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The relevance of microbiology in the management of anorectal sepsis

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Summary

Eighty patients with anorectal sepsis were studied over three years. All abscesses were drained and pus was submitted for culture. If a fistula was found when the abscess was drained it was laid open otherwise a second examination under anaesthetic was performed within 7–10 days. In no case was sterile pus obtained. Gut aerobes, predominantly Escherichia coli, *were isolated from 49 of 53 (92.5%) of patients with a fistula and 8 of 27 (29.6%) of those without. 'Gut-specific bacteroides' predominantly* Bacteroides fragilis *were isolated from 47 of 53 (88.7%) patients with a fistula and 5 of 27 (18.5%) of those without. Anaerobes not specific to the gut, predominantly* B. asaccharolyticus, B. ureolyticus, *peptococci and peptostreptococci, in the absence of those specific to the gut, were isolated from 2 of 53 patients with a fistula (3.8%) and 17 of 27 (63%) of those without.* Staphylococcus aureus *was isolated from only 1 of 53 (1.9%) patients with a fistula but from 8 of 27 (29.6%) of those without. It is concluded that only patients with gut-specific organisms should be submitted to a second examination under anaesthetic and that culture of pus in anorectal sepsis is an essential part of its management.*

Introduction

Until recently it was accepted that anorectal sepsis was secondary to infection of the anal glands *(1–5)*. This infection resulted in an intermuscular abscess which then extended to present as a perianal or an ischiorectal abscess or, less commonly, as a submucous abscess; by definition this implied that a fistula-in-ano was present. Little note had been taken of the relevant microbiology although several papers had reported a variable incidence of infection with *Staphylococcus aureus (6–9)*. Such microbial aetiology seemed at variance with a bowel origin for the infection since *S. aureus* is seldom present in faeces and then only in small numbers *(10)*. In 1982, Grace *et al. (11)* in a study of 165 cases of anorectal sepsis, showed firstly that those patients from whom a 'skin-derived organism', mainly *S. aureus*, was isolated, did not have a demonstrable fistula whereas a fistula was demonstrated in over half of those patients from whom an organism orginating in bowel, predominantly coliform, was cultured. Although anaerobic cultures were performed in this study anaerobes were neither speciated nor analysed separately. At about the same time, Whitehead *et al. (12)* reported a series of 74 cases of perirectal sepsis in which they found a definite correlation between the presence of colonic aerobes mainly *Escherichia coli* or 'gut-specific bacteroides' mainly *Bacteroides fragilis*, and the presence of a fistula. Although anaerobes were also recovered from patients without a fistula they were not 'gut-specific bacteroides'. They did, however, demonstrate fistulae in patients with skin organisms. These 2 studies were complementary in some respects but differed in others. The Wolverhampton series was prospective, involving a single consultant surgeon with routine laboratory microbiology, whereas the St Thomas' series relied on retrospective clinical data, involving numerous surgeons, mainly registrars, but had very detailed microbiology with a particular interest in anaerobes. It was therefore decided to undertake a study combining the surgical advantages of Wolverhampton with the microbiological expertise of St Thomas'. We report our findings.

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Patients and methods

Patients presenting in Wolverhampton with acute anorectal sepsis between August 1981 and October 1984 were admitted under the care of RHG who performed most of the surgery. Details of previous anorectal sepsis, antibiotics taken and the presence of any associated disease were recorded on admission. The surgical protocol was similar to that described in 1982 *(11)*. Examination was performed under general anaesthesia; the abscess was defined and drained and if a fistula was demonstrated it was laid open. Pus was collected in a universal container which was sealed with Parafilm® and sent with appropriate packaging by first class post to SJE in St. Thomas' Hospital, together with a record of the date and time the abscess was drained. No clinical information was provided. On arrival at St. Thomas' the time was noted and the specimen cultured with minimum delay by methods described previously *(12)*.

If no fistula was found, a second examination was performed within 7 to 10 days and a fistula again sought and if present, laid open. Microbiological results were not available to the surgeon before the second examination.

Results

During the 3 year period of the study 87 patients were seen with anorectal sepsis. Seven have been excluded because their specimens never reached St. Thomas', leaving 80 for analysis. Fifty seven patients were male. There were 56 perianal abscesses and 23 ischiorectal abscesses of which 8 were bilateral, and 1 submucous abscess. In 25 patients there was a history of previous anorectal sepsis and in 21 of

these 25 the abscess recurred at the same site. Five further patients gave a history of a previous fistula and 3 were at the same site. Six patients had Crohn's disease, 2 ulcerative colitis and 3 were diabetic. Twenty eight patients (35%) had been treated with antibiotics by their general practitioners before admission. This was usually for at least 2–3 days. Antibiotics included amoxycillin (3), talampicillin (1), flucloxacillin (10), ampicillin+flucloxacillin (5), erythromycin (2), co-trimoxazole (2), tetracycline (1), penicillin (1), cephalexin (1), co-trimoxazole+metronidazole (1), ampicillin+erythromycin (1).

SURGICAL FINDINGS

A fistula was demonstrated in 53 of the 80 patients (66.3%). In 37 cases it was found at the initial examination under anaesthesia when the abscess was drained. The fistula was laid open in all but the 4 patients who had Crohn's disease. There were 28 low and 5 high fistulae. In the other 16 patients the fistula was found and laid open at the second examination under anaesthesia, 12 low fistula and 4 high.

MICROBIOLOGY

Over half the specimens reached St. Thomas' within 2 days and 74 (93%) within 4 days. Eighteen specimens arrived in less than 24 hours. One specimen, during a postal strike, took 8 days to arrive but still yielded 10 different microbes on culture. There was no difference in the average transit times of specimens for patients with and without fistula. Both aerobes and anaerobes were isolated from 68 of the 80 abscesses (80%); in 48 of the 53 with a fistula (90.6%) and in 20 of the 27 without a fistula (74%). Aerobes only were isolated from 8 abscesses (10%); in 3 of the 53 with a fistula (5.7%) and 5 of 27 without a fistula (18.5%). Anaerobes only were isolated from 4 abscesses (5%); in 2 of the 53 with a fistula (3.8%) and 2 of the 27 without (7.4%). The aerobes isolated are shown in Table I and the anaerobes in Table II. A total of 462 organisms (310 anaerobes, 152 aerobes) was recovered from the 80 abscesses; multiple isolates were usual and up to 15 different organisms were isolated from a single specimen.

The incidence of 'gut-specific bacteria' both aerobic and anaerobic, the incidence of anaerobes not 'gut-specific', and the incidence of *S. aureus* in patients with and without a fistula is shown in Table III. Gut aerobes, predominantly *E. coli* were isolated from 49 of 53 (92.5%) of patients with a fistula but from only 8 of 27 (29.6%) of those without. 'Gut-specific bacteroides' predominantly *fragilis* were isolated from 47 of 53 (88.7%) patients with a fistula but from only 5 of 27 (18.5%) of those without. Most importantly, in the absence of those bacteroides specific to the gut, anaerobes not specific to the gut were isolated from 17 of 27 (63.3%) patients without a fistula but only from 2 of 53 (3.8%) patients with a fistula. *S. aureus* was isolated from 8 of 27 (29.6%) without a fistula but from only 1 of 53 (1.9%) patients with a fistula (only 2 colonies isolated) and this was a patient in whom bowel organisms were also identified.

TABLE I *Aerobic organisms isolated from 80 anorectal abscesses*

	Total abscesses n=80	*Fistula present n=53*	*No fistula n=27*
Number of abscesses yielding aerobes	76	51	25
S aureus	9	1	8
Skin flora*	16	7	9
Str milleri	29	22	7
α-haemolytic strep.	11	6	5
Group B strep.	4	3	1
Group C strep.	2	2	–
Str faecalis	10	7	3
Escherichia coli	50	45	5
Proteus spp	12	12	–
Klebsiella spp	6	6	–
Citrobacter sp	2	1	1
Salmonella sp†	1	1	–
Total isolates	152	113	39

*includes *S epidermidis* and diphtheroids †*Salm infantis*

TABLE II *Anaerobic organisms isolated from 80 anorectal abscesses*

	Total abscesses n=80	*Fistula present n=53*	*No fistula n=27*
Number of abscesses yielding anaerobes	72	50	22
'Gut-specific bacteroides'*	67	62	5
Bacteroides not 'gut-specific'†	112	63	49
Fusobacterium spp	15	12	3
Veillonella spp	14	10	4
Clostridium spp	5	5	–
Eubacterium spp	5	5	–
Propionibacterium acnes	1	1	–
Peptococcus spp	53	35	18
Peptostreptococcus spp	38	29	9
Total isolates	310	222	88

* *B fragilis* 40, *B thetaiotaomicron* 9, *B ovatus* 6, *B uniformis* 5, *B distasonis* 4, *B vulgatus* 2, † *B asaccharolyticus* 53, *B ureolyticus* 28, *B oralis* 3, *B bivius* 3, *B disiens* 2, *Bacteroides* spp 23, *B ruminicola ss brevis* 1

TABLE III *Type of organisms isolated from anorectal abscesses with and without fistulae*

Type of organism	*Fistula present (n=53)*	*No fistula (n=27)*	
Number of abscesses yielding anaerobes	49 (92.5%)	8 (29.6%)	$P<0.0001$
Escherichia coli	45 (84.9%)	5 (18.5%)	$P<0.0001$
Staph. aureus	†1 (1.9%)	8 (29.6%)	$P=0.0012$
Anaerobes 'Gut-specific bacteroides'	47 (88.7%)	5 (18.5%)	$P<0.0001$
Anaerobes not 'gut-specific' (only)	2 (3.8%)	17 (63%)	$P<0.0001$
Gut aerobes+ 'gut-specific anaerobes'	45 (85%)	4 (14.8%)	$P<0.0001$

* Includes *E. coli, Klebsiella* spp, *Proteus* spp, *Citrobacter* spp, *Salmonella* sp, *Str. faecalis* †Only 2 colonies isolated.

Discussion

This study has demonstrated unequivocally that in anorectal sepsis the isolation of colonic aerobes, in particular *E. coli*, or of 'gut-specific bacteroides', predominantly *B. fragilis*, is indicative of a fistula. In contrast the isolation of anaerobes not specific to the gut, in the absence of 'gut-specific bacteroides' or of *S. aureus* does not indicate a fistula. It has confirmed the earlier reports of Grace *et al. (11)* and Whitehead *et al. (12)* who independently suggested that the microbiology of anorectal sepsis with an associated fistula differed from that where no fistula was demonstrated. The data in this study are even more convincing than those in the earlier series. As already stated the advantages of the 2 centres involved have been combined and specimens of pus, not swabs, were cultured in a specialist laboratory. This differing microbial aetiology of abscesses with and without fistula is indicative of a differing pathogenesis for each. It is now clear that not all anorectal sepsis is associated with intersphincteric sepsis and that on occasions it may result from secondary infection of blocked

apocrine glands as suggested by Whitehead *et al. (12).*

The high incidence of previous sepsis, 30 of the 80 patients (37.5%) had had either a previous abscess or fistula in this series, is similar to that reported by Grace *et al. (11)* and yet again emphasises that anorectal sepsis is not well managed. Over a third of the patients had received antibiotics from their general practitioners before admission, mostly penicillins. This treatment did not influence the course of the infection nor did it sterilise the pus, the yield of microbes being similar whether antibiotics were given or not. The frequent use of flucloxacillin, effective only against *S. aureus*, suggests that outside hospital practice anorectal sepsis is still generally regarded as a staphylococcal infection.

Whatever their microbial aetiology anorectal abscesses require drainage and not antibiotics. Provided that the surgical expertise is available, any associated fistula should be laid open when the abscess is drained. Those patients in whom no fistula is demonstrated should only be subjected to a further examination under anaesthesia within 7 to 10 days if a gut organism, that is a coliform, *Strep. faecalis* or a 'gut-specific bacteroides', is isolated from the pus. It is emphasised that laying open a fistula-in-ano in relation to acute anorectal sepsis requires great care because subsequent incontinence resulting from damage to the sphincter mechanism is an unacceptable complication of surgery. Patients whose abscesses yield anaerobes not specific to the gut or staphylococci in the absence of the gut organisms listed above will not have a fistula. They do not require a further examination under anaesthesia.

Our experience has shown that more reliable results are obtained from culturing a specimen of pus submitted in a universal container, even if its arrival in the laboratory is delayed, than from culturing a swab.

The isolation of colonic aerobes and the fragilis group of bacteroides presents few problems for a routine clinical laboratory and a result should be available within 24–48 hours of receipt of the specimen. The isolation of those anaerobes that are not specific to the gut such as *B. asaccharolyticus, B. ureolyticus,* peptococci and peptostreptococci among others is more technically demanding. Should a laboratory fail to isolate these organisms the microbiological results would still be as useful for clinical management.

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