Non-tropical pyomyositis

I MUSCAT, P P ANTHONY,* J G CRUICKSHANK

From the Departments of Microbiology and *Histopathology, Royal Devon and Exeter Hospital, Exeter and Public Health Laboratory, Exeter

SUMMARY Pyomyositis occurred in a man who had not been to the tropics. The condition is common in the tropics but most unusual in temperate climates and is nearly always caused by *Staphylococcus aureus*. Pyomyositis must be borne in mind in obscure cases of sepsis, as early recognition and treatment are essential to prevent a fatal outcome.

Voluntary muscle is remarkably resistant to blood borne bacterial infection. None the less, primary intramuscular abscesses are well recognised in the tropics, the condition being known as pyomyositis tropicans.¹⁻³ Recently, it has been reported in temperate climates where its rarity often results in a delay in diagnosis.⁴⁻⁷ Progression to a toxæmic stage, though unusual, may be rapid and fatal. We report this case to draw attention to a condition that is eminently treatable if recognised in the early stages.

Case report

A 66 year old caucasian man was admitted to hospital with a four day history of right shoulder pain progressing to severe generalised myalgia. There was no history of trauma, travel in the tropics, or alcohol abuse. His medical history consisted of transient cerebral ischaemic attacks following a silent myocardial infarct three months previously and gout for nine years.

On examination he was pale, peripherally cyanosed, and tachypnoeic. His temperature was 36°C, pulse 110 regular, blood pressure 100/60 mm Hg. He had pitting oedema to his knees, and basal crepitations were heard in both lung fields. There was brownish oedema around his right shoulder and the muscles of his trunk. The proximal parts of his limbs were tender with painful limitation of movement. His haemoglobin concentration was 15 g/dl, white cell count $8 \times 10^9/l$ (80% polymorphs with left shift), platelets $87 \times 10^9/l$, and prothrombin time 16 seconds (control 12 seconds). Blood urea concentration was 39 mmol/l (230 mg/100 ml) and he had a metabolic acidosis. He was also hypoxic. No abnormalities were seen on radiography of the right shoulder and no fluid was obtained on attempted aspiration of the

joint. The chest radiograph showed diffuse patchy shadowing.

Septicaemia with pulmonary disease was diagnosed, and treatment with intravenous fluids, oxygen, penicillin, flucloxacillin, fusidic acid, and gentamicin was started. Despite cardiorespiratory support he failed to respond and died 12 hours later. *Staphylococcus aureus* (phage type 52) sensitive to flucloxacillin, fusidic acid, and gentamicin was isolated from all blood cultures taken on admission.

Necropsy findings

There were no external signs of injury. The right shoulder and left forearm were swollen. On exposure the muscles of the right upper arm, the left forearm, and the left quadriceps were oedematous but showed

Fig 1 Small intramuscular abscess with darkly stained colonies of organisms. (Haematoxylin and eosin.) $\times 125$.

Fig 2 Colony of Gram positive cocci. $\times 800$.

Fig 3 Edge of septic lung infarct with darkly stained colonies of organisms. (Haematoxylin and eosin.) $\times 125$.

no other change. The right shoulder joint was normal. The heart showed a three month old organising infarct and the rest of the myocardium was red. Multiple abscesses up to 1.5 cm in diameter were scattered throughout the lungs. The spleen was soft, the liver enlarged, and the kidneys oedematous and mottled. Sections of skeletal muscle and myocardium showed multiple foci of suppuration (fig 1), containing large numbers of Gram positive cocci (fig 2). These foci were intramuscular rather than between bundles or within fascial planes. Samples of muscle from unaffected sites were normal. The lung abscesses contained similar organisms and seemed to be septic infarcts (fig 3).

Discussion

Pyomyositis is a disease seen commonly in many tropical countries. It is characterised by the development of abscesses within skeletal muscle and may be associated with varying degrees of systemic disease.^{1,2} *Staphylococcus aureus* is isolated in more than 90% of cases.¹⁻⁷ Most patients are healthy before the onset of infection and young males, often in the paediatric age group, predominate. Large muscle groups, like thigh, buttock, and shoulder are most commonly affected, and in 75% of cases only a single abscess is present. Pain in the affected muscle is the commonest presenting feature and is followed a few days to a week later by fever, local induration, oedema, and severe restriction of movement. Neutrophil leucocytosis is usually present. Blood cultures are only

positive in 5% of cases and muscle enzymes are rarely raised despite considerable muscle destruction.¹⁻⁸ If not recognised and treated promptly frank septicaemia with the formation of metastatic abscesses will follow.

The disease differs from primary staphylococcal septicaemia, both in its clinical and pathological features. In three reviews encompassing 562 cases of *S aureus* septicaemia from various sources and portals of entry abscesses in skeletal muscle were found in only two, but details of distribution or risk factors were not documented.⁹⁻¹¹

Pyomyositis is particularly common in east Africa and it has been reported to account for 3 to 4% of all surgical admissions to hospital in Uganda.³ It is rarely seen in temperate climates,^{1,2,5} but since the disease was first reported in the United States in 1971,¹² several cases have been recorded in American residents, and 31 of these were reviewed by Gibson *et al.*⁶ Of these, three cases were not considered to be consistent with the diagnosis, and three patients had recently returned from the tropics. Two had diabetes,^{6,13} two had a neutrophil polymorph count of $<250 \times 10^9/l$,^{14,15} and one was a heroin addict.¹⁶ Muscle disease was multiple in 16 patients and *S aureus* was isolated from 23 of the 27 cases in which an organism was identified. Seven of 21 patients had positive blood cultures and two patients died.

Of the six cases of bacterial myositis reported in the British literature since 1930, four were of streptococcal origin and presented as rapidly developing cellulitis,¹⁷ and in another the abscess was inter-

muscular rather than intramuscular.¹⁸ Williams and Thomas¹⁹ reported a case with acute disease of both calf muscles, in which swelling so compromised the blood supply that surgical intervention was needed to avert ischaemic damage. *S aureus* was isolated from the affected muscles and the patient recovered, albeit slowly, with antibiotic treatment.¹⁸

S aureus isolates in pyomyositis have no singular pathogenic properties. In one Ugandan series 70% fell in phage group II, but this group also predominates in deep seated abscesses in temperate climates.^{1 2}

Epidemiological evidence suggests that host factors are important, but extensive studies have failed so far to explain the cause and distribution of the disease.² Miyake²⁰ showed that in animals haematogenous seeding of muscle with *S aureus* required prior trauma to that muscle. Trauma is reported in 20% of cases, but its importance is unknown.^{2-4 6 21} Parasitic infestation is no more common in pyomyositis than would be expected from the local prevalence of infestation, and although nematode larvae were found in drained pus in one series, this has not been observed in other studies.^{4 22} The finding of muscle fibre degeneration and a mononuclear infiltrate in muscle at sites distant from abscesses suggest widespread muscle damage.^{23 24} This and the rarity of recurrence of pyomyositis have suggested a viral²³ or possibly a toxin induced predisposition.² Neither theory has been confirmed, but it is possible that more than one specific factor may predispose muscle to bacterial infection. No abnormality was found in samples of unaffected muscle in our case.

In retrospect, our case had many of the features of the classically described disease but with rapid progression to septicaemia, metastatic abscesses, and death. None of the suggested predisposing factors was present, but the possibility exists that long-standing gout, or its treatment, may have resulted in some form of muscle damage,²⁵ so providing the nidus on which transiently circulating organisms might have settled.

The differential diagnosis includes muscle trauma, deep vein thrombosis, osteomyelitis, and septic arthritis. If the axial musculature is affected pyomyositis may mimic intra-abdominal disease or pneumonia, and if multifocal, it needs to be distinguished from acute polymyositis and trichinosis.^{1 13 26 27} Radioisotope scanning, computed tomography, and, most specifically, aspiration under ultrasonographic guidance have been claimed to be particularly helpful in diagnosis.^{3 6 8 13 26 28} Reports from the tropics show that with early drainage and appropriate antibiotics the mortality is less than 2%.^{3 4} Further abscesses may present after treatment has begun but true recurrences are extremely rare and residual dysfunction or deformity uncommon.^{3 4}

That the condition is rare in temperate countries is clear, but it does occur, and the presence of a localised or multifocal myalgia accompanied by features of

infection should suggest the diagnosis and elicit suitable investigation before toxæmia with widespread sepsis occurs.

References

- 1 Taylor JF, Henderson BF. Tropical myositis. In: Shaper AG, Kibukamusoke JW, Huttik MRS, eds. *Medicine in a tropical environment*. London: British Medical Association 1972:32-44.
- 2 Shepherd JJ. Tropical pyomyositis: is it an entity, and what is the cause? *Lancet* 1983;ii:1240-2.
- 3 Horn CV, Master S. Pyomyositis tropicans in Uganda. *East Afr Med J* 1968;45:463-71.
- 4 Chukwuma Chiedozi L. Pyomyositis: review of 205 cases in 112 patients. *Am J Surg* 1979;137:255-9.
- 5 Anonymous. Pyomyositis [Editorial]. *Br Med J* 1979;ii:458-9.
- 6 Gibson R, Rosenthal J, Lukert BP. Pyomyositis: increasing recognition in temperate climates. *Am J Med* 1984;77:768-72.
- 7 Brown JD, Wheeler B. Pyomyositis: report of 18 cases in Hawaii. *Arch Intern Med* 1984;144:1749-51.
- 8 Kallen P, Nies K, Louie J, Keller M, Worthen N, Bayer AS. Tropical pyomyositis. *Arthritis Rheum* 1982;25:107-10.
- 9 Smith IM, Vickers AB. Natural history of 338 treated and untreated patients with staphylococcal septicaemia (1936-1955). *Lancet* 1960;i:1318-22.
- 10 Cluff L, Reynolds R, Page B, Breckenridge JL. Staphylococcal bacteraemia and altered host resistance. *Ann Intern Med* 1968;69:859-73.
- 11 Libman H, Arbeit R. Complications associated with Staphylococcus aureus bacteraemia. *Arch Intern Med* 1984;144:541-5.
- 12 Levin MJ, Gardner P, Waldvogel FA. Tropical pyomyositis: an unusual infection due to Staph aureus. *N Engl J Med* 1971;284:196-8.
- 13 Schleck WF, Moulton P, Kaiser AB. Pyomyositis: tropical disease in a temperate climate. *Am J Med* 1981;71:900-2.
- 14 Mitsuyasu R, Gale RP. Bacterial pyomyositis in a patient with aplastic anaemia. *Postgrad Med J* 1980;56:61-2.
- 15 Jordan GW, Bauer R, Wong GA, Barry LA. Staphylococcal myositis in a compromised host. Successful treatment with a synergistic combination of nafcillin and gentamicin. *West J Med* 1976;124:140-3.
- 16 Alavi IA, Smith EC, Lattoo H. Pyomyositis—tropical and non-tropical. *N Engl J Med* 1971;284:854.
- 17 Barrett AM, Gresham GA. Acute streptococcal myositis. *Lancet* 1958;i:347-51.
- 18 Rogers DW. A case of pyomyositis occurring in London. *Br Med J* 1973;3:679.
- 19 Williams RHP, Thomas P. An unusual case of spontaneous bacterial myositis. *Postgrad Med J* 1975;51:255-7.
- 20 Miyake H. Beitrage zur Kenntnis der sogenannten Myositis Infectiosa. *Mitteilungen aus den Grenzgebieten der Medizin und Chirurgie* 1904;13:155-98.
- 21 Ashken MH, Cotton RE. Tropical skeletal muscle abscesses (pyomyositis tropicans). *Br J Surg* 1963;50:846-52.
- 22 O'Brien DD. Pyomyositis in London. *Br Med J* 1974;ii:78.
- 23 Taylor JF, Fluck D, Fluck D. Tropical myositis: ultrastructural studies. *J Clin Pathol* 1976;29:1081-4.
- 24 Taylor JF, Templeton AC, Henderson B. Pyomyositis: a clinical pathological study based on 19 autopsy cases, Mulago hospital, 1964-1968. *East Afr Med J* 1970;47:494-501.
- 25 Fox IH. Hypouricaemic agents in the treatment of gout. *Clin Rheum Dis* 1977;3:145-58.
- 26 Goldberg JS, London WL, Nagel DM. Tropical pyomyositis: a case report and review. *Pediatrics* 1979;63:298-300.
- 27 Finnerty RU, Vordermark JS, Modarelli RO, Buck AS. Primary psoas abscess: case report and review of literature. *J Urol* 1981;126:108-9.
- 28 Peller JS, Bennett RM. Bacterial pyomyositis in a patient with preleukaemia. *J Rheumatol* 1985;12:185-6.

Request for reprints to: Dr JG Cruickshank, Consultant Microbiologist, Deputy Director, Public Health Laboratory, Church Lane, Heavitree, Exeter EX2 5AD, England.