MAYO CLINIC

ORIGINAL ARTICLE

One- vs 2-Stage Bursectomy for Septic Olecranon and Prepatellar Bursitis: A Prospective Randomized Trial

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Abstract

Objective: To assess the optimal surgical approach and costs for patients hospitalized with septic bursitis.

Patients and Methods: From May 1, 2011, through December 24, 2014, hospitalized patients with septic bursitis at University of Geneva Hospitals were randomized (1:1) to receive 1- vs 2-stage bursectomy. All the patients received postsurgical oral antibiotic drug therapy for 7 days.

Results: Of 164 enrolled patients, 130 had bursitis of the elbow and 34 of the patella. The surgical approach used was 1-stage in 79 patients and 2-stage in 85. Overall, there were 22 treatment failures: 8 of 79 patients (10%) in the 1-stage arm and 14 of 85 (16%) in the 2-stage arm (Pearson χ^2 test; P=.23). Recurrent infection was caused by the same pathogen in 7 patients (4%) and by a different pathogen in 5 (3%). Outcomes were better in the 1- vs 2-stage arm for wound dehiscence for elbow bursitis (1 of 66 vs 9 of 64; Fisher exact test P=.03), median length of hospital stay (4.5 vs 6.0 days), nurses' workload (605 vs 1055 points), and total costs (Sw₣6881 vs Sw₣11,178; all P<.01).

Conclusion: For adults with moderate to severe septic bursitis requiring hospital admission, bursectomy with primary closure, together with antibiotic drug therapy for 7 days, was safe, effective, and resource saving. Using a 2-stage approach may be associated with a higher rate of wound dehiscence for olecranon bursitis than the 1-stage approach.

Trial Registration: Clinicaltrials.gov Identifier: NCT01406652.

 ■ Mayo Clin Proc. 2017;92(7):1061-1069

Infectious bursitis of the olecranon or prepatellar and infrapatellar bursas occurs frequently. Estimate incidences range from 0.1 per 1000 inhabitants[1] to 3 per 1000 persons,[2] or 0.01% to 0.1% of all hospital admissions.[3] Despite the frequency of this clinical entity, there are few data concerning the optimal surgical and antibiotic drug management or long-term follow-up. Although some groups advocate outpatient treatment with needle aspiration,[4,5] antibiotic drugs, and immobilization,[6] others advise immediate hospitalization with surgical drainage[7,8] or partial drainage with continuous suction and irrigation.[9] Some authorities believe that many patients can be treated with antibiotic agents alone.[5,10,11]

We previously published the results of an online questionnaire completed by orthopedic surgeons and infectious disease physicians in Switzerland. In a country with 7.5 millions inhabitants, we recorded a total of 36 different management schemes for bursitis.[1] Open surgical drainage remains indicated for sepsis and conservative (eg, without surgery) treatment failure.[11-13] Indeed, reported failure rates for conservative treatment range from relatively low (5%, 9%, 12%) to high (22%, 32%-39%).[4,14-19] When surgical drainage is needed, there is no current consensus on the best approach. To address this important question, we initiated a randomized study comparing outcomes of 1-stage bursectomy (1-SB) compared with 2-stage bursectomy (2-SB) in patients with septic olecranon and prepatellar bursitis.

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METHODS

Setting

The University of Geneva Hospitals is a 2200-bed tertiary medical center and the only public

orthopedic service in Geneva Canton, Switzerland. Moderate to severe cases, eg, those failing to respond to conservative treatment, or those accompanied by extensive cellulitis, fever, or sepsis, are referred to the orthopedic service for emergency bursectomy.

Randomization, Objectives, and Masking

From May 1, 2011, through December 24, 2014, we invited all patients hospitalized with bursitis to participate in this prospective, randomized, investigator-blinded clinical trial. The primary objective was to compare treatment failure (infection recurrence or wound dehiscence) in the 1-SB arm with the 2-SB arm. Secondary end points included patient satisfaction, length of hospital stay, nurses' workload, and time to full return to work. We defined cure as complete clinical and microbiological resolution of bursitis after at least 2 months of follow-up. We defined failure as a recurrence of infection and/or secondary wound dehiscence requiring surgical revision.

Study Definitions and Criteria

The study inclusion criteria were age 18 years and older, moderate to severe infection requiring hospitalization and bursectomy in the operating room, and active follow-up of the patient for at least 2 months. The exclusion criteria were mild infection with only slight elbow redness; patients who could be treated on an outpatient basis; patients with bacteremia who required more than 7 days of antibiotic drug therapy[20]; the presence of another symptomatic concomitant infection; arthritis; osteomyelitis; the presence of osteosynthesis material; patients known to have a rheumatologic disease prone to nonseptic bursitis; the presence of crystal-induced bursitis; bursitis of a site other than the elbow or knee; pregnant or lactating women; previous participation in this study; and severe immunosuppression, defined as organ transplant, untreated human immunodeficiency virus disease with a CD4 count of less than 200 cells/mm,[3] agranulocytosis, or chronic therapy with corticosteroid medication equivalent to at least 15 mg of prednisolone daily.

The definition of infectious bursitis required the presence of fluctuance, redness, warmth, pain, and purulent fluid noted on bursectomy. For antibiotic-naive patients, we also required a positive microbiological culture from an intraoperative specimen. For patients already receiving antibiotic drug therapy but not clinically responding, we accepted clinical signs and intraoperative pus in the absence of positive microbiological results, only in the absence of alternative diagnosis, eg, gout or chondrocalcinosis. We defined moderate septic bursitis as the presence of increasing cellulitis (Figure 1). We defined severe bursitis as cases that had additional systemic signs, such as fever, chills, or other findings of the systemic inflammatory response syndrome.

Study Conduct

Patients were randomly assigned following simple randomization procedures (computerized random numbers, 1:1) to 1 of 2 treatment arms: 1-SB vs 2-SB. All bursectomies were open, total, and performed in the operating room. We did not perform arthroscopic procedures[13] or incisions without removal of the bursa.[9] In the 1-SB arm, bursectomy, lavage, and immediate closure were performed during the same surgical procedure. In the 2-SB arm, bursectomy and lavage were performed during an initial procedure. Subsequently, when the wound appeared grossly clean, after 1 to 3 days of antibiotic drug therapy, it was closed in a secondary procedure. The timing of the second stage (closure) was decided by the

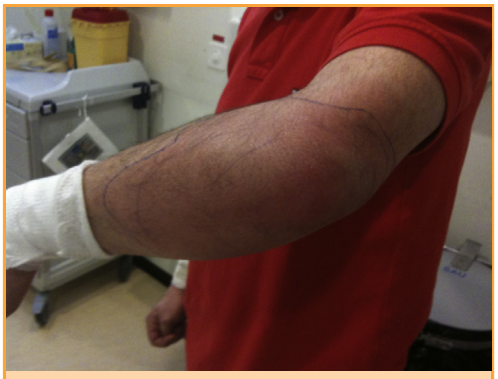

FIGURE 1. Moderate left olecranon bursitis with accompanying cellulitis. The 3 circular blue lines mark the extension of infection (inner circle: first day; outer circle: third day) developing under conservative therapy without surgery but with adequate antibiotic drug treatment. Published with the patient's written informed consent.

Mayo Clin Proc. ■ July 2017;92(7):1061-1069 ■ http://dx.doi.org/10.1016/j.mayocp.2017.03.011
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