



Original Article

Anal abscess microbiology as an anal fistula predictor



Victoria Eugenia Dowling Enez *, Carla Virginia Izarra Henriquez 

Dr. Antonio María Pineda University Central Hospital, Coloproctology Unit, Barquisimeto, Venezuela

ARTICLE INFO

Article history:

Received 21 October 2019

Accepted 18 November 2019

Available online 12 December 2019

Keywords:

Microbiologia

Anal abscess

Anal fistula

Anaerobic bacteria

ABSTRACT

In order to determine the microbiology of anal abscess as a predictor of anal fistulas in patients who attended the external consultation of the Coloproctology unit of the Dr. Antonio María Pineda University Central Hospital, a prospective, descriptive, longitudinal study was conducted from September 2018 to July 2019. In this study, the population consisted of patients with a diagnosis of anal abscess, without associated comorbidities or contraindications for surgery, who agreed to be included in the study. A non-probabilistic, intentional sample consisting of 42 patients was determined. An appointment-based study protocol was applied by outpatient for patients who met the inclusion criteria applied, to perform due medical history through anamnesis, physical examination and culture taking of supuration from the anal abscess to subsequently establish medical and surgical behavior thereof. The results were expressed in absolute numbers and percentages, a prevalence of ischioanal abscesses was observed, followed by deep post-anal space abscesses. Anaerobic bacteria were isolated in 100% of the sample. In all fistulized patients, *E. Coli* was isolated as a predominant germ.

© 2019 Sociedade Brasileira de Coloproctologia. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Microbiologia de abscesso anal como preditivo de fístula anal

R E S U M O

Um estudo prospectivo, descritivo e longitudinal foi realizado de setembro de 2018 a julho 2019 para determinar a microbiologia do abscesso anal como preditivo de fístulas anais em pacientes que compareceram à consulta externa da unidade de Coloproctologia do Hospital Central da Universidade Dr. Antonio María Pineda. Neste estudo, a população foi composta por pacientes com diagnóstico de abscesso anal, sem comorbidades ou contraindicações associadas à cirurgia, que concordaram em participar do estudo. Uma amostra intencional não probabilística, composta por 42 pacientes foi determinada. Um protocolo de estudo

PALAVRAS-CHAVE:

Microbiologia

Abscesso anal

Fístula anal

Bactérias anaeróbias

* Corresponding author.

E-mail: v.dowling@hotmail.com (V.E. Dowling Enez).

<https://doi.org/10.1016/j.jcol.2019.11.489>

2237-9363/© 2019 Sociedade Brasileira de Coloproctologia. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

com base na consulta em regime ambulatorial foi aplicado aos pacientes que atenderam os critérios de inclusão estabelecidos, para realizar a anamnese, o exame físico e a devida cultura da supuração do abscesso anal para posteriormente estabelecer o comportamento médico e cirúrgico. Os resultados foram expressos em números absolutos e porcentagens, observando-se a prevalência de abscessos isquiorretais, seguidos por abscessos profundos no espaço pós-anal. Bactérias anaeróbias foram isoladas em 100% das amostras. Em todos os pacientes com fístulas, *E. Coli* foi isolada como um germe predominante.

© 2019 Sociedade Brasileira de Coloproctologia. Publicado por Elsevier Editora Ltda. Este é um artigo Open Access sob uma licença CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

Perianal fistulas after the formation of anorectal abscesses have been the subject of multiple studies. The purpose of culturing pus after a perianal or ischiorectal abscess has also been a topic of interest. Usually, the doctor orders a laboratory culture from the pus in the abscess to determine the appropriate antibiotic for treatment. However, after surgical treatment by drainage, antibiotics are generally unnecessary, but the culture is beneficial in determining the probability of the formation of a fistula.¹

Grace RH and collaborators in their publication, show prevalence of fistula formation in 62 (54.4%) of 114 patients whose cultures performed reported enterobacteria.² Subsequently, based on this study, the aforementioned authors conducted a prospective descriptive study, where the enterobacteria of the patients who presented perianal fistula formation was isolated. From a total of 80 patients reported with isolated enterobacteria, there was a prevalence of aerobic enterobacteria as *Escherichia Coli* in 49 of 53 patients which represents 92.5%.³

Likewise, Henrichsen et al., in a study conducted with the aim to demonstrate perianal fistulas as a complication of anorectal abscesses, showed that patients whose cultures reported bacteria of the skin did not develop perianal fistulas after abscess formation.⁴

Although there are studies in the literature on the predictive factors of microbiology in anorectal abscesses, there is no established protocol where the culture of purulent material from anorectal abscesses functions as a predictive factor for the formation of perianal fistulas. Therefore, a prospective descriptive and longitudinal study was conducted to determine the predictive value of culture in anorectal abscesses for the formation of perianal fistulas in patients who attended the consultation of the Coloproctology Unit of the Antonio María Pineda University Central Hospital, in the city of Barquisimeto.

Materials and methods

For the development of this study, a prospective, descriptive and longitudinal investigation was conducted.

In this regard, the population consisted of 42 patients with diagnosis of anal abscess who attended consultation at the Coloproctology Unit of the Antonio María Pineda University Central Hospital in Barquisimeto, State of Lara, Venezuela,

from September 2018 to July 2019, which met the following criteria:

Inclusion criteria:

Patients of both sexes diagnosed with anal abscess.

Candidates for surgery.

Patients older than 15 years.

Patients who granted signed consent.

Exclusion criteria:

Patients with immunosuppression status (kidney transplants, HIV, others).

Patients who failed to grant signed informed consent.

The study protocol used is detailed as follows: Appointments were established by outpatient consultation for patients who met the inclusion criteria to perform medical history through anamnesis, physical examination and suppuration culture from anal abscess to subsequently determine medical and surgical procedure thereof.¹

A data collection form was used, where the data from the questionnaire, the physical examination and patient culture results were recorded; it consists of two parts: the first corresponds to the initial identification data including first and last name, history number, age, sex, clinical diagnosis, among others. The second part refers to the study group where the results of the processed cultures were expressed.

After the results were obtained, a statistical analysis was conducted. It can be found in the descriptive part, expressed by means of relative frequency or percentages, which allowed the elaboration of the corresponding tables and graphs.

Results

Figs. 1-3

Relationship of microbiology and anal fistula formation

Fig. 4

Microbiological findings

As shown in Table 1, anaerobic bacteria were isolated in all the cultured and studied samples (42), which represent 100% of the population. Furthermore, 34 anal abscesses with isolated anaerobic bacteria in the cultures evolved into anal fistulas in a period of 3 weeks after surgical drainage, which represents 80.9% of the sample and only 8 anal abscesses did not fistulize, which represents 19% of the sample. Also, as can be seen on

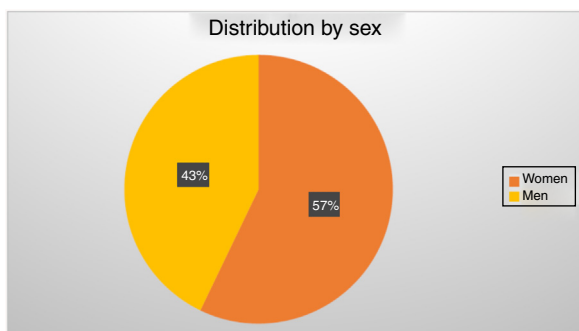


Fig. 1 – The distribution of sex was as follows: 18 men corresponding to 43% of the sample and 24 women corresponding to 57% of the sample. It is observed that the highest percentage of individuals studied were women.

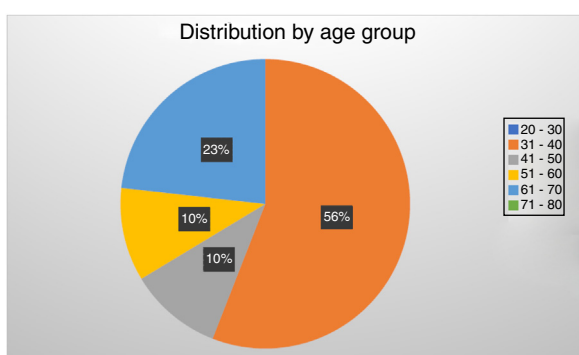


Fig. 2 – Distribution by age group was as follows: 20 to 30 years no patients were present; from 31 to 40 years, 23 patients which correspond to 56% of the sample; from 41 to 50 years 5 patients corresponding to 11% of the sample, from 51 to 60 years, 4 patients corresponding to 10% of the sample; from 61 to 70 years of age, 10 patients corresponding to 23% of the sample and no patients were present in the group from 71 to 80 years of age. The distribution of the sample is not homogeneous since there are age groups that have no representation. On the other hand, it was observed that the highest percentage of individuals studied is in the group from 31 to 40 years, followed by the group from 61 to 70 years of age.

Table 1 from 34 samples evaluated, in 21 of them the germ *E. coli* (53.8%) was isolated, which coincides with a high number of fistulized abscesses. *E. coli* was not isolated in abscesses which did not fistulize. It is important to note that cultures requested for evaluation of aerobic germs were negative in the entire sample (Figs. 5–7).

Discussion

The present report describes a study protocol for the microbiology of anal abscesses as predictors of fistula.

The distribution of sex was as follows: 18 men, corresponding to 43% of the sample and 24 women corresponding to 57% of the sample, as seen above, the highest percentage of individuals studied were women.

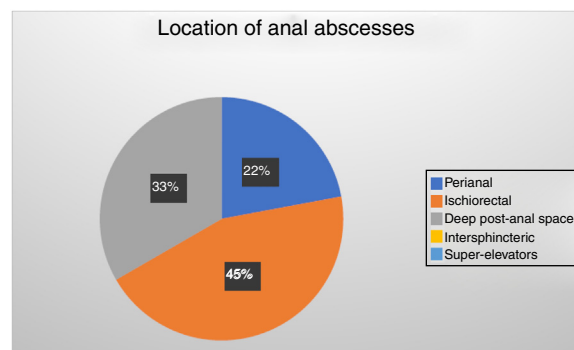


Fig. 3 – The distribution of anal abscesses was as follows: 9 perianal abscesses corresponding to 22% of the sample, 14 deep post-anal space abscesses corresponding to 33% of the sample, 19 ischiorectal abscesses corresponding to 45% of the sample. It is observed that the most frequent presentation of this pathology corresponds to the ischiorectal abscesses, followed by deep post-anal space abscesses and perianal abscesses. No intersphincteric abscesses or supra-elevators were observed.

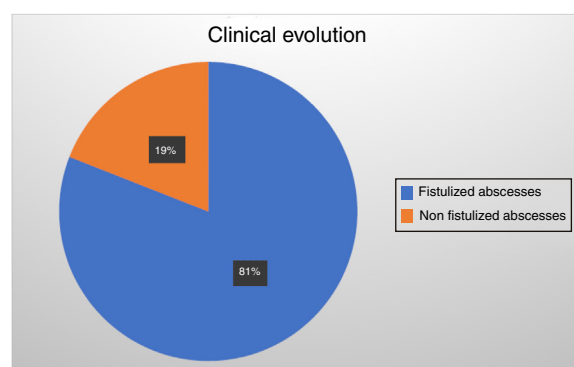


Fig. 4 – The distribution corresponding to the clinical evolution of patients with anal abscesses who were sampled for secretion culture without prior treatment, but underwent surgical drainage with a follow-up of 2 months after it, was as follows: 34 patients corresponding to 81% of the entire sample developed anal fistulas in the next 3 weeks or so. 8 patients corresponding to 19% of the sample did not fistulize.

The results above are in accordance with the study conducted by Ulises Rodriguez Wong (2013) at the Juarez Hospital of Mexico, who conducted an extensive literature review where it is concluded that the frequency of anorectal abscesses is lower in men than in women (of 2:1 to 3:1).⁴

Regarding the age of occurrence, the following was observed: from 20 to 30 years of age no case studies were presented; from 31 to 40, 23 patients corresponding to 56% of the sample; from 41 to 50, 5 patients corresponding 11% of the sample; from 51 to 60, 4 patients corresponding to 10% of the sample; from 61 to 70, 10 patients corresponding to 23% of the sample, and from 71 to 80 years of age no patients were presented. The distribution of the sample is not homogeneous since there are age groups which were not expressed as there were no individuals in them. Also, the highest percentage of

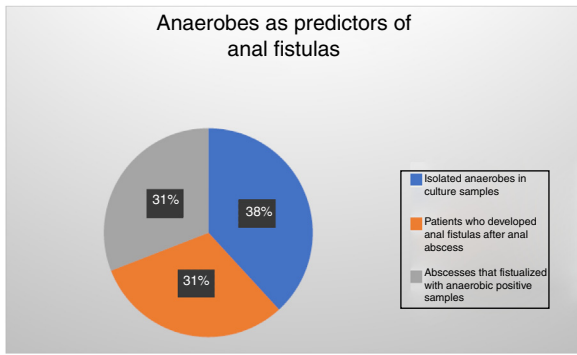


Fig. 5 – Anaerobic bacteria were isolated in the entire sample (42 patients) corresponding to 100%; 34 patients, which correspond to 80.9% of the sample, evolved clinically towards anal fistula. As illustrated in Fig. 5 above, there is an equal proportion, which helps us to infer that anaerobic bacteria can serve as a predictor in the formation of anal fistulas.

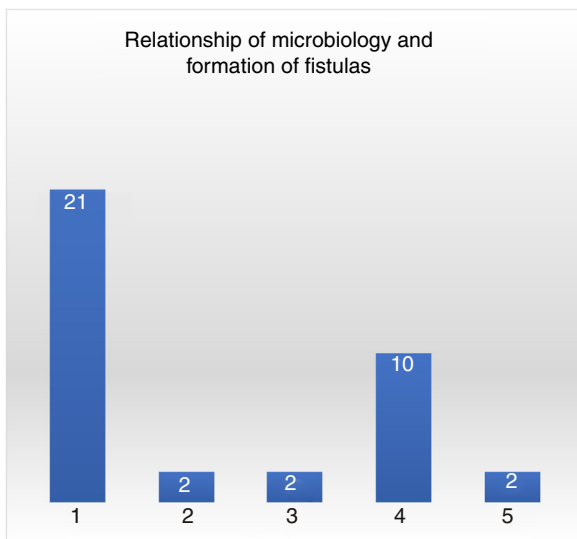


Fig. 6 – Of the total positive cultured samples for anaerobes that fistulized (34 abscesses), 21 samples were positive for *Escherichia coli*, which represent 61.7% of the sample and 18 patients developed transsphincteric fistulas, which represent 85, 7% of the sample. Of the latter, 12 fistulas were high transsphincteric, which correspond to 66.6% of the sample and 8 low transsphincteric fistulas corresponding to 33.33% of the sample. Likewise, we observed that 4 samples were positive for polymicrobial cultures (*Klebsiella Pneumoniae*, *E. Coli*, *Enterococcus Faecalis*), which represent 23.5% and are related to the formation of highly complex fistulas (suprasphincteric fistulas with high blind paths and extra-sphincter fistulas with blind paths). As can be seen from Fig. 6 above, in 10 samples, which correspond to 35.2%, *Klebsiella Pneumoniae* was isolated alone, which is related to simple intersphincteric fistulas. Finally, 2 positive samples for proteus mirabilis can be observed, corresponding to 5.8, which related to the formation of simple intersphincteric fistulas.

Table 1 – Anaerobic bacteria isolated in 42 anal abscesses.

	Total number of abscesses (42)	Fistulized abscesses	Non Fistulized abscesses
** Number of abscesses where anaerobic bacteria were isolated	42	34	8
* <i>S. aureus</i> (skin)	5	1	4
* <i>Streptococo B hemolítico</i>	4	0	4
* <i>Proteus Mirabilis</i>	9	2	0
* <i>Klebsiella Pneumoniae</i>	9	10	0
* <i>Enterococo Faecalis</i>	2	1	1
* <i>E. coli</i>	21	21	0
* <i>Bacteroides Fragilis</i>	7	0	3
* <i>Peptostreptococo spp.</i>	4	0	0

Relationship of non fistulized abscesses and microbiology

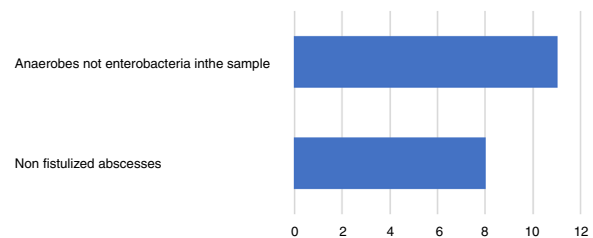


Fig. 7 – Of the total number of abscesses cultured, 8 did not fistulize, which corresponds to 19% of the sample. These bacteria are related to bacteria not belonging to the digestive tract (Table 1).

individuals studied is in the 31–40 age group, followed by the 61–70 age group.

These results are consistent with the study conducted by Ulises Rodriguez Wong (2013) at the Juárez Hospital of Mexico, in his literature review, where it is evident that the highest incidence of anorectal abscesses occurs in the third and fourth decades of life.

The frequency of occurrence of anal abscesses was as follows: 9 perianal abscesses corresponding to 22% of the sample; 14 deep post-natal abscesses corresponding to 33% of the sample and 19 ischiorectal abscesses corresponding to 45% of the sample. As shown above, the most frequent presentation of this pathology corresponds to the ischiorectal abscesses, followed by deep post-natal abscesses and perianal abscesses. No intersphincteric abscesses or supra-elevators were observed.

Despite the fact that our results report a high incidence of ischiorectal abscesses, these are not consistent with the revised bibliography of Ulises Rodriguez Wong (2013) at the Juárez Hospital of Mexico, where it is made evident that the

most frequent type of abscess is perianal, followed by the ischiorectal.⁴

Juan Antonio Villanueva Herrero and Collaborators (2014) in the Coloproctology Unit of the General Surgery Service of the Dr. Eduardo Liceaga General Hospital of Mexico, reported in a prospective observational analytical study, conducted in the period from January 1, 2012 to January 1, 2013, a diagnosis of anal abscess with an incidence of 62.8% of perianal abscesses, 30.2% of ischiorectal abscesses and 3.5% of deep post-anal space abscesses.⁵

The distribution corresponding to clinical evolution of patients with anal abscesses who were sampled for secretion culture without prior treatment and underwent surgical drainage with a follow-up of 3 months after this procedure, was as follows: 34 patients who correspond to 81% of the entire sample developed anal fistulas in the following 3 weeks; 8 patients corresponding to 19% of the sample did not fistulize.

The results above are not consistent with a prospective, observational, analytical study conducted by Henrichsen S et al. (1986). This study included 50 patients diagnosed with anal abscess, who were followed up for up to 6 months. Only 26% of these patients underwent medical treatment and drainage of anal fistula abscess.⁶

It must also be noted that in all the cultured and studied samples (42) anaerobic bacteria were isolated which represents 100% of the sample; 34 anal abscesses with isolated anaerobic bacteria in the cultures evolved into anal fistulas in a period of 3 weeks after surgical drainage, which represents 80.9% of the sample; 8 anal abscesses did not fistulize, which represents 19% of the sample. It was also observed that, from 34 samples evaluated, in 21 of them the germ *E. coli* (53.8%) was isolated, which is consistent with a high number of fistulized abscesses. *E. coli* was not isolated in those abscesses which did not fistulize. It is important to highlight that cultures requested for evaluation of aerobic germs were negative in the entire sample.

The above is consistent with a prospective, longitudinal, analytical study conducted by Eykin SJ et al. (1986), where 80 patients with diagnosis of anal abscess, 49 fistulized patients were isolated from 53 (92.5%) enterobacteria, predominantly *E. coli*, *Bacteroides Fragilis* in 47 fistulized patients of 53 (88.7%). *B. asaccharolyticus*, *B. ureolyticus*, peptococcus and peptostreptococci were also isolated in fewer samples; it was isolated in a single sample of fistulized patient, *Staphylococcus aureus*, which represents 1.9%.³

Anaerobic bacteria were isolated in the entire sample (42 patients) corresponding to 100%; 34 patients, corresponding to 80.9% of the sample, evolved clinically towards anal fistula. The Graph shows an equal proportion, which allows to infer that anaerobic bacteria can serve as a predictor in the formation of anal fistulas.

The above is consistent with a prospective, longitudinal, analytical study conducted by Grace RH et al. (1982), which reports in 114 patients (69.9%) the presence of whole bacteria, of which 62 (54.4%) patients developed anal fistula.²

Of the total positive anaerobic cultured samples which fistulized (34 abscesses), 21 samples were positive for *Escherichia coli*, which represent 61.7% of these samples, 18 patients developed transsphincteric fistulas, which represent 85.7% of the sample. Of the latter, 12 fistulas were high transsphinc-

teric, which correspond to 66.6% of the sample and 8 low transsphincteric fistulas corresponding to 33.33% of the sample.

Likewise, it was observed that 4 samples were positive for polymicrobial cultures (*Klebsiella Pneumoniae*, *E. Coli*, *Enterococcus Faecalis*), representing 23.5% of the sample, which are closely related to the formation of highly complex fistulas (suprasphincteric fistulas with high blind paths and extra-sphincter fistulas with blind paths).

Also, it was observed that, in 10 samples, which correspond to 35.2%, *Klebsiella Pneumoniae*, which is related to simple intersphincteric fistulas, was isolated alone. Finally, the analysis showed 2 positive samples for *proteus mirabilis*, corresponding to 5.8%, closely related to the formation of simple intersphincteric fistulas.

It is inferred from the findings described in the present study that there is a close relationship between the microbiology of anal abscess and the ability to predict the complexity of the fistula.

Conclusions

- 1 As a result of the present study, it is concluded with respect to anal abscesses, that the predominance of pathology prevails in men over women.
- 2 Anal abscesses are more frequent in the age group between 31 and 40 years.
- 3 Within the classification of anal abscesses, the most frequently diagnosed type is ischiorectal abscess, followed by deep post-anal space abscesses.
- 4 Most anal abscesses will evolve into anal fistula in periods less than 3 months.
- 5 Anaerobic bacteria were isolated in 100% of the sample. In all fistulized patients, *E. Coli* was isolated as a predominant germ. Therefore, the germ described is concluded as the main predictor of anal fistulas.
- 6 In the samples where *E. Coli* was isolated, mostly transsphincteric anal fistulas are associated.
- 7 It should be noted that positive samples for polymicrobial cultures (*Klebsiella Pneumoniae*, *E. Coli*, *Enterococcus Faecalis*) are related to the formation of highly complex fistulas (suprasphincteric fistulas with high blind paths and extra-sphincter fistulas with blind paths).
- 8 In the samples where *Klebsiella Pneumoniae* was isolated alone, simple intersphincter anal fistulas are evident.
- 9 In anal abscesses where bacteria belonging to the digestive tract were not isolated, no clinical evolution towards anal fistula was evident.

Conflicts of interest

The authors declare no conflicts of interest.

REFERENCES

1. Corman Marvin L. In: Tomo I, editor. *Cirugia de Colon y Recto de Corman. sexta edición* 2017. p. 367-83.

2. Grace RH, Harper IA, Thompson RG. Anorectal sepsis: microbiology in relation to fistula-in-ano. *Br J Surg.* 1982;69:401-3.
3. Eynkyn SJ, Grace RH. The relevance of microbiology in the management of anorectal sepsis. *Ann R Coll Surg Engl.* 1986;68:237-9.
4. Rodriguez-Wong U. Abscesos y Fistulas Anorrectales. *Rev Hosp Jua Mex.* 2013;80:243-7.
5. Herrero C, Jimenez-Bobadilla CH. El tipo de absceso anal afecta a la complejidad de la fístula anal. *Unidad de Coloproctología, Servicio de Cirugía General, Hospital General de México Dr. Eduardo Liceaga. Cir Gen.* 2014;3:15-9.
6. Henrichsen S, Christiansen J. Incidence of fistula-in-ano complicating anorectal sepsis: a prospective study. *Br J Surg.* 1986;73:371-2.