Research Article

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The value of microbiological analysis of pus swabs in perianal abscess. Have they stood the test of time and antibiotic usage?

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ABSTRACT

Background: Evaluation of perianal abscess bacteriology is useful in predicting anal fistula. We report on the predictive strength of pus swab microbiology in aiding future fistula identification and assess the impact of antibiotics.

Methods: Consecutive peri-anal abscesses were reviewed retrospectively from the OPCS database between 2003-2012. Microbiological flora analysis, impact of antibiotics and clinical outcome at follow up were recorded.

Results: 491 patients were identified in the study period. The age range was 4-81 with mean age being 40 years. 72 were female and 419 male patients. 152 patients received broad-spectrum oral antibiotics in the community for an average of 5 days duration (range 3 to 9). Microbiology revealed: polymircobial (mixed anaerobes, coliforms and Staph. aureus) in 58, monomicrobial in 76 (18 coliforms, 32 bacteroides and 26 Strep. milleri); sterile abscesses 70; no data available in 65 patients.43 patients had a fistula in the non-antibiotic group of which, enteric organisms were predictive in 32% at initial, and 67% at recurrent presentation. 18 patients in the antibiotic group had a fistula wherein enteric organisms were predictive in 16% at initial and 44% at recurrent diagnosis. 27% of these were associated with sterile abscesses.

Conclusions: Enteric flora are predictive of anal fistula to a significant extent. Antibiotic usage impacts the microbiology of the flora and can influence the predictive nature of enteric flora in anal fistula. Presence of skin organisms or sterile abscesses does not necessarily exclude occurrence of a fistula in ano in future and use of antibiotics may reduce the risk of fistula formation.

Keywords: Perianal abscess, Anal fistula, Microbiology, Enteric flora, Antibiotics

INTRODUCTION

Perianal abscess is the commonest type of anorectal abscess, constituting over 60% of the incidence rates. ^{1,2} More than 35% of these result in recurrent sepsis or the development of chronic anal fistulas. ³ There is a significant male preponderance in the incidence of perianal abscess compared to women. ⁴ Peak age of

occurrence is 40 years with an annual incidence of 19/100000 in England.⁵

Perianal abscess and anal fistulas are potentially incapacitating conditions and although more than one third of abscesses lead to fistula formation, there is no definitive means of preventing or predicting its occurrence.

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Microbiological evaluation of perianal abscess is good medical practice and often has a predictive role in future fistula-in-ano formation.^{6,7} Fistulas were classified by Parks into intersphincteric (70%), trans-sphincteric (25%), suprasphincteric (25%) and (the uncommon) extrasphincteric types (1%).

Fistulas can also be classified as simple and complex. Simple fistulas include the intersphincteric and low transphincteric where the involvement of external anal sphincter muscles is <30%. Complex fistulae include not only the high trans-sphincteric, suprasphincteric and extrasphincteric horse shoe tracts but also those associated with inflammatory bowel disease as well as underlying malignancy. 8.9

Examining for a fistulous opening whilst draining a perianal abscess is often unsuccessful and can cause more harm unless performed by surgeons very experienced in such procedures. A decreased recurrence rate and quicker healing time must be weighed against the increased risk of sphincter muscle damage and subsequent incontinence whilst contemplating synchronous fistulotomy and drainage of perianal abscess. ¹⁰

Aim

The aim of this study is to identify the role of microbiological analysis in perianal abscesses and evaluate their predictive strength of future perianal fistula formation in patients presenting with either their first or recurrent abscess.

We also aim to analyse the impact of antibiotic usage on the flora cultured and explore their role in fistula prediction.

METHODS

A retrospective cohort study of consecutive cases of perianal abscesses admitted to a UK district general hospital between 2003-2012 was conducted. This included both initial as well as recurrent presentation and data was gathered from OPCS database. Patient demographics, ASA status, duration of symptoms, use of antibiotics in the community, length of stay, operative findings and follow-up details were collected.

Pus swabs were taken at the time of incision and drainage of the perianal abscess following aseptic preparation with the use of aqueous 10% povidone-iodine solution and sent for microbiological evaluation. Antibiotic usage was documented on the microbiology request form.

For the purpose of this study any patient who has had at least one episode perianal abscess within the previous three months was classified as a recurrent presentation.

Patients with a history of inflammatory bowel disease especially Crohn's disease, underlying malignancy, hidradenitis suppurativa and pelvic irradiation were excluded as such conditions predispose significantly to fistula formation.

A proforma was used to collect the data retrospectively from case notes. Microbiology results were reported after a standard incubation period of 5 days and accessed via Integrated Clinical Environment (ICE) reporting systems.

All recurrent abscesses were followed up at 6-8 weeks postoperatively whilst a small proportion needed further outpatient review. Amongst the first presentation abscesses, those who had persistent discharge or prolonged healing for more than 4 weeks were directed for surgical follow up by the community district nurses or the general practitioner whilst the rest were completely healed. Culture results were analysed and correlated with clinical outcome. Fistula diagnosis was obtained from MRI reports, EUA findings from the operative notes and discharge summaries.

Mean with one standard deviation was computed for the relevant data and statistics calculated using student t-test and fishers exact analysis. A P value of <0.05 was considered significant.

RESULTS

491 consecutive perianal abscesses were identified in the study period. Patient's age ranged from 4 to 81 years with a mean of 40 years. 346 patients presented with their first diagnosis of perianal abscess whilst the remaining 145 had a recurrent presentation.

Table 1: Demographics and patient characteristics.

	Initial abscess (n=346)	Recurrent abscess (n=145)
Male patients	297	122
Mean age (years)	33 ± 11.6	29 ± 16.6
Female patients	49	23
No. of patients given oral antibiotics in the community. (Mean = 4.3 days; range 3-9)	Male = 92 Female = 47	Male = 8 Female = 5
Pus swabs performed	Male = 278 Female = 80	Male = 51 Female = 17
Length of stay (days)	1.9 ± 0.36	2.2 ± 0.15

There was male preponderance in the study population with a 5.8:1 ratio.152 patients had been prescribed co-amoxiclav in the community for a mean of 5 days and of these 45 were recurrent abscesses. ASA status was 1 or 2 for the patients in the study and the length of stay ranged from 1 to 4 days, those with recurrent abscesses having a slightly longer duration of stay. 78 patients were lost to

follow up and 65 patients had no pus swabs performed at the time of incision and drainage (Table 1).

Pus swab compliance and bacterial isolation

Of the total 491 patients, 86.7% had pus swabs sent for microbiological analysis (recurrent abscesses had 100%

compliance rate) whilst in 65 patients no pus swabs were performed.

Mixed heavy growth of polymircobial organisms (bacteroides, coliforms and staphylococcus aureus) accounted for 24% of the microbiological growth in recurrent abscess and 11% of the de novo abscesses.

Table 2: Microbiological analysis of the flora cultured.

Organisms		ntibiotic treatment ity prior to I & D	Patients without antibiotic treatment in the community prior to I & D		
	Initial abscess (n=107)	Recurrent abscess (n=45)	Initial abscess (n=178)	Recurrent abscess (n=96)	
Mixed heavy growth (Bacteroides, coliforms, Staph. aureus)	7	11	16	24	
Bacteroides	6	8	7	11	
Coliforms	7	1	6	4	
Strep. Milleri	7	1	15	3	
Skin flora only	47	5	121	49	
No growth	33	19	13	5	

I & D: Incision and drainage

Skin organisms were the predominant flora cultured in both initial and recurrent abscesses and the use of antibiotics in the community did not have any impact on its isolation (P < 0.0001). No growth (sterile abscess) was

isolated in 16% of initial abscesses and 17% of recurrences (Table 2). Sterile abscess occurrence was significantly more in the antibiotic group (both initial and recurrent) compared to the non-antibiotic group (33/107 vs.13/178 P <0.0001; 19/45 vs. 5/96 P <0.0001).

Table 3: Fistula incidence and organisms cultured.

Fistula in ano	Enteric organisms		Skin flora		Sterile abscess	
ristula in ano	Initial	Recurrent	Initial	Recurrent	Initial	Recurrent
43 (No antibiotics)	14	29				
18 (With antibiotics)	3	8		2		5

61 patients had perianal fistula. Men had a significantly higher incidence of fistula compared to women (51:10; p<0001). Of these, gut derived organisms (bacteroides and coliforms) were predictive of fistula in 33% of cases and for recurrent abscess at 61%. 5 fistulas were associated with sterile abscesses and these were in patients presenting with a recurrence (Table 3).

No patient received antibiotics in the intra or postoperative period. Among gut flora cases, the risk of fistula development is lower when treated with antibiotics 11/48 vs. 43/86 (P=0.003).

DISCUSSION

Anal fistula complicating perianal abscess is a potentially morbid condition and reported to develop in 20 to 35% of

cases. 11 The incidence from our series was 17.5%. Studies have been reported on the risk factors implicated in the development of anal fistula which include obesity, diabetes, sedentary life style, smoking and previous anorectal surgery. 12 Univariate analysis from our study has shown male patients and younger age (<40 years) as independent risk factors in fistula formation in patients with perianal abscess. Patients with recurrent abscess are at significantly higher risk of fistula formation (P <0.001). Similar findings were reported by Hamadani et al. 13 Traditionally antibiotics have been reported to play a limited role in the management of uncomplicated anorectal abscess. However there have been small studies reporting a reduced incidence of fistula formation with use of perioperative antibiotics. 14

In our study, 152 patients were given antibiotics for a variable length of time by their general practitioners (on

average 5 days). The majority of them received oral coamoxiclav, whilst a small proportion with penicillin allergy was given metronidazole. Sterile abscess (no growth) dominated in the antibiotic group both in initial as well as recurrent abscess and five of the recurrent presentations were associated with fistula. However the risk of a sterile abscess developing a fistula is much lower when compared to the effect of isolation of gutderived organisms (P <0.0001). It is plausible that these abscesses were rendered sterile by the use of antibiotics.

Grace and others have reported on the significance of isolation of gut derived organisms in perianal abscess as opposed to skin flora in prediction of future fistula in ano. Subgroup analysis from our study revealed that the risk of fistula occurrence with gut organisms in comparison with non-gut organisms was significantly high (54/134 vs. 7/222; P <0.0001). Unsurprisingly, this association was greater in recurrent presentations (P <0001). We also noted that amongst the gut flora isolated cases, the use of antibiotics significantly reduces the incidence of fistula occurrence (11/48 vs.43/86; P = 0.003).

Limitations

Information about antibiotic usage in the community was not attainable in 18 patients. These may have influenced the growth of microbiological flora to a certain extent and affected their predictive strength.

Bacterial isolation by culture of pus swabs from a contaminated site may have its own imperfections. Nevertheless the operative procedure was standardised in all patients and a consistent method of peroperative preparation was undertaken utilising the same antiseptic solution to minimise the effect of contamination.

CONCLUSION

Our study demonstrated that enteric organisms were predictive of fistula in ano and justifies their usefulness as good medical practice in view of its significant clinical, as well as pecuniary, implications. All abscesses with enteric organisms confirmed on microbiological assessment should have a follow up as well as those patients with recurrent presentations. Those with skin organisms do not imply a negative association with fistula occurrence especially if they are recurrent, and there is evidence of reduction in the incidence of fistula with the use of antibiotics.

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Ethical approval: Not required

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