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The microbiology of peritonsillar sepsis

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Abstract

Pus obtained by needle aspiration of 91 peritonsillar abscesses was examined microbiologically. A positive culture was obtained in 55 patients (60 per cent). Sixty-four bacteriological isolates were grown. Forty patients had a pure growth of a single organism, of which 21 (53 per cent) were *beta Haemolytic streptococci*. Pure growths of *Staphylococcus aureus* were found in only three patients. Fifteen patients had mixed organisms, including anaerobes, in their pus and the resistance to penicillin was low. Only the bacteroides species were generally penicillin resistant. The vast majority of patients made a good recovery following needle drainage of the abscess and treatment with parenteral penicillin. The patients with a mixture of penicillin sensitive and penicillin resistant organisms also made a good clinical recovery following needle drainage and administration of parenteral penicillin. The relevance of these findings in the pathogenesis and management of peritonsillar sepsis is discussed.

Introduction

Peritonsillar sepsis is an unpleasant and painful condition which is the result of infection in the peritonsillar space. Pus does not always collect, but when it does, the classical treatment is to incise and drain the abscess. In the last 10–15 years the practice of needle aspiration has been used, as an alternative method of surgical drainage. This procedure is less unpleasant for the patient and seems to be equally effective as incision and drainage, as a therapeutic option (Herzon 1984; Schechter *et al.*, 1982). It carries the great advantage of enabling accurate sampling of any pus in the abscess. Incision and drainage, using a knife, cannot give reliable microbiological data as any specimen obtained will inevitably be contaminated with oral flora.

This paper details the microbiological information in a series of patients, suffering from peritonsillar sepsis, that were treated with needle aspiration of the peritonsillar space.

Materials and methods

Ninety-one patients undergoing needle aspiration of a peritonsillar abscess were studied. There were 35 women and 56 men, with an age range of 16 to 60 years (median 29 years). Pus was collected by aspirating the affected peritonsillar space with a 19 gauge needle mounted on an evacuated 20 ml syringe. In a proportion of patients a throat swab was also taken.

The study period had been from 1984 to 1987, and the patients were selected from a larger group of 172 patients presenting with peritonsillar infection. All patients underwent a needle aspiration of the affected peritonsillar space. The 91 patients in whom pus was drained, formed the basis of this study. Eighty-one other patients in whom no pus was obtained, were excluded from this series.

The pus that was obtained was sent as soon as possible to the microbiology department for culture. All specimens were cultured in aerobic blood agar, anaerobic blood agar, anaerobic selective medium agar (incorporating neomycin) and Robertson's cooked meat medium.

All patients were commenced on intravenous penicillin, unless known to be allergic to it, in which case erythromycin was substituted. If clinical improvement—indicated by a reduction in pain, trismus and fever—was not apparent within the first 24 hours, a further aspiration was performed. If satisfactory clinical progress was not being made, and the culture result indicated that the infecting organism was penicillin resistant, an appropriate antibiotic was prescribed to replace penicillin.

Results

Of the 91 patients, a positive culture was obtained in 55 patients (60 per cent). The pus in the other 36 patients was sterile on culture. Sixty-four different isolates were grown (Table I). Forty patients had a pure growth of a single organism, of which 21 were *beta Haemolytic streptococci* (53 per cent). Pure growths of *Staphylococcus aureus* were rare and only found in three patients. Of the 15 patients with mixed growths of organisms, four were reported as mixed normal flora. The remaining 11 patients grew a variety of organisms (Table II), but *beta Haemolytic streptococci* still predominated, being present in seven of the 11 cultures.

Antibiotic sensitivities

The vast majority of organisms were penicillin sensitive (81 per cent). This included most of the anaerobic

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TABLE I
MICROBIOLOGICAL ISOLATES

Organism	No of isolates
Beta haemolytic streptococcus	28
Alpha haemolytic streptococcus	3
Non-haemolytic streptococcus	3
Strep milleri	5
Diplococci	2
Peptostreptococci	4
Staph aureus	R 3
Haemophilus influenzae	1
Gram neg coccobacilli	1
Veillonella species	1
Fusobacteria	2
Bacteroides melaninogenicus	R 4
Bacteroides fragilis	R 2
Gram neg anaerobes	R 3
'Mixed flora'	2
Total	64

R = penicillin resistant organisms.

organisms, except bacteroides species. Five patients had cultures of exclusively penicillin resistant organisms. Three of these were *Straphylococcus aureus* and two were of mixed anaerobic organisms. Despite being penicillin resistant, clinical recovery was good, following drainage, in one of the patients with *Staphylococcus aureus*. The other two patients with *Staphylococcus aureus* improved rapidly, once flucloxacillin was added to their treatment. The two patients with mixed resistant organisms recovered promptly once they were treated with metronidazole.

The remainder of the patients who had been growing a mixture of penicillin sensitive and penicillin resistant organisms, all made satisfactory progress. They required no additional therapy beyond the combination of needle aspiration and parenteral penicillin.

Previous antibiotics

Fifty-four of the 91 patients (59 per cent) had received oral antibiotics prior to admission. Approximately half of this group (26 patients) had positive cultures of pus, despite taking the antibiotics. Penicillin V was the commonest drug used. Table III shows the other drugs taken.

Swab results

Swab results were only available for 15 patients and the results were unhelpful. One swab grew *beta Haemolytic streptococcus*, two were reported as growing commensals only and 12 were reported as growing no pathogens.

TABLE II
PATIENTS WITH MIXED GROWTHS

Organisms	No of patients
Beta haemolytic strep and strep milleri	2
Beta haemolytic strep and peptostreptococci	1
Beta haemolytic strep, alpha haemolytic strep and Bacteroides fragilis	1
Beta haemolytic strep and fusobacteria	1
Beta haemolytic strep and non-haemolytic strep	1
Beta haemolytic strep and micro-coccus	1
Alpha haemolytic strep and Bacteroides fragilis	1
Strep milleri and Fusobacteria	1
Peptostreptococcus and Bacteroides fragilis	1
Anaerobic strep and Bacteroides fragilis	1
Mixed 'normal' flora	4
Total	15

Discussion

Our microbiological findings confirm that *beta Haemolytic streptococci* are the commonest organism cultured from pus obtained from a peritonsillar abscess. They were present in 28 of the 55 cases with positive cultures (51 per cent). It is found both as a single organism and in combination with other pathogens. This accords with other workers studying peritonsillar sepsis. Flodstrom and Hallander (1976) found 17 *beta Haemolytic streptococci* in 37 abscesses (46 per cent). Brook (1981) restricted his examination to children with quinsy, and found anaerobic organisms in every case, but a lower incidence of streptococci—four isolates in 16 patients (25 per cent).

In studies of tonsil tissue obtained from young adults at operation, Brook and Yocum (1984) found a similar proportion of *beta Haemolytic streptococci* (27 per cent) and anaerobic organisms in all patients. However, DeDio *et al.* (1988), studying paediatric tonsil and adenoid tissue from operation, found no anaerobic organisms at all. The variation in proportions of anaerobic organisms cultured, may be a reflection of the microbiological collection and culture techniques used. Anaerobic organisms being difficult to culture unless optimal conditions prevail.

It is possible, in our series, that inadvertent errors have resulted in less than perfect specimen collection, especially out of normal laboratory hours. Consequently, under reporting of anaerobic organisms is likely. Similarly, sterile pus can be the result of poor specimen collection, allowing fastidious organisms to die, rather than purely due to previous antibiotic therapy.

It is never clear why peritonsillar abscess formation is commoner in adults than children, when bacterial tonsillitis is commoner in children. The changing microbiological features of the tonsil may have a role to play. Hibbert (1987), suggests that the proliferation of anaerobic organisms, around the tonsil, is one possible explanation. Flodstrom and Hallander (1976) postulate a similar initiating role for the anaerobic organisms. They discovered that many cases of peritonsillar sepsis which had grown streptococci, together with anaerobes, in fact had negative serological markers for streptococcal infection. This might suggest that the streptococci were not the prime infecting organism.

It is clear from this study, and others quoted above,

TABLE III
PREVIOUS ANTIBIOTICS

Antibiotic	No of patients
Penicillin V	22
Erythromycin	13
Amoxicillin	8
Ampicillin	4
Cotimoxazole	5
Cephalexin	2
Total	54

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that mixed microbiological flora are common in peritonsillar sepsis. The majority of organisms, even the anaerobes, remain penicillin sensitive and this is the antibiotic of choice. Even in the small number of patients who grow some apparently resistant organisms, good clinical progress is nearly always the case once surgical drainage and parenteral penicillin therapy is initiated. The rare patient who fails to respond to this treatment may either have further loculated pus, which requires drainage, or may have a growth of purely penicillin resistant organisms. This latter possibility is the least likely, but it is then that microbiological culture of pus will indicate an appropriate, alternative antibiotic.

Useful microbiological data can still be obtained from patients who are already taking oral antibiotics. This study has shown that, of the patients taking antibiotics prior to presentation, 50 per cent can yield a positive culture. Presumably, as is often the case with other abscesses, the antibiotics are failing to penetrate the abscess space adequately.

We have found that throat swabs were unhelpful. Although available in only a small number of patients, the results did not correlate with the culture results of the pus. The possession of these results did not alter the management of the patients' treatment in any way.

Conclusions

1. The use of needle aspiration in peritonsillar sepsis can give useful microbiological data.
2. Mixtures of organisms are found fairly commonly.
3. The proportion of anaerobic organisms may be higher than previously thought.
4. The majority of organisms, including anaerobes, remain penicillin sensitive.
5. Drainage of pus and parenteral penicillin therapy should still be the mainstay of treatment. Only a tiny minority of patients will require any other form of treatment.

Key words: Peritonsillar abscess; Bacteria

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