

Septic olecranon and prepatellar bursitis in hockey players: a report of three cases

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Septic bursitis (SB) is an important differential diagnosis in athletes presenting with an acute subcutaneous swelling of the elbow or knee. Prompt recognition is essential to minimize recovery time and prevent the spread of infection. Due to the significant overlap in clinical features, it is often difficult to differentiate SB from non-septic bursitis (NSB) without bursal aspirate analysis. SB is commonly not considered unless the bursitis is accompanied by a local skin lesion or fever. This study describes two cases of septic olecranon bursitis and one case of septic prepatellar bursitis in adult hockey players presenting to a sports medicine clinic. None of the cases presented with an observable skin lesion and only one case developed a fever. It is therefore essential that clinicians maintain a high index of suspicion and monitor for signs of progression when presented with an acute bursitis even in the absence of these features.

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KEY WORDS: chiropractic, bursitis, olecranon, prepatellar, infection, hockey

La bursite septique (BS) est un diagnostic différentiel important chez les athlètes souffrant d'un œdème sous-cutané aigu du coude ou du genou. Le diagnostic rapide est essentiel pour réduire au minimum la période de convalescence et prévenir la propagation de l'infection. En raison du chevauchement important des caractéristiques cliniques, il est souvent difficile de distinguer entre la BS et la bursite non septique (BNS) sans analyse de l'aspiration de la bourse. La bursite septique n'est couramment envisagée que si elle est accompagnée d'une lésion cutanée locale ou de fièvre. Cette étude décrit deux cas de bursite rétro-olécranienne septique et un cas de bursite prérotulienne septique chez les joueurs de hockey adultes qui se présentent à une clinique de médecine sportive. Aucun des cas ne présentait une lésion cutanée observable et un seul cas a présenté de la fièvre. Il est donc essentiel que les cliniciens maintiennent un haut indice de suspicion et surveillent les signes de progression lorsqu'on leur présente une bursite aiguë même en l'absence de ces caractéristiques.

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MOTS CLÉS : chiropratique, bursite, olécrane, prérotulien, infection, hockey

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Patient consent was obtained for the use of clinical information and imaging with respect to these case reports.

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Introduction

Septic bursitis (SB) is characterised by inflammation secondary to bursal infection and most commonly involves the olecranon and prepatellar bursa due to their superficial locations.¹ The condition is frequently initiated by direct trauma with resultant transcutaneous bacterial contamination, most often through a traumatic or dermatologic skin lesion.^{2,3} Although the prevalence is unknown, SB accounts for one third of acute bursitis cases presenting to community hospitals with approximately 85% of cases occurring in young to middle-aged men.²

While non-septic bursitis (NSB) has been widely observed among athletes, to our knowledge only one case of SB resulting from sport participation has been reported in the literature.⁴ The purpose of this paper is to describe three cases of SB in young adult hockey players presenting to a multidisciplinary sports medicine clinic and provide an overview of the clinical features differentiating SB and NSB.

Case Reports

Patient A

A 19-year-old male hockey player presented to a sports medicine clinic with localized swelling over the right olecranon process one day after striking his elbow on the ice. The patient reported that his elbow padding had temporarily shifted leaving the area unprotected during impact. Due to minimal pain and full functionality, the patient was able to continue playing. Swelling reportedly began within two hours of injury. Physical examination revealed a mildly tender, localized, subcutaneous swelling overlying the right olecranon process (Figure 1). No skin lesions were observed. Elbow ranges of motion were full, though mild pain was reported at the end-range of flexion. Blood pressure, heart rate, and respiratory rate were normal and oral temperature measured 36.9 degrees Celsius. The patient was diagnosed with an acute traumatic olecranon bursitis and advised to apply ice and avoid aggravation.

The following day, the patient returned to the clinic due to progression of pain and swelling. Upon examination, there was diffuse tenderness, warmth, erythema, and swelling extending into the extensor surface of the forearm (Figure 2). Ranges of motion of the elbow were full though moderate pain was reported beyond 90 degrees of flexion with maximal pain at end-range. Oral temperature



Figure 1.

Upon initial presentation, the patient demonstrated a tender, localized, subcutaneous swelling overlying the olecranon process consistent with an acute traumatic olecranon bursitis. No skin lesion was observed. Vitals were normal.



Figure 2.

On the second day, diffuse swelling, warmth, and erythema developed over the extensor surface of the forearm indicating peribursal cellulitis. Vital examination revealed fever (38.3 °C). Patient was referred to urgent care with suspected septic olecranon bursitis.

measured 38.3 degrees Celsius. Blood pressure, heart rate, and respiratory rate were normal. The patient was referred to a local urgent care centre with suspected septic olecranon bursitis.

Bursal fluid aspiration yielded gram-positive bacteria, elevated leukocytes, and reduced fluid glucose. Blood analysis including complete blood count (CBC) and blood culture were normal. The diagnosis of septic olecranon bursitis was confirmed and the patient was prescribed Cephalexin (500mg 4x/day) and Naproxen (375mg 2x/day) for seven days and instructed to rest and ice. Over the course of treatment, the swelling continued to progress, travelling distally to the wrist and proximally to the middle of the arm. The patient returned to the urgent care centre and was immediately prescribed home-based parenteral antibiotics for an additional seven days. Fourteen days following initial presentation, the patient made a full recovery and gradually returned to play by the third week.

Patient B

A 20-year-old male hockey player presented to the above clinic with swelling over the left olecranon process two days after bumping his elbow on the boards. The patient reported wearing protective elbow padding at the time of impact and was able to continue playing with mild discomfort. Within three hours, a localized swelling developed over the olecranon process and over the course of two days, the swelling progressed into the extensor surface of his arm and forearm.

Physical examination revealed an erythematous, tender, warm, and diffuse swelling extending from the extensor surface of the proximal third of the forearm to the distal third of the arm most prominent over the olecranon process. No skin lesions were observed. Elbow ranges of motion were full with moderate pain at the end-range of flexion and extension. Vitals were normal and oral temperature measured 37.0 degrees Celsius. The patient was referred to an urgent care centre with suspected septic olecranon bursitis.

Bursal fluid analysis was consistent with SB and blood analysis (CBC and culture) was normal. Radiographic examination was negative for osseous pathology and diagnostic ultrasound revealed an avascular septated hypoechoic mass overlying the olecranon process. The patient was diagnosed with septic olecranon bursitis and prescribed Cephalexin (500mg 4x/day) and Naproxen



Figure 3.

Diffuse swelling, warmth, erythema, and tenderness along the anteromedial aspect of the right knee was observed with extension beyond the joint margins superomedially. Tenderness and swelling were most pronounced over the prepatellar bursa. An associated skin lesion was absent and vitals were normal. The involved area was outlined with a black marker prior to referral.

(375mg 2x/day) for seven days and instructed to rest and ice. The patient made a full recovery over the course of five days and returned to play on the seventh day.

Patient C

A 19-year-old male hockey player presented to the above clinic with a swollen and painful knee one day after receiving a lateral impact from an opponent player and striking his knee against the boards. The patient reported wearing knee protection though he was unable to continue playing due to pain. Upon physical examination, diffuse tenderness, warmth, erythema, and swelling along the anteromedial aspect of the right knee was observed with extension beyond the joint margins superomedially (Figure 3). The swipe test for intra-articular effusion was



Figure 4.

A significant reduction in the involved area was observed the following day (red marking). The weave pattern of the kinesiotope can be visualized on the skin.

negative. Palpation revealed maximal tenderness over the prepatellar soft-tissues and over the area of the MCL. Bony tenderness was absent at the patella, tibial plateaus, and femoral condyles. Range of motion of the knee was full with mild discomfort at the end-range of flexion and extension. Medial knee pain was reproduced with valgus testing at 30 degrees of flexion, though no laxity was observed. Orthopedic testing of the cruciate ligaments and menisci were negative. Vitals were within normal limits and oral temperature measured 36.4 degrees Celsius.

An acute MCL sprain was diagnosed clinically and septic prepatellar bursitis was confirmed by bursal aspiration at the urgent care centre. Blood analysis including CBC and culture was normal. The patient was prescribed Cephalexin (500mg 4x/day) and Naproxen (375mg 2x/day) for seven days and instructed to rest and ice. Prior to referral, a black marker was used to outline the affected area as shown in Figure 2A.

The patient returned to the sports clinic the same day and immediately began pain and edema reduction strategies including 30 minutes of ice and compression using a Game Ready machine and a lymphatic drainage kinesiotope technique. In addition to taking the prescribed medications, the patient was instructed to apply ice every hour at home. The response to treatment was examined the following day by outlining the area of warmth and tenderness with a marker. A three to five centimetre reduction was observed in all directions (Figure 4). This treatment protocol was continued and by the fourth day, there was complete resolution. The player returned to play on the fifth day with supportive taping of the MCL and no recurrence of infection to date.

Discussion

Injury to a superficial bursa may result from a single direct impact, multiple minor impacts, or prolonged constant pressure. Trauma triggers an acute inflammatory response resulting in the overproduction of bursal fluid and subsequent bursal swelling.¹ In some cases, injury may result in intrabursal bleeding.⁵ These processes damage the bursal epithelium and in turn increase susceptibility to microorganism seeding.^{2,5}

In most cases, SB is presumed to occur through direct transcutaneous seeding of normal bacterial flora through local skin lesions. Infection may also occur through secondary spread from an initial cellulitis⁶ or by hematogenous spread in rare cases³. Staphylococcus aureus is the causative agent in 80-90% of cases, followed by Group A Streptococcus accounting for 5-20%.¹ Although direct evidence is lacking, unsanitary athletic gear has been implicated as a potential source of soft-tissue infection among hockey players.⁷ Significant quantities of bacteria, including Staphylococcus aureus, have been identified in protective sports equipment of high school and university aged football players.⁸ Due to the prolonged and often direct contact with the skin, protective padding may serve as a fomite, facilitating bacterial contamination following localized soft tissue trauma. However, among the patients described in the present report, the exact origin of infection is unclear.

Early recognition of SB is essential as delay of treatment prolongs recovery time⁹ and unmanaged bursal infections may result in skin necrosis, infection of surrounding tissues, and septicemia⁶. However, differentiat-

ing SB and NSB on clinical examination alone is challenging due to the significant overlap in physical findings.¹⁰ Tenderness, warmth, and peribursal cellulitis show high negative predictive values (0.9-1.0)^{2,10}, indicating that the absence of any of these features strongly suggests the bursitis is non-septic. The absence of an observable local skin lesion also suggests the bursitis is likely non-septic, though the negative predictive value is somewhat lower (0.79-0.88).^{2,10} In the present report, none of the patients with SB showed evidence of local skin trauma. Clinicians should therefore maintain a high index of suspicion even when a portal for bacterial migration is not readily observable. In contrast, fever shows a positive predictive value of 1.0², suggesting that any bursitis accompanied by a fever should be considered septic. However, the absence of fever does not necessarily rule out SB, as fever demonstrates a negative predictive value of 0.30.² This is consistent with the afebrile presentations of Patient B and C. Although these data come from small sample sizes (n=30² and n=46¹⁰) they nonetheless suggest that clinical features may be useful in differentiating SB and NSB when applied appropriately in relation to their associated predictive values. However, as observed with Patient A, signs of infection may not be present upon initial presentation stressing the importance of educating the patient, following up, and monitoring for progression.

Septic arthritis is an important differential diagnosis to consider in athletes presenting with an acutely swollen joint as the clinical presentation is similar to that of SB.¹¹ A key differentiating factor suggesting an intra-articular inflammatory process such as septic arthritis is limitation in active and passive ranges of motion due to pain. Furthermore, the joint is often held in the position of maximal intra-articular space.¹¹ For example, a septic elbow will be held at 70 degrees of flexion¹² and a septic knee will be extended fully¹¹. Unfortunately, these specific positions were not noted with our patients during the physical examination. Patients with suspected septic arthritis should be immediately referred for diagnostic arthrocentesis as delay in appropriate antibiotic therapy within the first 24 to 48 hours of onset can result in subchondral bone loss and permanent joint dysfunction.¹¹

Definitive diagnosis of SB is made through bursal aspiration yielding bacteria, elevated leukocytes, and diminished fluid glucose. Identification of the specific causative agent is achieved with culture analysis. Blood

samples showing elevated infection parameters (e.g. CRP and leukocytes) are also associated with SB and if considerably elevated, indicate the need for hospitalization and parenteral antibiotic therapy.¹

Imaging studies including plain film radiography, ultrasound, and MRI have limited utility in the diagnosis of SB. However, radiography may be utilized to rule out fracture, bone lesions, spurs, and osteomyelitis. Ultrasound may also be useful in identifying possible underlying causes such as rheumatoid nodules and gouty tophi.¹

The therapeutic approach for mild to moderate SB consists of a seven to 14 day course of oral antibiotics, NSAIDs, and the PRICE principle (protect, rest, ice, compress, and elevate).⁹ The time required to achieve bursal sterility is correlated with the duration of symptoms prior to diagnosis (r=0.68)⁹, stressing the importance of early antibiotic intervention. When treatment is initiated within seven days of onset, full recovery is typically achieved within two to six days with an average of four days. Beyond seven days, time to full recovery may take up to fifteen days.⁹ This is consistent with the recovery time observed in Patient B and Patient C. In both cases, treatment was initiated within two days of onset and full recovery was observed between four and five days. In contrast, Patient A failed to respond to oral antibiotics over the first seven days, returned to the urgent care centre, and was prescribed parenteral antibiotics. As a result, the patient required an additional seven days of antibiotic treatment and had fully recovered by the fourteenth day.

Patient follow-up is generally recommended two days after initial diagnosis in order to evaluate the response to treatment and re-assess antibiotic selection based on aspirate culture results.¹ As demonstrated by Patient A, this may not always occur. It is encouraged that the referring clinician continue to be involved in monitoring the response to treatment, providing patient education, re-assurance, and addressing the secondary symptoms of pain and swelling.

Summary

Septic bursitis is an important differential diagnosis in athletes presenting with an acute subcutaneous swelling of the elbow or knee, particularly in response to trauma. Due to the significant overlap in clinical features between SB and NSB it is often difficult to rule out infection. It is important for clinicians to be aware that SB can occur in

the absence of fever and the absence of an observable skin lesion. Suspected cases should be immediately referred for bursal aspiration and blood analysis. If SB appears unlikely, clinicians should maintain a high index of suspicion and follow-up with patients for signs of progression. Failure to initiate appropriate antibiotic therapy results in prolonged recovery time and may lead to infection of surrounding tissues. Articular ranges of motion and vitals should also be assessed in order rule out septic arthritis and systemic infection respectively.

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