from bursal fluid collection. However, the benefits of aspiration may not outweigh the risks, given that it can cause local introduction of bacteria and create sinus tracts.[15] Stell[12] described the treatment of acute bursitis and included 17 patients with nonseptic olecranon bursitis, all of whom were treated with initial aspiration, with 7 patients reporting improvement, 5 patients noting no change, and 3 patients who stated they were worse. In total, 7 of 17 patients (41%) were reaspirated. In the study by Kim et al,[14] the proportion of resolved cases after aspiration was 17 of 26 (65%), less than the compression/NSAIDs group (25 of 30; 83%) and the aspiration with steroid injection group (23 of 27; 85%), although the differences were not statistically significant. The relative risk of treatment failure was highest for the aspiration group at 2.19 compared with 0.68 and 0.59 for compression/NSAIDs and aspiration with steroid injection groups, respectively.

Intrabursal injection

Given the inflammatory pathology of nonseptic olecranon bursitis, anti-inflammatory treatment with intrabursal corticosteroid injection has been proposed for localized treatment. For symptomatic relief,

corticosteroid injection presents a quick method of alleviating pain and inflammation at the affected site. However, the negative effects of corticosteroid injection may outweigh its benefit. In a retrospective study, Weinstein et al[16] compared aspiration with corticosteroid injection in 47 patients with 31 months of follow-up. Twenty-two patients received aspiration treatment with a slow decrease in bursal effusion throughout the period of observation, whereas the 25 patients treated with injection of 20 mg triamcinolone hexacetonide had a markedly faster reduction in bursal effusion. However, those treated with steroids had long-term adverse effects including infection (3 patients), skin atrophy (5 patients) , and local pain (7 patients).[16]

Kim et al[14] reported that aspiration with steroid injection was associated with significantly faster resolution of bursitis at an average of 2.3 weeks ($P = .015$) compared with compression with NSAIDs and aspiration-alone treatment groups. Smith et al[17] performed a randomized double-blind study comparing intrabursal steroid injection with compression dressing in 42 patients, in which administration of intrabursal methylprednisolone acetate with oral naproxen resulted in the largest decrease in swelling (-13.3 ± 4.1 mm) at 1 week followed by sustained improvement of the condition at 3 weeks. The mean decrease in swelling in the intrabursal steroid injection groups (with or without oral naproxen) was significantly greater than in the compression groups (with or without oral naproxen) at 1 week following the start of treatment. However, it is notable that, in this study, the patients who received intrabursal steroid injection had also received compression dressings. Septic bursitis and skin atrophy were not seen in any of the patient treatment groups by 6-week and up to 6-month follow-up. The authors reasoned that the lack of complications seen in this study, unlike those seen in the previous retrospective study by Weinstein et al,[16] may have been due to the injection technique of a thin needle with lateral placement and with a sterile dressing over the injection site to minimize contamination by skin flora.[17]

The considerable risks of intrabursal corticosteroid injection are illustrated in a case report of an isolated rupture of the triceps tendon in a patient with history of olecranon bursitis treated with local steroid injections. Both oral systemic steroids and local steroid injections have been found to predispose tendons to rupture, particularly in patients with a history of olecranon bursitis.[18] The superficial tissue planes at the dorsal elbow predispose the superficial subcutaneous tissues to risk of atrophy and the deep muscular layer to risk of rupture in the setting of steroid injections to the affected site.

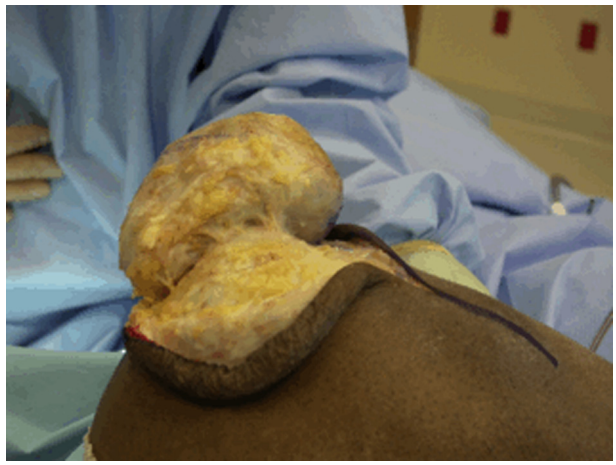

FIGURE 4: Surgical photograph of an aseptic olecranon bursa.

Intrabursal ethyl alcohol injection has also been described in a single study.[19] A prospective pilot study of ultrasound-guided injection of 50% ethyl alcohol, chosen because of its ability to denature proteins and shrink tumors, was performed in 2 patients with olecranon bursitis (along with 22 with malleolar bursitis) who had failed initial treatment with steroid injection. Ethyl alcohol was injected and aspirated repeatedly and then a compressive was wrapping placed. In the 2 patients with olecranon bursitis, one had complete relief and the other had partial relief at 16 months. However, intrabursal ethyl alcohol injection also has complications, which include infection, nerve injury, skin changes, ulcers, and abscess.

SURGICAL MANAGEMENT

For nonseptic olecranon bursitis, surgical management is considered for cases refractory to non-operative management, aspiration, and/or intrabursal injection. Bursectomy or olecranon spur excision can be performed if symptoms persist.

Open bursectomy

The traditional treatment of a persistently swollen and inflamed bursa has been open bursectomy. A longitudinal incision—curved laterally to avoid the olecranon tip—is made, and the bursa is removed in its entirety down to the subcutaneous fat (Fig. 4). In a retrospective review of 37 patients treated with open olecranon bursectomy, 10 patients (27%) experienced poor wound healing lasting for an average of 31 days and 8 patients (22%) had recurrence of swelling in the olecranon bursa within a mean of 51 days post-

olecranon bursectomy.[20] In a retrospective study of patients following open olecranon bursectomy, Stewart et al[21] reported that 15 of the 16 patients without rheumatoid arthritis had complete resolution of symptoms post-operation. The authors described a lateral incision and excision of the affected bursa as 1 single structure, suggesting that this may have contributed to favorable outcomes.

Endoscopic bursectomy

In a prospective study, Meric et al[22] compared the outcomes of open with those of endoscopic bursectomy in 49 patients who had failed to respond to non-operative management, aspiration, and/or intrabursal steroid injection in 3 months. Although all patients in both groups returned to daily activities and had no limitations in range of motion in the affected elbow, the endoscopic bursectomy group also had significantly higher patient satisfaction scores compared with the open bursectomy group. There were no recurrences in the endoscopic bursectomy group. Two of the 24 patients treated with open bursectomy had wound infections, 1 patient developed a fistula 3 weeks post-operation, and 1 patient had recurrent swelling.[22] Rhyou et al[23] performed a retrospective survey of 30 patients who underwent endoscopic bursectomy, 15 of whom had nonseptic olecranon bursitis. In the nonseptic olecranon bursitis group, the authors reported that visual analog score pain scores and (*Quick*DASH) scores improved from 0.6 to 0.1 and from 25.7 to 0.5, respectively.[23] Ogilvie-Harris et al[24] performed endoscopic bursectomy on 31 patients with olecranon bursitis, with outcomes of diminished tenderness and resolution in 30 of 31 patients as well as no infections or wound complications.

Olecranon spur excision

Presence of a prominent olecranon tip or bony spur can predispose a patient to nonseptic olecranon bursitis, increasing the likelihood of the occurrence of microtrauma to the olecranon bursa. For these patients, excision of the olecranon prominence can be considered. This procedure removes the bony spur to expose a broad surface with wider weight distribution and thus decreased risk of trauma to the joint[7]; the bursa is preserved. In a review of 11 patients, Quayle and Robinson[7] evaluated outcomes of open olecranon spur excision in patients with disease refractory to either non-operative management or aspiration. Each patient was treated with excision of the olecranon spur and experienced a return to normal bursa size with no recurrence of olecranon bursitis.[7] In this study, 2 patients had initial hyperesthesia and 2 patients developed tender scars, which resolved after 2 and 3 years, respectively. Singh and Bain[25] described an endoscopic extrabursal technique for olecranon spur excision. The extrabursal method involves creating a space between the deep fascia and the subcutaneous tissues compared with the traditional intrabursal method, which can result in small skin perforations.[25] The authors proposed that their endoscopic method yielded smaller surgical wounds and thus less wound healing complications as well as avoidance of persistent sinus due to skin perforation.

SUMMARY

Olecranon bursitis is a condition in which the olecranon bursa becomes inflamed, most often owing to microtrauma or direct trauma to the affected elbow. Evidence has shown that complete resolution of signs and symptoms can be achieved with non-surgical management including rest, ice, compression, orthoses, and NSAIDs as needed. With persistent or recurrent symptoms, aspiration can be used to both rule out infection and potentially treat the bursitis, but there is a risk of development of sinus tracts or iatrogenic infection. Although use of intrabursal corticosteroid injections has been shown to produce rapid symptomatic relief, the side effects of skin changes, muscle atrophy, and potential triceps rupture render the use of corticosteroids in management of olecranon bursitis inadvisable. Furthermore, steroid injections have not been shown to be superior to conservative management in complete resolution of signs and symptoms. For chronic cases that are refractory to conservative management, surgical excision of the bursa can be considered, with potential complications such as poor wound healing and recurrence of swelling. There are minimal data on this clinical disease, and more prospective studies are needed to guide optimal treatment.

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JOURNAL CME QUESTIONS

Clinical Management of Olecranon Bursitis: A Review

1. Systemic conditions that may be contributory to the development of olecranon bursitis include which of the following?
   a. Chronic renal failure
   b. Hypercholesterolemia
   c. Maffucci's disease
   d. Rheumatoid arthritis
   e. Thrombocytopenia

2. Radiographs of the elbow in olecranon bursitis may show which of the following?
   a. Supracondylar process
   b. Persistent apophysis of the olecranon
   c. Olecranon tip spur
   d. Loose body at the olecranon
   e. Lucency

3. A randomized trial of conservative treatment for olecranon bursitis comparing nonsteroidal anti-inflammatory drugs (NSAIDs)/compression to aspiration and intrabursal injection showed which of the following?
   a. Higher infection rate with steroid injection
   b. Development of draining sinus with aspiration
   c. Skin breakdown with compression
   d. Resolution with compression at 3 weeks
   e. Resolution with steroid injection at 2 months

4. Risks of intrabursal steroid injection include which of the following?
   a. Skin atrophy
   b. Elevated blood glucose
   c. Skin erosion
   d. Allergic reaction
   e. Fungal infection

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