

OBSERVATIONS ON ANORECTAL SUPPURATION

By R. N. V. Prasad

SYNOPSIS

A retrospective survey of 832 case records and a clinical study of 60 patients with anorectal infection were done to throw some light on the aetiology and pathogenesis of this condition in the local population. Information on the epidemiology, bacteriology and the general status of health (using as parameters haemoglobin levels, coexistent diabetes mellitus and other debilitating disease and the presence of concomitant anorectal lesions) were obtained from the retrospective survey; the clinical survey supplied data on the bowel and the opium habits of these patients. It was found that infection in anorectal suppurations is mainly of enteric origin occurring in a patient who is of generally healthy disposition usually in the fourth decade of life. Analysis of bowel habit shows that it plays some part in the pathogenesis, but the exact nature of the link could not be proven conclusively.

Abscess formation in the tissue adjacent to the anal canal and lower rectum is common, and tends to persist in chronic form. This survey is aimed at elucidating factors relating to the aetiology and pathogenesis of anorectal suppurative conditions in the local population. Only cases of perianal abscesses, ischio-rectal abscesses and fistulae-in-ano have been included in this survey; pelvic and pelvi-rectal abscesses have been excluded because the author feels that these conditions come to be included under "anorectal" conditions merely because of anatomic juxtaposition; they do not share common pathogenetic factors which act to produce perianal suppurations.

It is widely believed that in the majority of instances, fistula and abscess formation represent two stages of a single process. The first stage is infection of the anal crypts (of Morgagni) and this leads on either by direct extension or via blood or lymphatic spread to infection of the perianal tissues; this acute stage of abscess formation can then persist into the chronic form of fistula formation. But what are the predisposing causes which trigger off such a chain of events? The present study is geared towards answering this question.

METHOD AND MATERIAL

The sources of material are as follows:—

(A.) Retrospective Survey

The hospital charts in the Government Surgical 'B' Unit at Outram Road General Hospital, of all cases diagnosed from 1966 to 1970 inclusive, as having anorectal abscesses were reviewed.

(B.) Clinical Survey

A clinical survey was conducted on 60 cases of anorectal abscesses admitted to the Surgical 'A' and 'B' Units at the Outram Road General Hospital. This was carried out by personal enquiry and examination.

RESULTS

(A.) Results of Retrospective Study

A total of 832 case records were reviewed. The proportions of the various categories of cases are shown in Table I.

TABLE I
BREAKDOWN OF THE CASES REVIEWED

Type of Case	Number	Percentage
Perianal abscess	496	59.7
Ischio-rectal abscess	96	11.5
Fistula-in-ano	176	21.1
Both fistula and anorectal abscess	64	7.7
TOTAL	832	100.0

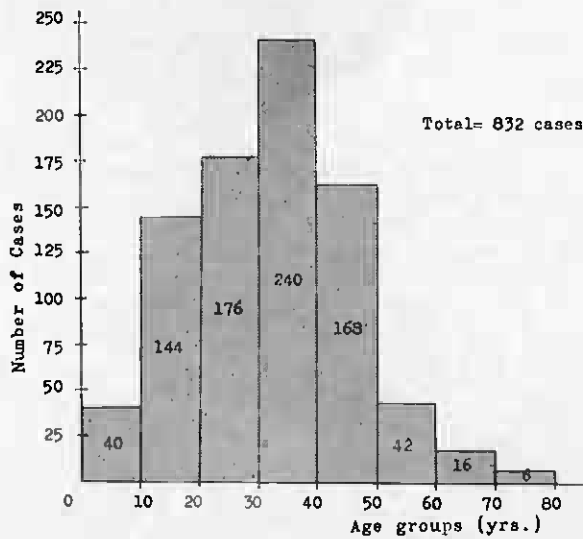
It is seen that 71.2% of the cases presented in the abscess stage and as much as 28.8% came for treatment after fistula-in-ano (with or without concomitant abscess) had developed.

(1) Epidemiology

The peak age group in which anorectal abscess occurs most frequently is in the 30-40 year bracket. Almost no age group is exempt, but most of the cases tend to come from the younger age ranges (Table II).

Central Manpower Base, Singapore.
R. N. V. PRASAD, M.B., B.S. (S'pore).
(Winner of the Singapore Surgical Society Prize as a medical student 1971).

TABLE II
AGE DISTRIBUTION



(b) SEX INCIDENCE

There were four times as many males as there were females who presented with anorectal suppurations.

(c) RACIAL DISTRIBUTION

The racial distribution of the 832 cases surveyed was as follows (Table III):—

TABLE III
RACIAL INCIDENCE

Race	Number	Percentage
Chinese	607	72.9
Indians	112	13.5
Malays	104	12.5
Others	9	1.1
TOTAL	832	100.0

Comparing the racial distribution amongst cases of anorectal suppuration with the hospital racial population, it is obvious that the Chinese suffer the highest incidence of this affliction; next come the Indians and finally the Malays followed by 'others'. The Malays, however, with their low hospital utilization, are more at risk and appear to have a higher incidence than expected.

(2) Bacteriological Flora

640 cases out of the 832 reviewed had bacteriological cultures done. Some cases had several cultures done, but only the result of the culture

taken at operation was included in the study. The types of organisms and their frequency of occurrence are shown in Table IV.

TABLE IV
BACTERIOLOGY OF ANORECTAL SUPPURATIONS

Organism	Number	Percentage
<i>Escherichia coli</i>	251	39.1
<i>Klebsiella aerogenes</i>	109	17.2
<i>Streptococcus faecalis</i>	30	4.7
Other enteric bacteria— <i>Alk. faecalis</i> , <i>Paracolo-</i> <i>bact.</i> , <i>Proteus</i> , <i>Achromobacter</i> , <i>citro-</i> <i>bacter</i>	140	21.8
<i>Staph. aureus</i>	61	9.4
Beta Haemolytic <i>Streptococci</i>	20	3.1
<i>Staph. albus</i>	15	2.3
Mixed culture (cutaneous/enteric organisms)	9	1.6
Sterile culture	5	0.8
TOTAL	640	100.0

Total percentage of organisms of enteric origin = 82.8.
Total percentage of organisms of cutaneous origin = 14.8.

The majority of the organisms cultured (82.8%) were of enteric origin. Only 14.8% of them were of cutaneous origin, out of which the commonest was *Staphylococcus aureus* (9.4%).

(3) General State of Health of the Patients

This was assessed by using their haemoglobin level as one parameter, and the occurrence of concomitant disease such as diabetes mellitus which decreases a patient's resistance to infection. The presence of local rectal conditions (e.g. haemorrhoids) was also investigated.

(a) HAEMOGLOBIN STATUS

This study was restricted to Chinese patients, as normal values of haemoglobin level were obtainable only for this ethnic group. Out of the 832 case records examined, 664 had results of haemoglobin investigation available, and of these, 462 were Chinese. The arithmetic mean values of the haemoglobin level of the different age groups for both the sexes of Chinese origin were worked out, and are listed in Table V.

The values of normal Chinese patients are taken from a clinical survey by Y. K. Lim *et al*⁷.

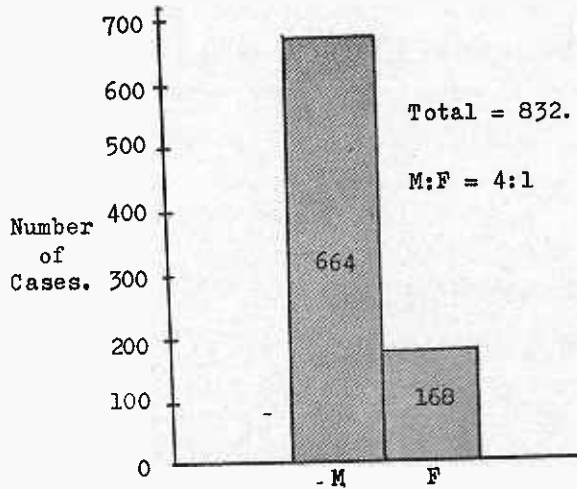


Fig. 1. Sex distribution.

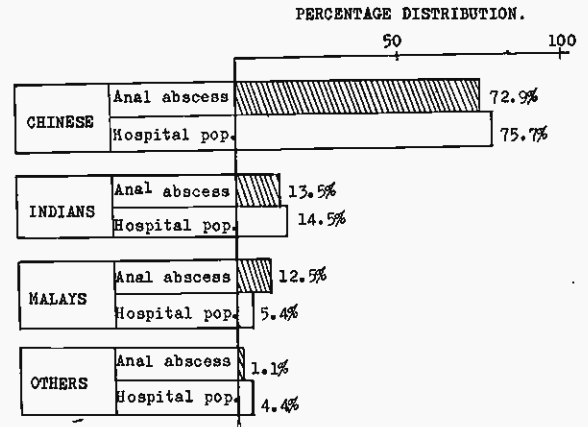


Fig. 2. Comparison between racial distribution of anorectal abscesses with hospital population distribution.

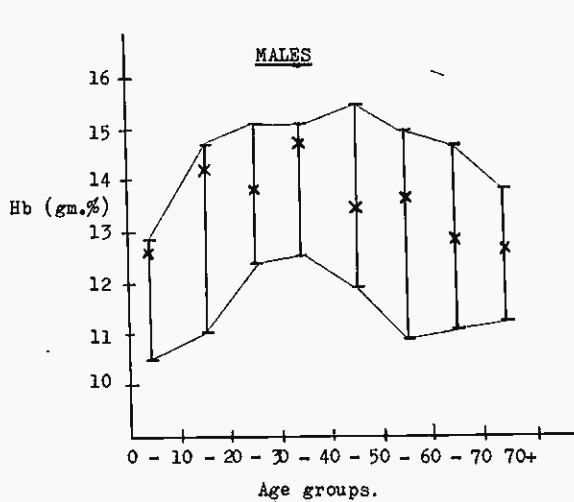


Fig. 3(a). Haemoglobin values of Chinese patients with anorectal abscess compared with normal haemoglobin range.

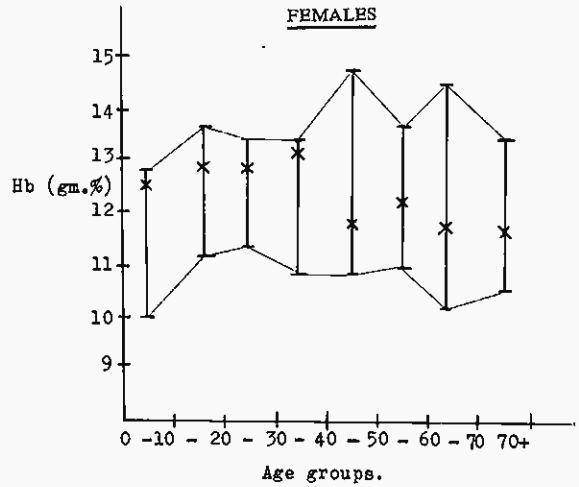


Fig. 3(b). Haemoglobin values of Chinese patients with anorectal abscess compared with normal haemoglobin range.

TABLE V

MEAN HAEMOGLOBIN VALUES OF MALE AND FEMALE CHINESE PATIENTS WITH ANORECTAL ABSCESS

Age Grp. (Yrs.)	Hb. gm. %							
	0-10	11-20	21-30	31-40	41-50	51-60	61-70	70 +
Mean for Males	12.61	14.23	13.60	14.51	13.24	13.35	12.55	12.20
Mean for Females	12.45	12.73	12.60	13.01	11.50	11.82	11.30	11.26

TABLE VI
NORMAL HAEMOGLOBIN VALUES IN CHINESE SURGICAL PATIENTS

Age Grp. (Yrs.)		0-10	11-20	21-30	31-40	41-50	51-60	61-70	70 +
		Hb. gm. %							
M A L E S	Mean	11.64	13.35	13.8	13.78	13.65	13.36	12.79	12.478
	± 1 S.D.	±1.18	±1.376	±1.326	±1.307	±1.664	±1.474	±1.749	±1.281
F E M A L E S	Mean	11.399	12.435	12.302	12.119	12.63	12.162	12.071	11.783
	± 1 S. D.	±1.414	±1.255	±1.107	±1.321	±1.906	±1.297	±2.112	±1.433

in which the haemoglobin values of 1,499,800 Chinese surgical patients of both sexes, without any evidence of bleeding were analysed (Table VI).

The author's figures for the haemoglobin values are extrapolated on to the normal range for each sex. This is shown in Figs. 3 (a) and (b).

(b) RELATION TO DEBILITATING DISEASE/DIABETES MELLITUS

Out of the 832 case records of anorectal abscesses examined, only three had generalised debilitating disease; two of them had widespread malignancy and one case was a 2-month old child with cerebral palsy. With regard to diabetes mellitus, all cases had their urine sugar results recorded in the case notes. In suspect cases the glucose tolerance results were available. Analysing the records, there were only 52 cases (i.e. 6.2%) of diabetes mellitus.

(c) CONCOMITANT PRESENCE OF HAEMORRHOIDS AND OTHER LOCAL CONDITIONS

This information was obtained from the notes made at operation, and from the clinical notes. The proportions of the various local ano-rectal conditions present in addition to anorectal abscesses are listed in Table VII.

It is apparent that the majority of patients with anorectal abscesses had no other concomitant local anal condition.

B. Results of the Clinical Survey

The results of the survey of 60 patients with anorectal abscess, obtained by personal enquiry into their bowel habits are presented below.

TABLE VII
OTHER ANORECTAL CONDITIONS PRESENT IN ADDITION TO ANORECTAL ABSCESS

Concomitant Local Condition	Number	Percentage
Haemorrhoids	52	6.2
Trauma, foreign bodies	16	1.9
Fissure-in-ano	2	0.2
Nil	762	91.7
Total number of cases	832	100.0

Their ages ranged from 20-50 years and they comprised 50 males and 10 females. All of them had either perianal or ischio-rectal abscess.

(a) Bowels

The patients were questioned about their bowel movement with special emphasis on constipation or recent change in bowel frequency. For the purposes of this study, constipation is taken to mean "infrequent or difficult evacuation of faeces"⁴. Diarrhoea implies conditions where there is increased frequency with watery stools. 'No change' or 'normal bowels' means that the patient has experienced no change in the bowel frequency, with stools of normal consistency and without need for straining, during the past many years and even after the onset of symptoms of the lesion. The various proportions of patients with constipation/no change/diarrhoea are shown in Table VIII.

TABLE VIII
BOWEL MOTION

Bowels	Number	Percentage
Constipated	28	46.6
No change	31	51.7
Diarrhoea	1	1.7
TOTAL	60	100.0

There was only one person (1.7%) with diarrhoea and he had been having 2-3 motions per day, consisting of watery stools, for about a week before the onset of his anal condition. His bowels still remained watery after he had developed the anorectal abscess.

Of those who had constipation, enquiry was made as to whether they were constipated after developing the other symptoms (viz. pain, swelling, discharge, fever) of anorectal abscess, or if they had been constipated before the onset of the other symptoms, and if so, for how long before had they been constipated. The results are shown in the Table IX.

TABLE IX
OCCURRENCE OF CONSTIPATION

Patients having Constipation		
Before onset of other Symptoms		After onset of other Symptoms
More than two weeks before	Within the last two weeks	24 (86%)
1	3	
Total number having constipation =		28 (100%)

It is seen that about half (46.6%) of the total number of cases with anorectal abscess are constipated, the majority of them becoming so as a result of developing the abscess. Only very few of those constipated (14%) developed constipation before other symptoms of abscess developed.

(b) *Occurrence of Opium Addiction*

This aspect was investigated because opium can cause constipation and hardening of faeces which may play some part in the pathogenesis of anorectal abscesses. The sixty patients with anorectal abscesses were questioned as to whether they were taking opium in any form (e.g. by smoking, ingestion). The results are shown in Table X.

TABLE X
THE OPIUM HABIT IN PATIENTS WITH ANORECTAL ABSCESS

Opium Habit	Number	Percentage
Taking opium	2	3.3
Not taking opium	58	96.7
TOTAL	60	100.0

Only two patients (3.3%) out of the sixty patients admitted to taking opium. Both were males, one aged 42 years and the other 49 years; the younger of the two smoked his opium whereas the older man swallowed opium pellets. Both of them denied having constipation before they developed their anorectal abscess, but the patient swallowing opium admitted having hard stools for some years, to evacuate which he had to strain moderately every morning.

DISCUSSION

Much controversy has surrounded the mechanism of production of anorectal abscesses and fistulae, but perhaps the most popular conception of their aetiology at present is the anal gland or cryptoglandular infection hypothesis. The first researchers to associate the aetiology of anal infection with anal ducts and glands were Chiari (1878), Herrmann and Defosses (1880) and Bodenhammer (1888). Much evidence has been presented to link anal glandular infection with the development of anorectal abscesses and fistulae. Detailed observations have led Eisenhammer to conclude that anorectal abscesses and fistulae derive almost without exception (97%) from anal gland infection. There are about 6 to 8 epithelial lined tracks, known as the anal glands which are present in the wall of the anal canal, extending from the anal crypts into the submucosa and usually through the lower third or half of the internal sphincter to abut onto the longitudinal intersphincteric muscle fibres. It is postulated that infection extends via these glands to occupy a loculated abscess site which lies between the external and internal sphincters. From this site, infection can extend via direct extension or via hematogenous or lymphatogenous routes to form anorectal abscesses in the different regions.

The pathogenesis of anal infection has been succinctly summarised by Nesselrod and is shown in modified diagram form in Fig. 4.

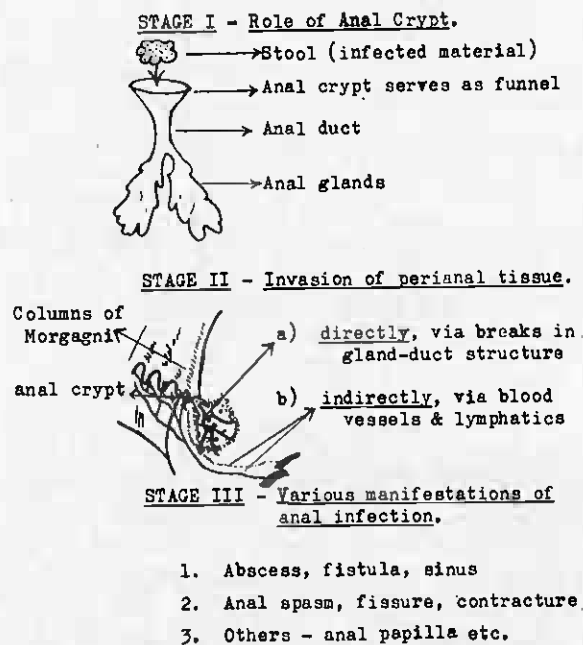


Fig. 4. Pathogenesis of anal infection.

The present survey attempts at elucidating the possible causes of anal glandular infection in the local population. The results of the investigation have shown that no age is exempt from developing anorectal infection; however, many cases fall into the 20 to 50 year age group with the peak incidence in the fourth decade. There is a strong male preponderance (M : F = 4 : 1) and this is borne out by other studies made elsewhere the M : F ratio ranging from 2 : 1 to 8 : 1. The general status of health (as determined by the haemoglobin level, presence of debilitating disease/diabetes mellitus and the occurrence of other local anorectal lesions) of the patients in the author's series is good. It would seem that the patient with anorectal infection is usually a healthy male aged slightly over thirty years.

As far as racial incidence is concerned, the occurrence of the lesion follows the general racial distribution of the local population, except that the Malays with their low hospital utilization show a slightly higher incidence than would be expected. The reason for this is unknown, but dietary habits, bowel habits and local anorectal hygiene probably play some part.

There seems little doubt that infection is mainly of enteric origin. Bacteriology of the pus from the abscesses showed that 82.8% of the cultures grew enteric organisms, the commonest of them being *E. coli* (39.1%). A very small percentage grew *Staphylococcus aureus* (9.4%) and beta haemolytic *Streptococci* (3.1%). Bailey and Love give a higher

percentage of 23% of *Staph. aureus* infection. These cutaneous pathogens could have caused anal infection either by infecting the cutaneous glands around the anal skin or by secondarily invading tissues weakened by infection which was already present. Other causes could be direct implantation of these cutaneous bacteria by trauma, or spread to the anal region via blood-borne infection. Trauma caused by foreign body does not play a big role in the causation of anorectal infection locally. Only 1.9% of patients with anorectal suppurations could give a history of previous trauma. Other conditions which weaken local tissue defences against infection were investigated and it is found that they seem to play little part. Haemorrhoids was present in only 6.2% of the cases investigated and fissure-in-ano only in 0.2%. These conditions, in addition to weakening local tissue resistance also produce a change in bowel habit usually constipation, because of the fear of aggravating the pain concomitant with these conditions. The question of bowel habit was investigated in detail. Diarrhoea is regarded by Nesselrod, Esinhammer and Spiesman as a common factor leading to anal gland infection. It is believed by them that liquid material can gain entrance into the anal crypts and their attached ducts much more easily than can material from a fairly dry and well formed stool. Cantor opines that constipation too could be an important aetiological factor. Passage of hard stools tends to injure the anal crypts and weaken them by inducing inflammatory changes; straining at stools tends to cause venous congestion, stretching and tearing and helps spread infection. To throw some light on this aspect, the bowel habits of a representative sample of patients were enquired into. Diarrhoea was present in only 1.7% of the cases and constipation in 46.6%. There was no change in bowel habit in the rest of the patients (51.7%). Lilius in a clinical study of 150 cases of fistula-in-ano found that 61.8% of his patients had normal stool history. 33.8% complained of hard stools, 1.5% had constipation and only 2.9% had diarrhoea. The question of constipation which seems important in this context was investigated further by the author. It was found that of those having constipation, 86% developed it *after* developing other symptoms (e.g. pain, swelling, discharge) i.e., constipation followed anal infection rather than preceded it. Most patients admitted that they dared not pass stools for fear that it may aggravate anal pain. The opium habit was also investigated with the expectation that this might predispose to causing infrequent bowel motion and hard stools. However, only 3.3% of the patients admitted to taking opium. So in essence,

the role of constipation in the causation of ano-rectal infection is still much a mystery. Though bowel habits cannot be directly incriminated, they must still be regarded as being of some aetiological significance.

ACKNOWLEDGEMENTS

I wish to thank Professor Chan Kong Thoe of the Surgical 'A' Unit, University of Singapore and Mr. Yahya Cohen, Head of Surgical 'B' Unit for their interest, encouragement and guidance during the course of this study.

I am also much indebted to Dr. Y. K. Lim of Surgical 'A' Unit, University of Singapore, for allowing me to make use of his data on haemoglobin level in normal Chinese surgical patients.

Special thanks also go to Mr. Chiam Heng Khim and Mr. Sung of Surgical 'B' Unit, Outram Road General Hospital, for their assistance and for permission to avail myself of the clinical records from the Records Office.

REFERENCES

1. Bailey & Love's: "Short Practice of Surgery." 13th Edition, H.K. Lewis & Co., 1965.
2. Cantor, A. J.: "Ambulatory Proctology." 3rd Printing, Hoeber Publications.
3. Chan, K.T.: "Primary Liver Carcinoma."—Prospective Study of 108 Cases, Doctorate of Medicine Thesis, University of Singapore, 1965.
4. Dorlands': "Illustrated Medical Dictionary." 24th Edition, Saunders.
5. Eisenhammer: Surg., Gynae., Obstet., 106, 595, 1958—Quoted in (6).
6. Lilius, H.G.: "Fistula-in-ano—A Clinical Study of 150 Patients—Review of Literature." Acta Chirurgica Scand. Supplementum, 383-395, 1968.
7. Lim, Y.K. *et al.*: Unpublished Report on "The Normal Haemoglobin values in Chinese Surgical Patients." Obtained through personal communication.
8. Lockhart-Mummery: "Diseases of the Rectum and Colon." 2nd Edition, Balliere, Tindall & Cox.
9. McColl, Ian: "The Comparative Anatomy & Pathology of Anal Glands." Annals of the Royal College of Surgeons 40:36-67, Jan., 1967.
10. Nesselrod: "Clinical Proctology." 3rd Edition, Saunders.
11. Spiesman: "Abscess & Fistula of the Anorectum." Amer. J. of Proctol., 9, 120, 1958—Quoted in (6).