

A CASE OF SEPTIC ARTHRITIS IN MULTIPLE JOINTS DUE TO *BACTEROIDES FRAGILIS* IN A PATIENT WITH RHEUMATOID ARTHRITIS

ANN-CHRISTINE RYDÉN*, ANNA SCHWAN*
& BENGT-OLOF AGELL†

* Institute of Clinical Bacteriology, University of Uppsala, Uppsala, and

† Department of Infectious Diseases, Gävle Hospital, Gävle, Sweden

A case of arthritis in multiple joints due to *B. fragilis ssp. fragilis* is described. The patient was a 55-year-old man badly disabled by rheumatoid arthritis. The patient's immune response to the isolated strain was studied and a significant titre reduction during the course of the disease was observed.

The serum antibodies of the patient cross-reacted with heterologous strains of *B. fragilis ssp. fragilis*. It is suggested that indirect immunofluorescence tests against a certain number of *B. fragilis* strains could be performed with serum from a patient in whom an infection with *B. fragilis* is suspected.

Key words: polyarthritis, septic; anaerobic infection; Bacteroides infection

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Anaerobes are nowadays isolated from most types of clinical specimens and this has raised the question of what role these bacteria play in different infections. Most anaerobic bacteria infecting human tissue are part of the normal flora. Anaerobes often act as opportunists infecting patients in special risk groups with weak immunological defence. The debilitated patient with rheumatoid arthritis appears to be unusually susceptible to bacterial infection and may develop septic arthritis which may be fatal if not adequately treated (Brit. med. J 1976). In 1969, Ziment et al. made a review of the literature and found reports of 47 cases of septic joint infections involving anaerobes. Brorson et al. (1975) reported a case of pyogenic arthritis due to *Bacteroides fragilis* in a patient with rheumatoid arthritis with significant changes in antibody titres during the course of the disease.

In this report a patient is described with septic polyarthritis due to *B. fragilis ssp. fragilis*.

CASE REPORT

The patient was a 55-year-old man with rheumatoid arthritis. He was badly disabled. He had earlier been treated with steroids and phenylbutazone. At the time of the infection he was on indometacin and salicylic acid.

The patient was admitted to the hospital with a high fever which had lasted 3 days and signs of acute arthritis in his left shoulder. Treatment with penicillin V had been started. Prednisolone treatment was added. Pus from the affected joint grew *B. fragilis ssp. fragilis*. Initially the patient responded well to treatment, but his temperature rose as an abscess formed on the left upper arm. Lincomycin treatment was instituted. Later arthritis developed in the patient's right knee and

right elbow and there were signs of incipient phlegmone on his right upper arm. Subsequent cultures grew *B. fragilis* resistant to penicillin. After a change of treatment to clindamycin and metronidazole, as well as surgical drainage and daily irrigation of the affected joints with physiological saline, the patient recovered.

Laboratory methods

Bacteriological procedures. All specimens for culture were transported to the laboratory in Stuart's medium, or, when aspirated, in anaerobic blood culture bottles. They were cultured aerobically using conventional laboratory techniques as well as anaerobically using the Gas Pak® system (BBL, Maryland, USA). The methods for cultivation and identification of anaerobic bacteria described by Holdeman & Moore (1973) were followed. The subspecies of *Bacteroides fragilis* were identified by fermentation tests, using the API system (API, Plainview, N.Y., USA). For sensitivity testing, the technique of Ericsson & Sherris (1971) was used. The agar was the same as for the original anaerobic cultivation. The bacteria were carefully suspended in sterile saline and flooded on each plate. Excess suspension was removed and the plates were dried at 37°C. Impregnated discs containing the antibiotics (AB Biodisc, Stockholm, Sweden) were applied to the plates and incubated for 48 h at 37°C in anaerobic jars, using the Gas Pak® system.

Serum specimens. Seven blood samples were drawn from the patient between October 1975 and July 1976. Sera were examined for antibodies against the infecting strain of *B. fragilis ssp. fragilis*. Pooled serum from five healthy laboratory workers, 25–40 years of age, was used as control. Serum samples were frozen in small portions and stored at -70°C until used.

Immunological procedures. Indirect immunofluorescence test (IFL), tube agglutination and passive haemagglutination (PHA) were performed as described by Danielsson et al. (1974a). Fourfold or greater changes of titres were considered clinically significant (Danielsson et al. 1974b).

RESULTS

B. fragilis ssp. fragilis was isolated from the left shoulder joint, the left upper arm, the right elbow and the right knee. All blood cultures were negative. The isolated strain was sensitive to doxycycline, erythromycin, lincomycin, clindamycin and metronidazole. It was resistant to ampicillin, penicillin, gentamicin, cephalexin, sulphonamides and trimethoprim/sulphamethoxazole.

Table 1 shows the immunological response against the isolated *Bacteroides* strain determined by three different methods. High titres were found with all methods at the time of the beginning and the peak of infection. The titres decreased significantly during the recovery of the patient. Control serum did not show any antibody titres against the *Bacteroides* strain used as antigen.

Four of the patient's sera were also tested against three heterologous strains of *B. fragilis ssp. fragilis* isolated in this laboratory from other types of infection. Only the IFL technique was performed. The result is shown in Table 2.

Table 1. Antibody titres in patient's sera against the isolated strain of *Bacteroides fragilis ssp. fragilis*

	Date of serum sample							
	1975 7/10	1975 22/10	1975 5/11	1975 12/11	1976 14/1	1976 7/4	1976 24/6	Control serum
Indirect immunofluorescence	160*	160	80	40	80	40	40	20
Tube agglutination	320	ND†	80	ND	40	ND	ND	ND
Passive haemagglutination	320	160	80	20	40	ND	20	ND

* Reciprocal titres

† ND = Not Done

Table 2. Antibody titres of patient's sera against the homologous strain and three heterologous strains of *B. fragilis* ssp. *fragilis*

Strain no.	Date of serum sample			
	1975 7/10	1975 5/11	1976 14/1	1976 24/6
Homologous strain	160*	80	80	40
3559	80	160	80	20
3851	80	80	80	20
3686	160	160	160	40

* Reciprocal titres.

DISCUSSION

Though anaerobic infections are not common in patients with rheumatoid arthritis one has always to consider the possibility of an opportunistic infection in this risk group. Steroid treatment of these patients is a contributing risk factor. It is obvious that the isolated *B. fragilis* strain was responsible for the infection in this case.

Since the sensitivity to penicillin decreased during the therapy the treatment was changed to clindamycin and metronidazole. Most *Bacteroides fragilis* strains are resistant to penicillins. Unfortunately, metronidazole was not available for sensitivity testing at the time of this study, but most *Bacteroides fragilis* strains isolated later in this laboratory were sensitive to this agent. Patients with bacteroides infections have been treated with metronidazole with success (Tally et al. 1975).

Elevated antibody titres against an organism show an engagement of the immunological defence indicating that the isolated strains play a role in the infection, as was seen in this case.

Table 2 shows that heterologous strains of *Bacteroides fragilis* ssp. *fragilis* cross-react with the isolated strain from this patient. Titres against the heterologous strains follow those against the homologous strain not differing more than one step upwards or downwards. Immunological methods will probably be of great value in the future in

establishing the role of anaerobes in infection. The IFL-technique seems to be the most satisfactory of the methods we have used in this study. It is fast and does not require pure bacterial cultures. When a *Bacteroides* infection is suspected, serum from the patient could be immediately tested against a suitable number of strains. This would allow the clinician to obtain a rapid answer before the organism can be isolated from the specimen.

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Correspondence to: Ann-Christine Rydén, Ph.D., Institute of Clinical Bacteriology, Box 552, S-751 22 Uppsala, Sweden.