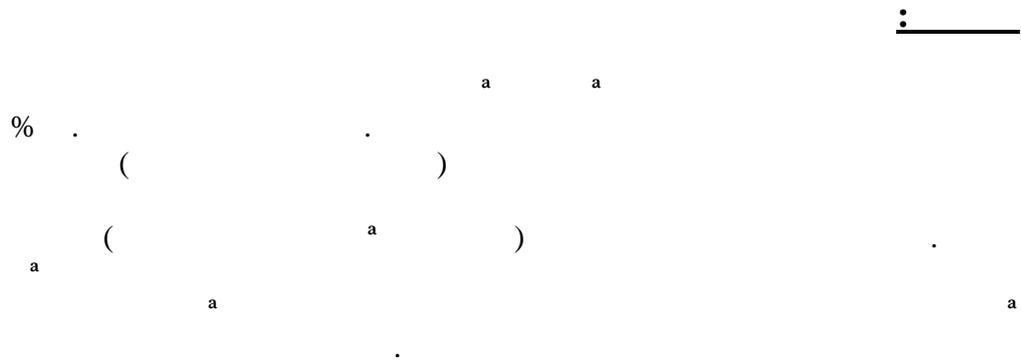


Risk of fistula development following drainage of ano - Rectal abscess –Bacteriological study

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Summary:

Background: Anorectal sepsis is a common surgical disorder. The majority of anorectal suppurative disease result from infection of anal gland (Cryptoglandular), and usually due to a mixture of fecal and/ or cutaneous flora. Drainage alone result in cure of 50% of patients, the other 50% develop an anal fistula with persistent symptoms of local infection .If only skin pathogens are cultured from an anorectal abscess, there is a decreased incidence of fistula formation. Objectives: to find out the correlation between different types of bacteria as a causative agent of anorectal abscess and the future risk of fistula-in-ano development. Methods: During the period from July 2004 till October 2007 , 129 patients admitted to Al- Diwaniya teaching hospital for surgical management of anorectal abscess, three anatomical variant of anorectal abscess were encountered which assessed bacteriologically by aspirating pus from the abscess at the time of surgery, which was subjected to an aerobic and anaerobic cultures . Each individual patient was followed up for 6 months after the initial episode for development of fistula in ano, or recurrent abscess. Results: showed that the perianal abscess was the most common abscess encountered 62.8% , followed by ischiorectal type 30.2% , with the sub mucous variety was the least common 7%.

Out of 129, 76 patients develop fistula 58.9%, with higher proportion in the ischiorectal variant. It was found that Bacteroides spp. and Escherichia coli (Gut derived bacterial flora) were a predominant isolate in those who developed fistula which were significantly higher than in the non fistula group . In contrast, Staphylococci and Streptococci were the predominant isolate in the non fistula group in significantly higher rate than fistula group. Conclusion: careful bacteriological assessment of pus obtained from an anorectal abscess may provide a good indication of future development of fistula in ano which may affect subsequent management.

Introduction:

Anorectal sepsis is a common surgical disorder with an approximate incidence of 1-2% of the general population. ¹ The majority of anorectal suppurative disease, result from infection of anal gland (Cryptoglandular) and usually due to a mixture of fecal and /or cutaneous flora ² . The anal glands are found in the intersphincteric plane, traverse the internal sphincter and empty into the anal crypt in the anal canal at the level of dentate line. ^{2,3} These common infections should not be confused with anorectal manifestations of Crohns disease, pilonidal disease, Hidradenitis suppurativa or rarely tuberculosis or actinomycosis. ^{2,4}

The acute phase of cryptoglandular disease result in formation of an abscess, if the abscess drains, an infected tract persist, the process enter the chronic phase of fistula-in-ano.^{1,3,4} Infection of the anal gland result in formation of an abscess in the intersphincteric plane, as the abscess enlarge it spread to one or more of the potential spaces around the ano-rectum that ordinarily filled with fat and areolar tissue.^{2,3,5} Sever anal pain is the most frequent presentation, a palpable lump is often found during examination of perianal area, fever, urine retention are occasional manifestations.^{2,4} These infections can be life threatening in immunocompromised and diabetic patients.^{4,5} Anorectal abscess should be treated by incision and drainage as soon as the diagnosis is established.¹⁻⁶ Drainage alone result in cure of 50% of patients , the other 50% develop an anal fistula with persistent symptoms of local infection.^{1,3,4,5,6,7} If only skin pathogens are cultured from an anorectal abscess , there is a decreased incidence of fistula formation , this probably because such an abscess originate from perianal skin instead of from the anal crypt.^{1,2,8}

The majority of recurrence are found following drainage of ischiorectal abscess.^{2,4,6} Whitehad et al drew attention to the presence of gut specific *Bacteroides (B. fragilis)* and their significance in predicting the presence of fistula-in- ano.⁹ The presence of *Bacteroid fragilis* was found in 56% of perianal abscess with an underlying fistula , compared with 21% of patients with no such communication . If colonic aerobic bacilli , *Escherichia coli* were included , then 81% of abscess with underlying fistula contained "gut specific microorganisms as apposed to 43% without fistula .^{7,8,10} G.Nicholls et al also studied this association , he suggest that the association is invalid if *Bacteroides spp.* is unspecified and become valid if *Bacteroides spp.* subtyping is performed .¹¹

Patient and methods:

129 patients with mean age of 33 years admitted to Al- Diwaniya teaching hospital for surgical management of anorectal abscess over 39 months period from July 2004 till October 2007 , they were managed by incision , drainage and de-roofing of the abscess under general anesthesia^{1,2,3,4,6} , mostly by an inexperienced resident surgeons. The anatomical type of abscess was a preoperative decision .¹² Patients who receive an antibiotic pre operatively were excluded from the study.

Each abscess was aspirated using a sterile syringe to obtain 2-5 ml of pure pus, which was subdivided into 2 samples for aerobic and anaerobic cultures.¹³ The time between sample collection and inoculation was 1-2 hrs^{13,14} .In cases when samples can not be transferred to the media expeditiously, 2ml of pus is injected into a sealed anaerobic tube (port -a-cult) and kept over night at room temperature.¹⁵ Specimens were cultured on sheep blood 5% agar, chocolate agar , both were incubated in air with CO₂ 5% and MacConkeys agar (incubated aerobically at 37C and examined at 24 and 48 hrs. ^{13,14,16} For anaerobic samples , were cultured on pre reduced brucella blood agar with vitamin K , blood agar containing kanamycin and vancomycin , blood agar containing phenyl ethyl alcohol , all were incubated in Gas Pak Jars (Baltimore Biological Laboratories) at 35-37C and examined after 48-96 hrs.^{13,14,15,17} Aerobic and anaerobic bacteria were identified by culture characteristics and direct microscopy.^{13,14,15,18}

Statistical analysis:

The data were analyzed by Epi ver 6.2 soft ware system. The statistical significance of calculated estimate of the risk (OR) was assessed by chi square test. P value less than 0.05 considered statistically significant.

Results:

129 patients with anorectal abscess were included in the study, in whom perianal abscess was the commonest type account for 62.8(n=81) %, ischiorectal abscess 30.2% (n=39) and the sub mucous variety was the least common 7% (n=9).

Bacteriological examination and culture for both aerobic and anaerobic bacteria for pus aspirated from the abscess were assessed independently for an individual type of abscess in which *Bacteroides spp.* were isolated in 64,2% of perianal , 82.9 % of ischiorectal ,and 77.8 of sub mucous abscesses .

Isolates of *E. coli* were found in 49.4% of perianal, 64.1% of ischiorectal and 77.8% of sub mucous abscess . Mixed aerobic bacilli were cultured in 17.3%, 25.6% and 44.4% from perianal, ischiorectal and sub mucous abscesses respectively. Regarding anaerobic streptococci (*peptostreptococci*), it were isolated in 8.6% of perianal, 10.3% of ischiorectal and 33.3% of sub mucous abscesses. *Staphylococcus aureus* was cultured in 38.3% of perianal, 25.6% of ischiorectal and none of sub mucous abscess. *Streptococci* were found in 20.9% of perianal, 10.2% of ischiorectal and none of sub mucous abscesses has showed streptococci . Table 1.

Table 2.

Shows the overall rate of fistula development which was 58.9%, and in each specific type of abscess in which 54.3% of patients with perianal abscess develop fistula, this rate reach 55.5% and 69.2% for patients with sub mucous and ischiorectal abscess respectively.

Table 3. shows The rate of bacterial isolation in specific type of abscess in both fistula and non fistula groups, with the regard to *Bacteroides spp.* (gut derived microorganisms), it appeared that the rate of isolation is significantly higher in the fistula group than non fistula group for perianal 90.9% as compared with 32.4% and ischiorectal 92.6% as compared with 33.3%, with no significant difference in the sub mucous variety. Regarding *E. coli* isolation it also appeared significantly higher in the fistula group than non fistula group , with a rate of 79.5% as compared with 13.5% for perianal , and 88.9% as compared with 8.3% for ischiorectal abscess , again with no significant difference in the sub mucous variety . The rate of isolation of other gut derived flora, namely mixed aerobic bacilli (*Proteus spp* and *Klebsiella spp*) and *Peptococci* have no significant difference in both fistula and non fistula groups.

With the regard to skin derived bacterial flora *Staphylococcus aureus* it appeared significantly higher in the non fistula group than the fistula group, with a rate of 70.2% as compared with 11.4% in perianal and 66.6% as compared with 7.4% in ischiorectal .Regarding streptococci it was isolated in higher rate in the non fistula than fistula groups in which the rate was 40.5% compared with 4.5% in perianal and 25% compared with 3.7% for ischiorectal abscess with no significant statistical association, none of the sub mucous abscesses showed *Staphylococcal* or *Streptococcal* isolate.

Table 1: The rate of isolation of specific types of bacteria in each specific type of abscess.

| | | | | | | | | |
|---------------------------------------|----|------|----|------|---|------|----|------|
| <i>Bacteroides spp</i> | 52 | 64.2 | 29 | 82.9 | 7 | 77.8 | 88 | 68.2 |
| <i>E. coli</i> | 40 | 49.4 | 25 | 64.1 | 7 | 77.8 | 72 | 55.8 |
| mix. bacilli | 14 | 17.3 | 10 | 25.6 | 4 | 44.8 | 28 | 21.7 |
| Aner. cocci | 7 | 8.6 | 4 | 10.3 | 3 | 33.3 | 14 | 10.9 |
| Staph. | 31 | 38.3 | 10 | 25.6 | 0 | 0 | 41 | 31.7 |
| Hemolytic streptococci various groups | 17 | 20.9 | 4 | 10.2 | 0 | 0 | 21 | 16.3 |

Table 2: The rate of fistula development in different types of anorectal abscess.

| Fistula | Perianal | | Ischiorectal | | submucous | | Total | |
|----------|----------|------|--------------|------|-----------|------|-------|------|
| | No. | % | No. | % | No. | % | No. | % |
| Positive | 44 | 54.3 | 27 | 69.2 | 5 | 55.5 | 76 | 58.9 |
| negative | 37 | 45.7 | 12 | 30.8 | 4 | 44.5 | 53 | 41.1 |
| Total | 81 | 62.8 | 39 | 30.2 | 9 | 7 | 129 | 100 |

Table 3: Correlation between the type of bacteria recovered and the rate of development of fistula in each specific type of abscess .

| Type of bacteria | Fistula positive (n=76) | | | | | | Fistula negative (n=53) | | | | | |
|-------------------------|-------------------------|------|----------------|------|-----------|-----|-------------------------|------|----------------|------|-----------|----|
| | perianal | | ischioirecta l | | Submucu s | | perianal | | ischioirecta l | | Submucu s | |
| | No | % | No. | % | No. | % | No | % | No. | % | No. | % |
| <i>Bacteroides</i> spp. | 40 | 90.9 | 25 | 92.6 | 4 | 80 | 12 | 32.4 | 4 | 33.3 | 3 | 75 |
| | P=0.048 | | P=0.04 | | | | | | | | | |
| <i>E. coli</i> | 35 | 79.5 | 24 | 88.9 | 5 | 100 | 5 | 13.5 | 1 | 8.3 | 2 | 50 |
| | P=0.04 | | P=0.01 | | | | | | | | | |
| Mix.bacilli | 12 | 27.3 | 9 | 33.3 | 2 | 40 | 2 | 5.4 | 1 | 8.3 | 2 | 50 |
| | P=0.1 | | P=0.2 | | | | | | | | | |
| Aner.cocci | 4 | 9.1 | 3 | 11.1 | 2 | 40 | 3 | 8.1 | 1 | 8.3 | 1 | 25 |
| | P=0.8 | | P=0.9 | | | | | | | | | |
| <i>Staph.aureus</i> | 5 | 11.4 | 2 | 7.4 | 0 | 0 | 26 | 70.2 | 8 | 66.6 | 0 | 0 |
| | | | | | | | P=0.05 | | P=0.04 | | | |
| streptococci | 2 | 4.5 | 1 | 3.7 | 0 | 0 | 15 | 40.5 | 3 | 25 | 0 | 0 |
| | | | | | | | P=0.06 | | P=0.1 | | | |

* P=P value, of less than 0.05 regarded as statistically significant.

Discussion:

Anorectal abscess is a common important surgical problem, and if enter in the chronic phase i.e. fistula it become a source of distress .^{4,6}

The incidence of individual type of abscess, the perianal being the commonest variety, followed by ischiorectal and sub mucous types in a decreasing frequency , 62.8 % , 30.2% ,and 7% respectively , these results were comparable with other studies.^{6,7,19}

Regarding the type of microorganisms recovered from abscesses, it was found that *Bacteroides spp.* and *E. coli* constitutes major pathogens isolated from anorectal sepsis, followed by *Staphylococcus aureus* , mixed aerobic bacilli, streptococci and anaerobic cocci in a decreasing order of frequency 68.2% , 55.8% 31.7% 21.7%, 16.3% and 10.9% respectively . These results were comparable with other studies.^{8,9,11}

The rate of fistula development in the studied population was 58.9% which slightly higher than other literatures^{1,3,5,6,7,19} , This may be attributed to relative inexperience of most resident surgeons, with possible creation of false passage in the friable anorectal tissue with the resultant internal anal opening that was not been present , this may explain cases of perianal and ischiorectal fistula in whom bacteriology reveled skin derived microorganisms, ^{5,6,11,12} in addition experience may add the benefit of identification of the internal opening at the time of initial drainage with possible one stage surgery.^{2,7} Grace has recently drawn attention to the high recurrence rate of anorectal sepsis after treatment by inexperienced surgeon ⁶. For sub mucous type in which the risk of developing fistula should be very minimal if treated by ideal trans anal mucosal incision approach , some of cases again due to lack of experience, the abscess was drained through perianal skin , this explain cases of sub mucous abscess with fistula.^{7,12} Regarding the rate of isolation of specific type of bacteria in an individual type of abscess in both fistula and none fistula groups it appeared that the (gut derived bacterial flora) *Bacteroides spp.* was significantly higher in perianal 90.9%, ischiorectal 92.6% in the fistula group than none fistula group in whom the rate was 32.4% for perianal and 33.3% for ischiorectal. *E. coli* was isolated in a significantly higher rate in the fistula than none fistula groups in both perianal and ischiorectal variant 79.5% Vs 13.5% and 88.9% Vs 8.3% respectively , these results were comparable with other studies ¹¹, these results signify that an anorectal abscess of cryptoglandular origin in which gut derived bacterial flora are major pathogens, they usually enter the chronic phase (fistula) ^{2,9,11} , in addition , in contrast to G.Nicholls et al who insist on *Bacteroides* subtyping for prediction of fistula , we found that the mere presence of *Bacteroides* spp. is sufficient to predict the risk of future fistula . No significant difference were found in the rate of isolation of both *Bacteroides* spp. and *E. coli* in sub mucous abscess in fistula and none fistula groups , this may be attributed to the fact that all sub mucous abscess arise from cryptoglandular origin with expected higher rate of isolation of fecal flora and most of these abscesses will be cured if managed by properly placed mucosal incision ^{6,9,12} , in our study however , those who develop fistula in the sub mucous variety probably mismanaged by cutaneous incision with creation of new non existing tract ^{7,11}. Regarding the rate of isolation of mixed aerobic bacilli and anaerobic cocci, there was no significant difference between fistula and none fistula groups in all types of abscess .Conversely, *Staphylococcus aureus* has been isolated in significantly higher rate in the non fistula group than the fistula group, 70.2% Vs 11.4% in perianal, 66.6% Vs 7.4% in ischiorectal , this may be explained by that this organism is responsible for primary focus of infection with no significant communication with the mucous membrane of ano rectum ^{2,4,8,9}. Regarding *Streptococci* it was isolated in a higher rate in the non fistula group than the fistula group, 40.5% Vs 4.5% for perianal and 25% Vs 3.7% for ischiorectal abscess with no significant statistical association, however it may become significant in larger sample .Neither *streptococci* nor *staphylococci* were cultured from sub mucous abscess which support the fact that these organisms are not primary pathogens in this type of abscess .^{8,9}

Conclusion:

* Anorectal abscess is a common important surgical problem, and if enter in the chronic phase i.e. fistula it become a source of distress.

* Bacteriological assessment, is vital diagnostic step, with the importance of anaerobic culture.

* The identification of gut derived microorganisms ((*Bacteroides* spp. and *E. coli*, will potentiat each other)) in cultures from anorectal abscess can provide a good indicator for the risk of fistula development.

* *Bacteroides* spp. sub typing is not essential for prediction of fistula –in-ano .

If cultures reveled skin derived flora then cure may follow initial drainage and the fistula will be unlikely fade.

* Anatomical definition of anorectal abscess is essential step, a decision that should be made by an expert, further more subsequent drainage has to be made by well trained surgeon

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