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Pyogenic arthritis due to bacteroides complicating rheumatoid arthritis

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SUMMARY Two cases of anaerobic, pyogenic arthritis complicating rheumatoid disease due to bacteroides are described. The relative well-being of the patients and indolence of the affected joints are emphasised, and the effective role of metronidazole in the treatment of septic arthritis due to bacteroides is discussed.

Joint infection by anaerobic bacteria is uncommon and in the majority of reported cases the causative organism is a member of the genus *Bacteroides.*[1] Patients with rheumatoid arthritis appear to be unusually susceptible to septic arthritis,[2] but in the recent English literature there are only 2 cases of *B. fragilis* joint infection complicating rheumatoid arthritis[3 4] and no reports implicating *B. melaninogenicus.* We report a further case of *B.* fragilis complicating rheumatoid disease and describe a patient who developed a pyogenic arthritis due to *B. melaninogenicus.*

Case reports

CASE 1

A 69-year-old edentulous man with a 7-year history of seropositive, erosive rheumatoid arthritis was admitted because of a 14-day history of gradual increase in swelling, with pain, of his right knee and subsequent pain and swelling of his right calf. He had never received systemic or intra-articular steroids, and apart from his right knee his only other complaint was of a cough productive of yellow sputum for one week.

On admission to hospital he was apyrexial and looked generally well. He had a tense, swollen right knee which lacked 30° of full extension, with a large popliteal cyst. There was also swelling of the right calf, with pitting oedema over the right lower leg, ankle, and foot, which suggested a ruptured popliteal cyst. By contrast his other joints were not active. Examination of his chest revealed a few coarse crepitations at the right base.

His haemoglobin on admission was 8·7 g/dl with normochromic and normocytic indices, white cell count 12·5 × 10^9/l with 89% neutrophils and erythrocyte sedimentation rate (ESR) 113 mm/h. Chest *x*-ray showed consolidation at the right base.

Aspiration of his right knee produced 60 ml of cloudy synovial fluid, which was reported as having numerous Gram-negative rods, which were later identified as *Bacteroides fragilis.* Blood and sputum cultures were sterile. Treatment was begun with metronidazole 400 mg orally, 8-hourly. Seventy-two hours later reaspiration produced sterile synovial fluid. On the fifth day in hospital he developed a fistula on the posterior aspect of his right knee. This took 4 weeks to heal, but the discharge from the fistula was sterile on 5 occasions. Despite an extensive search, which included multiple small bowel aspirates, no obvious primary site for the infection was found. He was maintained on metronidazole 400 mg 8-hourly for 6 weeks. There has been no evidence of recurrence of the septic arthritis.

The opportunity was taken to assay simultaneously taken serum and joint fluid levels of metronidazole in this patient. One set of specimens was obtained 2 hours and 15 minutes after an oral dose of 400 mg, and on the second occasion the interval between the oral dose (400 mg) and the specimen was 3 hours. The levels measured by bioassay are shown in Table 1.

Table 1 *Levels of metronidazole in simultaneously taken serum and synovial fluid*

Dose	*Route*	*Interval to sample*	*Level of metronidazole in*	
			Serum	*Joint fluid*
400 mg	Oral	2 hours 15 minutes	25 μg/ml	17·2 μg/ml
400 mg	Oral	3 hours	28 μg/ml	22·5 μg/ml

SI conversion: μg/ml = mg/l.

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CASE 2

A 63-year-old female with a 10-year history of seropositive, erosive rheumatoid arthritis was admitted with a 6-week history of persistent swelling of her left knee. She had undergone bilateral Gunsten arthroplasties in 1973 and a left Thompson arthroplasty in 1976. She had never received systemic or intra-articular steroids, and apart from her left knee her arthritis had been quiescent in the recent past.

On admission she was apyrexial. There was a marked effusion of the left knee, but pain, increased heat, and redness were not prominent. Examination of her chest and abdomen were normal, but she had an area of periodontitis affecting the left lower first molar on the right side.

Full blood count on admission showed a haemoglobin of 9·9 g/dl, white cell count $3{\cdot}7 \times 10^9$/l, with 60% neutrophils, and ESR 76 mm/h. *X*-rays of her chest and knees showed nothing unusual. 35 ml of cloudy fluid was aspirated from her left knee, and *Bacteroides melaninogenicus* was isolated on culture. Subsequent speciation of this organism showed it to be *B. melaninogenicus* subspecies *oralis (B. oralis)*. Treatment with metronidazole 400 mg 8-hourly was begun and continued for 3 months. Repeat aspiration and culture at 72 hours failed to isolate the organism, and all blood cultures were negative. She underwent dental clearance for her oral sepsis during her admission, and an infected, retained root in the right anterior mandible was found.

Discussion

Patients debilitated with rheumatoid arthritis are considered to be a high-risk group for the development of septic arthritis.[2] However, anaerobic opportunistic infection is surprisingly uncommon in this group. In 2 previous case reports of *Bacteroides fragilis* joint infection[3,4] both patients had been treated with systemic and intra-articular steroids, and they were considered to be a contributing factor to their infections. In addition both cases showed the classical signs usually associated with septic arthritis, namely, pyrexia, systemic disturbance, and hot, painful, and swollen joints.

In the 2 cases reported here we were impressed by the insidious onset, lack of systemic upset, and the apparent indolence of the infection in the affected joints. Steroids were not given in either case, and, although case 2 had had replacement arthroplasties, this was 7 years before the septic arthritis.

Although anaerobic infection of joints is uncommon,[1] it has been suggested that when the patient develops pyoarthritis due to these organisms it is as a consequence of either upper respiratory tract infection, otorhinopharyngeal infection, or septicaemia complicating intra-abdominal sepsis. In the cases reported above we presume that the primary sites of infection were the chest and jaw respectively. Although organisms were not isolated from these sites, the subspeciation of the *B. melaninogenicus* isolated from case 2 would strongly support an oral source in this patient. In addition, although the organisms were cultured from the synovial fluid, blood cultures before the introduction of antibiotic treatment were sterile.

Since the sensitivity of *Bacteroides* species to metronidazole is high, this infection appears to be readily treatable, with rapid clearing of the organism from the joint. The rapid response to metronidazole is underlined by the levels of the drug found in the joint fluid relative to that in the serum. The concentrations of metronidazole achieved in joint fluid after an oral dose of 400 mg are well in excess of those required to inhibit and kill almost all *Bacteroides* species. Although in both our cases the synovial fluid had become sterile within 72 hours of beginning treatment, we felt that a prolonged antibiotic course was advisable. In neither case did we observe any evidence of neuropathy, which has previously been described in association with long-term metronidazole therapy.[5]

We would suggest that patients with long-standing rheumatoid arthritis who present with an isolated, active joint but who do not have the classical features of pyogenic arthritis should be seriously considered as suffering from an anaerobic infection and all attempts made to isolate the organism from the synovial fluid.

We are grateful to Dr M. Thompson for allowing us to report case 2.

References

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