

Case report

Parasitic arthritis induced by *Strongyloides stercoralis*

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SUMMARY A 40-year-old man presented with palpable purpura and symmetrical polyarticular arthritis. Histological examination of the synovial membrane and fluid unexpectedly disclosed *Strongyloides stercoralis* infestation of the ankle joint.

In the last decade polyarticular arthritis caused by parasitic agents has been clearly established, and circulating immune complexes have been implicated in the aetiology of this reactive arthritis.¹⁻³ Direct invasion of joints by metaechinococcus⁴ and microfilariae in laboratory animals⁵ has also been described. However, neither direct invasion of joints by *Strongyloides stercoralis* nor systemic vasculitis has previously been reported.

We present a patient with vasculitis and symmetrical polyarthritis in addition to 'boggy' swelling of his ankles. Histological examination of synovium of the ankle revealed parasitic invasion by *Strongyloides stercoralis* larva. Immunological tests showed that parasitic antigens were probably responsible for the patient's systemic manifestations.

Case report

A 40-year-old man, a chronic alcoholic with a past history of pulmonary tuberculosis, was admitted to hospital with night sweats, fever, and cough. He was treated with isoniazid, rifampicin, and streptomycin, with a diagnosis of reactivated tuberculosis. Six weeks later he developed pain in his elbows, wrists, fingers, knees, and ankles. One week thereafter a skin rash appeared and he was transferred to our hospital.

There was swelling, discolouration, and painful limitation of the joints. The ankles were most severely affected, with 'boggy' swelling. Marked

oedema was present in the feet and ankles. A number of reddish, nodular lesions, 1 to 5 mm in diameter, were present on the lower legs and a few on the forearms. The liver was enlarged, but no splenic enlargement was detectable.

Chest x-rays revealed a slight infiltration of the apex of the right lung with doubtful cavitation. Tuberculin skin reaction (5TU) was strongly positive, but direct staining of sputum for *Mycobacterium tuberculosis* was negative. A marked hypochromic anaemia (Hb 7.0 g/dl) was present, serum iron level and iron-binding-capacity being compatible with iron deficiency. The sedimentation rate was 80 mm/h, rheumatoid factor, antinuclear antibody, anti-DNA antibody and LE-cell tests were negative, and the serum C3 level was normal. Circulating immune complexes were increased (by 3% PEG precipitation and C1q-binding methods) in which IgG was the predominant immunoglobulin.

Histological examination of the skin lesions revealed a leucocytoclastic type of vasculitis, and immunofluorescence studies showed IgG, IgM, and C3 deposits in the walls of small arterioles

Antituberculous treatment was continued, and prednisone 40 mg daily was added on the third day of his admission. After 10 days the skin lesions had completely cleared and arthritic symptoms improved. However, swelling of the ankles became worse, and diagnostic aspiration of the left ankle was performed, at which 10 ml of turbid grey and very viscous fluid was obtained. Direct microscopic examination of this fluid showed the cells to be mainly mononuclear with some erythrocytes and a few polymorphs. Gram and acid-fast stains and

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routine bacteriological investigation were all negative, and no crystals were detected under polarised light microscopy. Repeated x-ray films of both ankles showed only periarticular tissue swelling, and there were no erosive changes.

Arthrotomy was performed in order to obtain a synovial biopsy specimen. On the medial aspect of left ankle there was a small cavity, 2–3 cm in diameter, attached to the joint capsule, from which turbid grey material was aspirated. Synovial fluid was also slightly turbid. Tissue specimens were removed for microscopic examinations. Some sections of worms surrounded by heavy inflammatory cell infiltration were seen on histological examination of the wall of the cyst and synovial membrane (Fig. 1). However, the parasites seen in these sections could not be identified. In a stool specimen many *Strongyloides stercoralis* larvae and *Ascaris* eggs were seen. At that time serum IgE level was 615 KU/l (normal 1–178 KU/l).

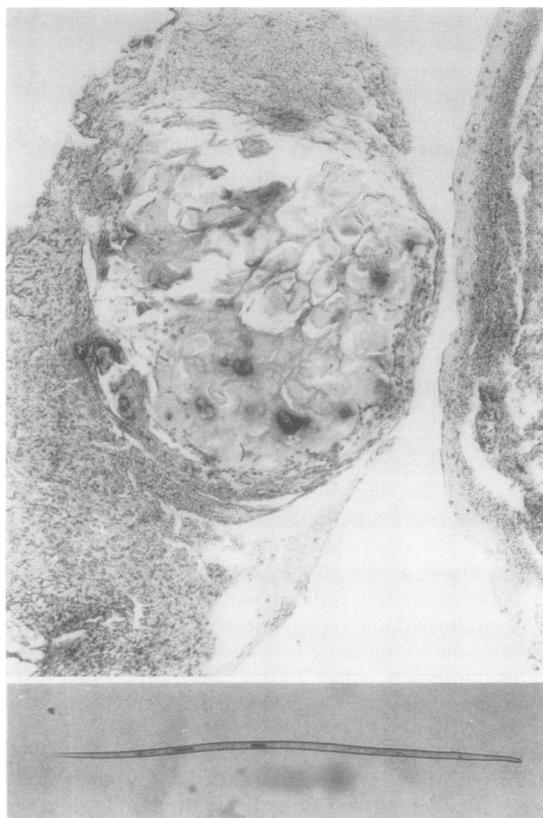


Fig. 1 Above: Some worm sections are seen in the synovial membrane obtained from the left ankle joint. Below: *S. stercoralis* larva found in the cystic cavity.

Corticosteroid treatment was discontinued and thiabendazole was started. After 15 days of treatment the left ankle joint improved slightly. Although some improvement was also observed in the right ankle, fluctuant swellings on both sides of this joint persisted, and arthrotomy of the right ankle was performed. Two cavities attached to the joint capsule on both sides were observed from which similar material was aspirated. Synovial membrane and synovial fluid were grossly normal. There were larvae of *Strongyloides stercoralis* in the material from the cavity (Fig. 1). Synovial membrane showed marked thickening of capillary walls and mononuclear cell infiltration. By fluorescence microscopy IgG, IgM, and C3 deposits were detected. There were no parasites in the synovial membrane sections.

After an interval of two weeks a second course of thiabendazole treatment was instituted. The patient felt generally much better and his ankle joints improved, but less severe polyarthritic symptoms continued which were treated with anti-inflammatory drugs for the next two months. Further improvement was noted in the following four months.

In order to assess whether parasitic antigens were involved in the pathogenesis of the systemic manifestations the following investigations were performed.

(1) *Strongyloides stercoralis* larvae were embedded into tragacanth gel and cryostat sections were examined by the indirect fluorescence antibody method using the patient's serum and fluorescein-labelled sheep anti-human serum. This test was positive.

(2) Rabbits were immunised with the homogenate of *Strongyloides stercoralis* larvae in Freund's incomplete adjuvant and the patient's synovial membrane was examined by sandwich fluorescence technique using rabbit anti-*S. stercoralis* serum and fluorescein-labelled sheep anti-rabbit serum. There was very clear granular staining indicating *S. stercoralis* antigen(s) in the capillary walls of the synovial membrane.

Discussion

Strongyloides stercoralis is usually asymptomatic and limited to the intestine. However, severe systemic disease due to *S. stercoralis* may develop in patients suffering from wasting diseases or malnutrition, or who are receiving immunosuppressive therapy or corticosteroids.⁶ It has been shown that tuberculosis is one of the factors which might contribute to the development of systemic strongyloidosis.⁶ Thus our patient who had both tuberculosis and chronic alcoholism was at risk.

The patient had systemic vasculitis, polyarthritis, and 'boggy' swellings of both ankles. At diagnostic exploration cystic cavities attached to the joint capsules were observed in both ankles. Aspirates from the cavities were examined and a larva of *S. stercoralis* was found in one. Although no larvae were found in synovial fluids, the fluid obtained from the left ankle was abnormal and similar in appearance to the aspirates from the cystic cavities. This suggested that this joint might also have been infected. This was confirmed on histological examination, which revealed the presence of worms in the synovial membrane from the left but not from the right ankle joint. However, histological evidence of non-specific arthritis was found on the synovial membrane from the right ankle.

Parasitic invasion of both ankle areas, symmetrically, without any sign of dissemination, is difficult to explain. The patient worked in marshy places without shoes from time to time, and it is likely that a number of larvae penetrated into the skin. While most larvae would have migrated to the lung and then to the intestine, some could have remained near the site of penetration and formed these cystic cavities around the ankles. If this was the case, parasitic invasion of the left ankle joint could be explained by dissemination from neighbouring cysts spontaneously, or alternatively it might be iatrogenic. Four days before the surgical arthrotomy joint aspiration was performed on this joint, and the needle might have entered through the cystic cavity which contained the worms and carried some of them into the joint space itself.

Both leucocytoclastic type of vasculitis and reactive arthritis are well described syndromes mediated by immune complexes.⁷ Although there is no reference to the appearance of leucocytoclastic vasculitis in strongyloidosis, this has been reported in other parasitic diseases such as malaria.⁸ However, reactive arthritis is more common than vasculitis in

parasitic disease, and one of the parasites well known in this respect is *S. stercoralis*.¹⁻³ Our patient had active tuberculosis and was receiving antituberculous drugs when the systemic symptoms first appeared. Although both these factors may cause vasculitis and/or arthritis, they were not likely to be solely responsible in this particular patient. Although treatment for tuberculosis was continued, vasculitis and arthritis improved following the treatment of the parasitic infestation. Furthermore, the findings of increased levels of circulating immune complexes and the presence of antibody against *S. stercoralis* in the patient's serum, together with the demonstration of *S. stercoralis* antigen in the capillaries of the synovial membrane, strongly support our conclusion that antigen(s) of this parasitic worm were involved in the development of the arthritis and possibly of the vasculitis.

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