

Simple tests for septic bursitis: comparative study

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Differentiating septic from non-septic bursitis of the olecranon and prepatellar bursae is a common and important problem. Though septic cases may be identified clinically, laboratory tests have also been used.^{1,2} However these tests are either not widely available or inadequately sensitive. We assessed two new tests that can be performed by most clinical laboratories: estimation of cell counts in a sample of EDTA anticoagulated bursal fluid and inoculation of the fluid into liquid media.

Subjects, methods, and results

A total of 36 patients (32 men), 28 with olecranon and eight with prepatellar bursitis, were recruited from 54 consecutive patients with these conditions attending an accident and emergency department between May 1996 and March 1997 (age range 21-88 (median 36.5) years). Delay to presentation, severity of pain (visual analogue scale), fever, and degree of bursal erythema, warmth, and tenderness were recorded. The bursa was aspirated and the appearance of the fluid noted. The aspirate was divided into three aliquots, one for absolute and differential cell counts performed on an automated cell counter (Coulter), one for direct culture on solid media, and one for inoculation into liquid media (blood culture bottles, VITAL, bio Merieux SA). Treatment was in accordance with current practice. The definitive diagnosis of septic or non-septic bursitis was determined for each patient by an independent panel of senior clinicians, not otherwise involved in the study, on the basis of all clinical, laboratory, treatment, and follow up data to the point of final discharge (table). The four patients who did not attend follow up were contacted by telephone.

Patients with septic bursitis usually presented earlier and had more pain, erythema, warmth and tenderness, and some had mild fever (maximum recorded 37.5°C). Clinical features alone could not identify all the septic cases, nor were the volume and appearance of the aspirate helpful.

Positive results were obtained on culture in liquid media in all 17 cases of septic bursitis and on direct culture in 10 cases ($P < 0.05$, McNemar's test with continuity correction). This gives a sensitivity of 100% (95% confidence interval 92% to 108%), specificity of 89% (74% to 104%), and predictive value of a positive test of 89% (74% to 104%). Median white cell counts in septic cases were higher than in non-septic cases ($P < 0.001$, Mann-Whitney U test). Counts $> 2 \times 10^9/l$ had a sensitivity of 94% (81% to 107%), specificity of 79% (60% to 98%) and positive predictive value of 80% (62% to 98%) in the detection of septic cases.

Staphylococcus aureus was isolated in 15 of the 17 septic cases, β haemolytic streptococcus group G in one, and *Staphylococcus epidermidis* in one.

Comment

This greater sensitivity of liquid media inoculation than of direct culture methods in detecting sepsis has also been established for acute monoarthritis.³ The

main reasons are likely to be the larger inoculum of fluid used in liquid media methods, lysis of leucocytes with release of phagocytosed bacteria, and dilution of inhibitory factors by the medium.

Synovial fluid cell counts have been widely used in diagnosing joint conditions,⁴ mainly by manual microscopy as high viscosity makes samples unsuitable for automated cell counters. These are designed to count and differentiate cells in whole blood, but the principles are applicable to other body fluids. We established the validity of automated cell counters for this fluid in a prior study (unpublished data).

It is standard practice to aspirate inflamed bursae.⁵ With these two investigations, guidance on diagnosis can be obtained rapidly from the cell count, and treatment can be given on the same day. If doubt remains then antibiotics should be given while awaiting culture results.

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Discrimination of septic and non-septic bursitis by clinical features and laboratory tests

	Septic bursitis (n=17)	Non-septic bursitis (n=19)
Median (range) onset to presentation (days)	1 (1-7)	2 (0-29)
Median (range) pain (visual analogue score)	3.6 (0.8-7.8)	0.8 (0.2-7.0)
No (%) with fever	7 (41)	0
No (%) with erythema	14 (82)	5 (26)
Skin temperature:		
Cool	0	7
Warm	12	11
Hot	5	1
Tenderness:		
None	1	8
Mild	8	9
Moderate	4	2
Severe	4	0
Appearance of aspirate:		
Clear	2	3
Hazy	4	4
Serosanguinous	9	5
Bloody	2	7
Median (range) bursal fluid white cell count ($\times 10^9/l$)	5.2 (1.2-34.6)†	1.3 (0.1-6.1)†
% (range) neutrophils	79 (17-99)	36 (13-71)
No (%) positive on direct culture	10 (63)*	0
No (%) positive on culture in liquid media	17 (100)*	2 (11)

* $P < 0.05$, † $P < 0.001$.

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