

The relation between the presence of intestinal bacteria in the perianal abscess and the anticipated perianal fistula.

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Abstract:

Background: Perianal abscess and fistulas are frequently encountered in our surgical practice; however, very little has been written about them. The clinical effectiveness of pus swabs for microbiological analysis during incision and drainage of perianal abscess is controversial. Its cost implication is often overlooked.

Objectives: To assess whether the culture of pus swab following incision and drainage of perianal abscess has any significant impact on surgical outcome and on early anticipation of development of fistula in-ano in our local population.

Patients and methods: A non-probability sample, total coverage multicenteric cross-sectional study. All consecutive cases of incision and drainage of perianal abscess between November 2008 and June 2011 were enrolled into our study after acceptance of a pre-given informed consent.

Results: Out of 76 patients with perianal abscess included in the study only 62 patients were available for the final assessment (9 F: 53 M; age range: 18–63 years; mean \pm SD: 37.66 \pm 10.67). Median follow-up was 2 months irrespective to culture result. The mean hospital stay was 1.44 days, and is affected by the presence of associated illness ($p=0.02$). Skin flora organisms, heavy mixed growth of both skin flora and intestinal organisms, and no bacterial growth were isolated from 75.8%, 12.9% and 11.3% respectively. Fistula in-ano developed in 16.7%, 83.3% and 0% respectively. 83.3% of fistula developed in the group of patient who presented ≥ 10 days, which is statistically found to be significant $p=0.003$. Fistula was developed in 7.1% (4/56) of patients who were treated under general anaesthesia, and in 33.3% (2/6) of patients who were treated under local anaesthesia.

Conclusions: The preliminary findings suggest that microbiological results have correlation with presence of fistula in-ano. The result warranted us to submit pus swabs from perianal abscess for assessment as it affect clinical effectiveness of treatment, and that culture of pus in perianal abscess is an essential part of its management.

Keywords: Anal pain; Abscess; Fistula; Intestinal bacteria.

A PERIANAL abscess (PAA) is a generic term encompassing the collection of pus to form an abscess in the perianal, intersphincteric, ischiorectal or pelvirectal spaces¹. Most perianal abscesses arise from the occluded duct of an anal gland with subsequent bacterial overgrowth and abscess formation². Infection usually caused by, an aerobic and anaerobic polymicrobial infection. *Bacteroides fragilis* is the predominant anaerobe.

Other common bacteria include *Escherichia coli* and those of the genera *Proteus*, *Bacteroides*, and *Streptococcus*. Sources of bacteria are skin, bowel, and, rarely, the vagina³.

Perianal suppuration is common, affecting men three times more frequently than women¹. PAAs are usually sporadic, but in certain situations such as diabetes mellitus, Crohn's disease and chronic steroid treatment the risk of developing abscess is increased.

The patient presents with acute anal pain and tenderness. The pain often prevents digital examination, and so an anaesthetic is required for proper assessment. The diagnosis is confirmed by demonstration of a localized

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pea-sized lump in the intersphincteric space¹. An abscess should be incised and drained under general anaesthetic⁴. Antibiotics have little part to play, they are unlikely to abort the infection once the symptoms have been present for 24 hours, as they cannot penetrate into the pus and there is often some necrosis of fatty tissue^{4,5}. In other hand the routine use of antibiotics following incision and drainage of an abscess has no impact on healing time or reduction of recurrence rates and therefore not ordinarily indicated⁶⁻⁸. In addition, the American Heart Association advises preoperative antibiotics before incision and drainage of infected tissue in patients with prosthetic cardiac valves, previous bacterial endocarditis, complex congenital heart disease, surgically constructed systemic pulmonary shunts or conduits, congenital cardiac malformations, acquired valvular dysfunction (e.g., rheumatic heart disease), hypertrophic cardiomyopathy, and mitral valve prolapse with valvular regurgitation and/or thickened leaflets⁹.

Fistula-in-ano (FIA) is a chronic consequence of PAA. Fifty percent of perianal abscesses present with chronic purulent discharge or intermittent pain associated with abscess reaccumulation followed by intermittent spontaneous discharge. Parks was classified the FIA according to its relation to the anal sphincter as intersphincteric, transsphincteric, suprasphincteric, or extrasphincteric¹⁰.

The term "complex" fistula is frequently encountered in literature, it denotes a fistula when its track crosses >30 to 50 percent of the external sphincter (high-transsphincteric, suprasphincteric, and extrasphincteric. These types of fistula their treatment poses a higher risk for impairment of continence¹¹⁻¹³.

There is relationship between perianal abscess and fistula because suppuration is the common aetiological factor for both. Frank abscess precedes some cases of fistula and inappropriate surgical drainage of perianal abscess is responsible for a small but significant proportion of fistulae¹. Some studies showed that approximately two thirds of patients with rectal abscesses treated by incision and drainage or by spontaneous

drainage will develop a chronic anal fistula¹⁴. In patients with recurrent perianal abscesses, a fistula tract may be identified. However, there is no need to search routinely for a fistula when draining straightforward perianal abscesses because probing may actually inadvertently cause a fistula¹. If an associated fistula suspected, a routine examination under general anaesthetic 10 days later to look for it should be arranged. Factors suggesting an associated fistula include: a recurrent abscess, growth of enteric rather than cutaneous organism in the pus culture, or pus draining from an internal opening seen on proctoscopy⁴.

The study conducted to achieve the cost effectiveness in term of early detection and treatment of fistula in-ano (FIA), determine the association between the presence of a certain bacteria and the development of FIA.

Patients and methods:

The study conducted in the surgical units of Charity and Omdurman teaching hospitals, Khartoum, capital city of the Sudan with more than 6 million inhabitants. All patients with a first attack of perianal abscess and absence of identifiable fistula who attended the surgical emergency department in the period from November 2008 to June 2011 were enrolled in our study after acceptance of a pre-given informed consent. The participants completed a questionnaire based on British Medical Research Council recommendations. It included personal data, habits, predisposing factors and subject disease history. The participants had undergone general physical examination, and then enrolled into appropriate investigations. Clinical examination included assessment of induration and scarring in the perianal region, external and internal openings to exclude the presence of fistula without probing the tract iatrogenic or inadvertent creation of fistula tract might occur. All patients were assessed in the lithotomy or prone jackknife position. Examinations performed under general anaesthesia. Prior to collect pus samples, the perianal skin was disinfected twice using alcohol solution (spirit) firstly then 10%

povidone iodine applied to skin and kept in situ till dry. Then after, pus was aspirated from the abscess cavity using a 5-ml needle syringe to prevent contamination by local skin microflora. The samples were then sent for routine aerobic and anaerobic culture

Abscess was treated by incision, drainage (I&D), and de-roofing the cavity to prevent premature closure of an abscess cavity and the patients advised for daily dressing. Then the patients were followed up in outpatient referred clinic. The first visit was arranged 2 weeks postoperatively. During which proctoscopic examination was carried out.

Results:

A total of 76 cases were identified in the study period. None of the patients were known to suffer from pre-existing inflammatory bowel disease, exposure to radiation therapy or malignancy which would have predisposed them to the formation of abscesses or fistulae. 14 patients were lost from follow-up or did not provide the culture result and all were excluded from the study (compliance rate of pus swab sampling was 94.7%). Therefore 62 patients (53 males and 9 females) remained for the final assessment. Male to female ratio was 5.9:1. Their age ranged between 18 and 63 years old, with mean \pm SD of 37.66 ± 10.67 years.

Perianal pain was the main presenting symptom as it was seen in 59 (95.2%) patients. Duration of illness on presentation ranged from 2 to 14 days with mean \pm SD of 5.53 ± 3.4 days.

All abscesses were classified as perianal, and there were no ischio-rectal abscesses.

Eight patients had an associated illness along with the perianal abscess. It includes diabetes mellitus (DM), and use of steroid therapy (due to bronchial asthma and empty sella syndrome) in 5 (8.1%) and 3 (4.8%) patients respectively.

Their hospital stay ranged from 0 to 5 days, with mean \pm SD of 1.44 ± 0.97 days, that is affected by the presence of associated illness ($p=0.02$).

Eighteen (29.03%) patients had received antibiotics during the preoperative period,

which was self-administered or prescribed by doctors. There was observed effect of preoperative antibiotic on culture growth, but statistically was not significant ($P=0.068$)

A total of 69 bacterial growths were isolated from the abscesses, either as single cutaneous microorganism species (41 cases (66.1%)) or as mixed growth of both skin flora and intestinal organisms (14 of individual abscess (22.6%)).

The remaining 7 (11.3%) specimens did not yield any bacterial growth on culture, whether aerobic or anaerobic.

Anaerobic microorganisms were isolated from 6 out of 62 patients (9.7%), and aerobic organisms were found in 55 (88.7%).

The culture rates of anaerobic and aerobic bacteria were determined to be 8.70% (6 (anaerobes) /69 (total cultured organism (aerobes+ anaerobes))) and 91.30% (63 (aerobes) /69 (total cultured organism (aerobes+ anaerobes))), respectively.

Cultured aerobic bacteria included mainly *Streptococcus* spp. in 59.7% (37/62) with culture rate of 58.7% (37/69), *Staphylococcus aureus* in 29.03% (18/62) with culture rate of 26.09% (18/69), and *Escherichia coli* in 8.06% (5/62) with culture rate of 7.25% (5/69).

The predominant anaerobes cultured, were *Bacteroides*, seen in 4/62 (6.45%) patients, with culture rate of 5.8% (4/69).

The most common infectious anaerobic and aerobic microorganisms found were *Bacteroides* and *Streptococcus*; 4/62 (6.45%) with culture rate of 5.8% and 37/62 (59.7%) with culture rate of 53.62% respectively.

When classified into cutaneous and intestinal bacteria, there were 55 cutaneous bacteria and 14 intestinal bacterial isolates with a culture rate of 100% and 25.46% respectively. The most common infectious microorganisms were *Streptococcus* spp. (37/62 (59.7%)) and *Escherichia coli* (5/62 (8.06%)), their culture rates were 53.62% (37/69) and 7.25% (5/69) respectively. The identity of the cultured organisms is shown in Table 1 and 2.

Table 1: Microbiological analyses according to their classification into aerobic and anaerobic of perianal abscesses in study group, Khartoum 2011 (n=62).

Organisms	Isolated bacteria	Culture rate (%) N=69
Aerobic	63	91.30
Escherichia coli	05	07.25
Klebsiella	01	01.45
Streptococcus spp.	37	53.62
Citrobacter	01	01.45
Staphylococcus aureus	18	26.09
Salmonella enteric	01	01.45
Anaerobic	06	08.70
Bacteroides	04	05.80
Clostridium perfringens	01	01.45
Fusobacterium	01	01.45
Total	69	100.00

Table 2: Microbiological analyses according to their classification into cutaneous and intestinal bacteria in study group, Khartoum 2011 (n=62).

Organisms	Isolated bacteria	(%) N=55	Culture rate (%) N=69
Cutaneous bacteria	55	100	79.71
Streptococcus spp.	37	67.27	53.62
Staphylococcus aureus	18	32.73	26.09
Intestinal bacteria	14	25.46	20.29
Escherichia coli	05	09.09	07.25
Klebsiella	01	01.82	01.45
Citrobacter	01	01.82	01.45
Salmonella enterica	01	01.82	01.45
Bacteroides	04	07.27	05.80
Clostridium perfringens	01	01.82	01.45
Fusobacterium	01	01.82	01.45
Total	69	—	100.00

Fifty-six (90.3%) of abscess drainage were performed under general anaesthesia and the reminder 6 (9.7%) were carried out under local anaesthesia.

Within follow-up period of 4 months (median 2 months) 56 (90.3%) of the abscesses had healed leaving 6 (9.7%) cases with fistula in-ano. Subsequently out of the healed abscesses 7 patients presented with recurrent abscess formation. These patients were followed up for 4 months again and on repeated proctoscopy none of them developed fistula in ano. Their culture results were mixed cutaneous bacteria.

The incidence of perianal fistula in male and female was 5/53 (9.4%) and 1/9 (11.1%) respectively. On univariate analysis, men did not differ significantly from women, $p=0.67$.

There was correlation between the duration of symptoms and the development of fistula, as 83.3% (in 5 out of 6 patients with fistula) of fistula developed in the group of patient who presented with symptoms for more than or equal to 10 days of duration, which is statistically found to be significant $p=0.003$.

None of patients with associated medical illness had developed fistula in-ano.

Fistula was developed in 7.1% (4/56) of patients who were treated under general anaesthesia, and in 33.3% (2/6) of patients who were treated under local anaesthetics. The type of anaesthetic used during incision and drainage of an abscess using tests of Conditional Independence (Mantel-Haenszel) was found to be statistically significant $p=0.006$.

There were 16 (25.8%) smokers of either cigarette or shisha (Narjeela) and 5 alcoholics

from both sexes. Among smokers, male represented 15/53 and female represented 1/9. While in other hand among alcoholics male represented 5/53 and there was no alcoholic female.

Using univariate and multivariate regression local anaesthetics and delayed presentation found to be statistically significant p value were < 0.05 . Table 3 shows the Cox proportional hazard ratios for development of fistula in ano by risk factors.

Table 3: Cox proportional hazard ratios for development of fistula in ano by risk factors in study group, Khartoum 2011.

Risk factor	Univariate		Multivariate	
	Hazard ratio (CI)	P value	Hazard ratio (CI)	P value
Male gender	0.53 (0.32-1.22)	0.21	0.73 (0.35-1.37)	0.58
Age < 45	1.98 (1.01-3.56)	0.09	1.52 (1.26-3.89)	0.06
Smoker	1.17 (0.53-2.97)	0.48	1.21 (0.43-2.59)	1.02
Perioperative antibiotics	1.33 (0.71-2.64)	0.68	1.61 (0.89-2.43)	0.25
Diabetics	2.53 (1.11-6.97)	0.07	2.75 (0.74-6.32)	3.01
Patients on Steroid therapy	3.65 (1.51-4.01)	0.98	3.81 (1.35-2.59)	1.73
Local anaesthetics	1.03 (0.91-2.79)	< 0.05	1.64 (1.01-2.07)	< 0.05
Delayed presentation	8.28 (5.97-10.97)	< 0.05	19.03 (7.79-10.12)	< 0.05

Five out of 8 (62.5%) patients with intestinal bacteria were developed fistula, where only 1 out of 47 (2.1%) with pure cutaneous bacteria developed fistula in ano (FIA).

Statistically speaking, using Fisher's exact test

there was significant effect of isolation of gut microorganisms in perianal abscess (PAA) on the development fistula-in-ano (FIA) in the future compared with isolation of non-gut microorganisms ($p= .001$), table 4.

Table 4: Relation between the type of bacteria and the development of perianal fistula in study group, Khartoum 2011 (n=62).

Culture result	Proctoscopic examination		Total
	No fistula	Fistula	
Cutaneous bacteria	46 (97.9%)	1 (2.1%)	47 (75.8%)
Mixed bacteria	3 (37.5%)	5 (62.5%)	8 (12.9%)
No growth	7 (100%)	0 (0%)	7 (11.3%)
Total	56 (90.3%)	6 (9.7%)	62 (100%)

Discussion:

Perianal abscesses (PAAs) are important not only because they constitute a common problem of the perianal area¹⁵, but also because they mostly affect the most active

part of population, a fact that was confirmed by this study as the mean age of our patients was 37.66 years and most of them (68.2%) were in the age range of 18-45 years.

This is less than in the study by Hamadani A. et al.¹⁶ where the overall mean age at presentation was 43.6 (median 43; range 20-88) years.

Most of our patients were males and male to female ratio of 5.9:1 is well seen within the general distribution of the illness among sexes in literature worldwide^{17, 18}. This might be explained by the trend of our female patients to prefer private hospitals to general hospitals, where the study was performed, when the operation involves a socially sensitive part of the body. However, a study conducted at St. Mark's Hospital in London did not reveal any significant differences in circulating sex hormone levels between patients with fistula-in-ano compared with matched controls¹⁹.

Mean duration of illness on presentation was long 5.53 days (range 2-14 days), none had a previous history of an abscess. Safwan et al.²⁰ in their study in Basrah, Iraq, reported almost similar result as a mean period of presenting symptoms was 5.17 days (range 1-15 days), whereas in study by ST Edino et al.²¹ in Nigeria, the duration of symptoms was 3-10 days (mean 6.4 days). This relatively long duration might be attributed to the generally low level of health awareness among our patients and their negligence towards early medical consultation, or it might be due to their higher pain threshold.

The mean hospital stay, on the other hand, was short (1.44 days) stressing the fact that this illness, especially if managed early, is potentially easily curable. It seems that the additional hospital stay was related to the associated illnesses rather than the perianal abscess itself. This is particularly clear especially in diabetic patients in whom few more days were spent to control blood sugar. In study by Safwan et al.²¹, postoperative hospital stay ranged from 1-4 days with a mean of 1.17 days, and it was found that the effect of associated illnesses on prolongation of hospital stay was statistically significant.

Smoking has been previously implicated as a risk factor in the development or exacerbation of chronic inflammatory diseases affecting the skin or its appendages¹⁶. Although there are limited data on the effect of smoking on

the development of anal sepsis, a case-controlled study in San Diego²² noted that a history of recent smoking was a significant risk factor for development of anal fistula and abscess. It is interesting to note that the incidence of smokers in our study was 25.8% of either cigarette or shisha (Narjeela) (16 patients), which is lower than the estimated incidence of 29 percent in the general population of urban areas within the United States²², and the 41 percent that estimated by Hamadani A. et al.¹⁶.

Only 5/53 [5/62 (8.06%)] of our males and none of the female patients consume alcohol, whereas in study by Varut Lohsiriwat et al.²³ in Thailand, the incidence of alcohol consumption among patients with perianal fistula was 21/64 (32.8%), this difference might be due to religious factors.

The main presenting symptom in this study was a perianal pain that had been encountered in 59 patients (95.2%). Similar result was reported before²⁰. Therefore, the clinician should never attribute acute anal pain to thrombosed internal haemorrhoids, anal fissure or perianal cellulites as these entities are less encountered when compared with abscess and misdiagnosis may allow occult anal sepsis to progress untreated.

Associated medical conditions identified in 12.9% of the patients, included diabetes mellitus (DM) in five patients (8.1%) and 3 (4.8%) had a history of receiving steroids due to bronchial asthma and empty sella syndrome. There was no patient with a history of inflammatory bowel disease (IBD) or had irradiation therapy. The effect of associated illnesses on prolongation of hospital stay was statistically significant; Safwan et al.²⁰ in their study of 90 patients with PAA, found that 17 patients (18.9%) had an associated illness along with PAA and also concluded similar result.

The study showed that 18 patients (29%) received antibiotics during preoperative period, this was found to be higher than the 13.9% (5/36) reported elsewhere²⁴.

Knowing the microbiology of PAA is the mainstay for correct management²⁵.

The compliance rate with the surgical practice of pus swab sampling and reaching laboratory in our study was 94.7%, this is better than that reported by Edmund Leung et al.²⁶ in united kingdom (UK) where it was 83.8%.

The study revealed a total of 69 bacterial growths are isolated from 55 abscesses, either as single microorganism species (66.1%) or as mixed growth (22.6%). This is in agreement with Safwan et al.²⁰. Geographical difference and acclimatization may play a role in the observed little difference rate of bacterial growths.

The study revealed a bacterial growth rate that is different from that of Edmund Leung et al.²⁶. This can be explained by preoperative antibiotic usage observed, but it was statistically not significant, $p > 0.05$.

In this study the anaerobic and aerobic microorganisms were isolated from 6 (10.9%) and 55 (100%) abscesses with bacterial growth respectively. This is different from the 87.5% and 100% anaerobic, and 90% and 95% aerobic growths reported in the literature^{27,28}.

The most common infectious anaerobic and aerobic microorganisms found were Bacteroids in 5.8% (4/69), and Streptococcus in 53.62% (37/69). This is not going with the dominant E.coli (62.5%) and Bacteroids (55.6%) reported by others^{27,28}.

Where classified into cutaneous and intestinal bacteria, our study found that the most common infectious microorganisms were Streptococcus spp. and E.coli. This is comparable with the result obtained by Safwan et al.²⁰

About 6 (9.7%) of abscesses were carried out under local anaesthesia. Use of local anaesthetic in the current study was either due to the general condition of the patient at presentation that the application of general anaesthetic might affect his life, or some of the patients presented at time where the anaesthesia team were busy in emergency aseptic theatre.

Follow up of drained PAA is encouraged, because the estimated acute abscess recurrences and development of chronic fistula in-ano in literature occur in 10% and up to 50% of patients respectively¹⁶.

The duration of follow-up was varied in literature and ranged from 1.5 to 36 months^{16,20,23-27,29,30} (table 5), while in our study we assessed patient only at 4 months. The median follow up period was 2 months. During follow up period, 10 patients (13.2%) were lost from follow up so they were excluded from the study. Comparatively, in study by Edmund Leung et al.²⁶ 5% of patients were lost to follow up.

Table 5: Post-surgical follow-up periods found in literature, Khartoum 2011 (n=62)

Author	Follow up period/ month	Median follow up/month
Y. El-Dhuwaib et al. ²⁹	01.5	—
Edmund Leung et al. ²⁶	06	—
Grace ²⁵	02 — 36	06
Serour et al. ²⁴	03 — 18	10
Safwan et al. ²⁰	12	—
Cheng et al. ²⁷	—	19
Varut Lohsiriwat et al. ²³	10 — 53	30
Reşit Inceoğlu et al. ³⁰	06 — 78	35
Hamadani A. et al. ¹⁶	—	38
Our study	04	02

Although failure to return to the hospital is not evident that a fistula does not exist, it is likely that a large proportion of the patients

lost to follow-up had complete healing and therefore decided that they did not require further follow-up as they stated when

contacted by phone. It must be kept in mind; however, that 81.6% of cases were assessed in referred clinic for healing, recurrence or development of FIA. Once again, follow-up was based on clinical findings and not the results of the microbiological analysis only. Healing time which defined as the period from the date of operation to the date of complete healing ranged between 9 to 37 days, with mean \pm SD of 16.9 ± 5.4 days. In 25.8% (16 patients) wound found completely healed in less than 14 days, while in the reminder 74.2% (46 patients) wounds were healed in ≥ 14 days. This is comparable with the result obtained by others^{26,30}.

During the follow up period, 7 (11.3%) patients were presented with recurrent abscess formation that necessitate I & D and swap culture again that isolated mixed cutaneous bacteria, and they were followed up for another four weeks, where none had developed FIA.

In these abscesses, the main concern is the presence of a concomitant fistula. There are few good follow up studies relating to the incidence of recurrence of abscess or development of fistula in-ano (FIA) after drainage of an acute perianal abscess (PAA). The high incidence of recurrent sepsis in our study is supported by studies showing that in any group of patients presenting with perianal sepsis there is high incidence of previous episodes of sepsis^{24, 31, 32}. In studies by Reşit Inceoğlu et al.³⁰ and Safwan et al.²⁰ no recurrence was observed.

During follow up period the incidence of fistula development following management of an acute PAA recorded in our study is 9.7% (6/62 patients). This is in agree with that reported in literature (5.77%— 85%)^{20,33-35}. The presented lower rate of FIA may be attributed to the fact that other studies did not exclude acute abscess with coexisting fistula or condition associated with high risk fistula development (IBD, Irradiation,etc). It is also possible that we underestimated the FIA incidence as some patients with FIA might not seek medical attention because all of the fistulae diagnosed at follow-up were unrecognized by the patients.

From male and female patients who presented with PAA, the FIA was developed in 9.4% and 11.1% respectively, and this observed difference statistically was not significant ($p>0.05$). This is in agreement with a study conducted at St. Mark's hospital in London²⁰. Our study showed that there is statistically significant correlation between the duration of symptoms and the development of fistula, as 83.3% of patients who developed fistula had late presentation (≥ 10 days). This delay in presentation is explaining the attitude of our patients who do not seek medical advice until late.

There was observed effect of preoperative antibiotic on culture growth, but it was not statistically significant.

In agreement with others¹⁶, the study revealed that the use of preoperative antibiotics was not associated with development of FIA.

The study found that 8.1% of patients had history of diabetes mellitus (DM) and none of them developed FIA. This is different from the FIA that developed in 10% of diabetic patients in some reports²³.

Use of local anaesthetic is statistically significant in development of FIA, as 33.3% (2/6) of fistula developed in patients who were treated under local anaesthesia. Some investigators identified inadequate surgery and spontaneous drainage as factors are responsible for subsequent recurrence²⁵.

Our study showed that 62.5% of patients with intestinal bacteria developed fistula, compared to only 2.1% with pure cutaneous bacteria. Statistically speaking, there is significant effect of isolation of gut microorganisms from PAA on the development of FIA in the future compared with isolation of non-gut microorganisms.

Safwan et al.²⁰ documented that the progression into perianal or FIA was observed only in 5.77% of patients whose swabs yielded growth of gut microorganisms. On the other hand, no perianal fistula was reported to develop among those patients whose cultures showed other types of bacterial growth or no growth at all.

Our study also has supported the earlier

reports of Grace et al.³⁶ and Whitehead et al.³⁴ who independently suggested that the microbiology of anorectal sepsis with an associated fistula differed from that where no fistula was demonstrated.

Conclusion:

The clinician should never attribute acute anal pain to thrombosed internal haemorrhoids, perianal cellulitis or anal fissure as these entities are less frequent, and misdiagnosis may allow occult anal sepsis to progress untreated.

Based on the present study, the incidence of FIA following incision and drainage of PAA was 9.7%. A diabetic and non-diabetic patient appeared to have a similar risk for fistula development.

Our study provides additional support for the presence of gut bacteria in swab culture is a good indicative of presence or development of fistula in-ano, so bacteriology is to be routinely requested following incision and drainage of perianal abscesses. Intestinal bacteria should be looked for specifically to try to and to identify accurately those patients with a risk of developing fistulas.

The presence of intestinal bacteria in culture would justify a follow-up by proctoscope if no fistula was found at the initial examination by a surgeon after the initial episode has resolved.

All perianal abscesses should be drained under general anaesthesia, as the use of local anaesthesia might lead to an incomplete evacuation and drainage of the abscess, which is in turn, might progress into FIA.

Early presentation is important to avoid development of FIA. Associated illnesses as DM or steroid therapy prolong hospital stay.

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