

Bacterial Profile In Histologically Proven Acute Appendicitis Cases

*¹Dr. Vivek Bhasker, ²Dr. Brajesh Kumar, ³Dr.D.K.Sinha, ⁴Dr. Anil Kumar ,
⁵Dr. Ashwini Verma,

¹Senior Resident, Rims, Ranchi, ²Junior Resident, Rims, Ranchi, ³Associate Professor, Rims, Ranchi

⁴Junior Resident, Rims Ranchi, ⁵Junior Resident, Rims Ranchi

Corresponding author: *Dr. Vivek Bhasker *

ABSTRACT:

Introduction: acute appendicitis occurs due to obstruction of appendix lumen followed by vascular compromise and bacterial overgrowth. Our study is aimed at recognizing the common bacterial strains present in appendix during the attack of acute appendicitis and to find if there is any association between a particular bacterial strain and incidence of acute appendicitis.

Material and methods: in 60 consecutive operated cases of acute appendicitis, appendix was sent for- a) histopathologic examination and b) culture of luminal content from excised appendix

Result and conclusion: bacteroides was the most common single bacteria isolated from culture of appendiceal content in acute appendicitis cases

Keywords: acute appendicitis, histopathological examination, intraluminal pressure, bacterial translocation

I. Introduction

Acute appendicitis is a common cause of acute abdominal pain. Appendicitis is caused by a blockage of the hollow portion of the appendix.¹ This is most commonly due to impacted fecal matter which is referred to as fecalith.^{1,8} Inflamed lymphoid tissue from a viral infection, parasites, gallstone, or tumors may also cause the blockage.² Obstruction leads to bacterial overgrowth which leads to an increase in intraluminal pressure which obstructs the blood flow and leads to congestion and ischemia in the appendix allowing the bacterial translocation and infection resulting in the inflammation of appendix.⁹ The standard treatment for acute appendicitis is surgical removal of the appendix.^{2,3} Antibiotics may be equally effective in certain cases of non-ruptured appendicitis.⁴ Over the last decade non-operative treatment with antibiotics has been proposed as an alternative to surgery.^{6,7} Since antibiotics are so effective in treatment of acute appendicitis; role of bacteria in causing appendicitis should be studied in more detail. Detailed role of microbial flora in causation and progression of the disease is not well understood. This study was done with the idea to recognize the common bacterial micro-organism associated with acute appendicitis.

II. Material And Methods:

A total of 60 consecutive patients operated for acute appendicitis in which histological examination showed features suggestive of acute appendicitis, were included in this study. After appendectomy, excised specimen was examined for histology and culture of luminal content was done to identify the bacterial species predominantly present in the lumen. Data was collected in data collection sheet. Statistical analysis was done using SPSS-23 software.

III. Result

*In our study total 60 patients undergoing appendectomy for acute appendicitis were included. Out of 60; 44 were female and 16 were male.

Sex	Male	Female	Total
Number Of Patients	16(26.6%)	44(73.3%)	60

*Mean age of patients was 24.98 years with standard deviation of 9.07 years.

Cases were divided in 4 age groups. A maximum of 26 patients included in our study were from <20 years age group, 18 were in 20-30 years age group, 9 were in 30-40 years age group and 7 were in >40 years age group.

Age Group	Number Of Patients
<20 Years	26(43.3%)
20-30 Years	18(30%)
30-40 Years	9(15%)
>40 Years	7(11.6%)

*Pain Abdomen was present in all the 60 cases. Second most common complaint was Fever, found in 22 cases. Anorexia was seen in 18 cases and Nausea And Vomiting was present in 17 cases

Chief Complains	Number Of Patients
Pain	60(100%)
Fever	22(36.6%)
Anorexia	18(30%)
Nausea & Vomiting	17(28.3%)

*In this study culture report showed that, bacteroides is the most common bacterial genera associated with acute appendicitis in 35 % (21) cases. Mixed growth was seen in 30 % (18) cases. In 21.6 % (13) cases E.coli was isolated from culture, in 6.6 % (4) cases klebsiella was isolated. Growth of 1(1.6%) case each of pseudomonas, citrobacter freundii, enterobacter and staphylococcus aureus was also seen.

Bacterial Growth	
Mixed (>1 Bacteria)	18(30%)
Bacteroides	21(35%)
E.Coli	13(21.6%)
Klebsiella	4(6.6%)
Pseudomonas	1(1.6%)
Citrobacter Freundii	1(1.6%)
Enterobacter	1(1.6%)
Staphylococcus Aureus	1(1.6%)

IV. Discussion

Although lifetime risk of acute appendicitis shows a male preponderance in western countries¹³; in our study female patients of histologically proven acute appendicitis were significantly higher in number than male patients. Bacteroides is a gram-negative, obligate anaerobic bacteria.¹⁴ This was the most common single bacterial isolate in our study. In 30% of cases mixed growth of more than one bacterium was found on culture. Escherichia coli (E. coli) is a gram-negative, facultatively anaerobic, rod-shaped, coliform bacterium of the genus Escherichia that is commonly found in the lower intestine.¹⁵ E.coli was the second most common single bacteria isolated in our study. Klebsiella was isolated in 6.6% of cases. It is a genus of nonmotile, Gram-negative, oxidase-negative, rod-shaped bacteria with a prominent polysaccharide-based capsule¹⁶ Pseudomonas was isolated in one case. It is a genus of Gram-negative, aerobic bacteria, belonging to the family Pseudomonadaceae.¹⁷ Citrobacter freundii was isolated from one case. It is a species of facultative anaerobic gram-negative bacteria of the Enterobacteriaceae family.¹⁸ Enterobacter was isolated from one case. It is a genus of Gram-negative, facultatively anaerobic, rod-shaped, non-spore-forming bacteria of the family Enterobacteriaceae¹⁹ Staphylococcus aureus was found after culture in one case. It is a gram-positive, round-shaped bacterium that is frequently found in the nose, respiratory tract, and on the skin²⁰

V. Conclusion

In our study pseudomonas was the most common bacteria associated with acute appendicitis. Mixed growth of more than one bacterium and E.coli were also very commonly isolated. Other less common bacteria isolated on culture were Klebsiella, Pseudomonas, Citrobacter freundii, Enterobacter and Staphylococcus aureus

References

- [1]. Pieper R, Kager L, Tidefeldt U (1982). "Obstruction of appendix vermiformis causing acute appendicitis. One of the most common causes of this is an acute viral infection which causes lymphoid hyperplasia and therefore obstruction. An experimental study in the rabbit". Acta Chirurgica Scandinavica. 148 (1): 63–72.
- [2]. Longo, Dan L.; et al., eds. (2012). Harrison's principles of internal medicine. (18th ed.). New York: McGraw-Hill. p. Chapter 300. ISBN 978-0-07174889-6. Retrieved 6 November 2014.
- [3]. Tintinalli, editor-in-chief Judith E. (2011). Emergency medicine : a comprehensive study guide (7. ed.). New York: McGraw-Hill. p. Chapter 84. ISBN 978-0-07-174467-6. Retrieved 6 November 2014.
- [4]. Varadhan KK, Neal KR, Lobo DN (2012). "Safety and efficacy of antibiotics compared with appendicectomy for treatment of uncomplicated acute appendicitis: meta-analysis of randomised controlled trials". The BMJ. 344: e2156. PMC 3320713. PMID 22491789. doi:10.1136/bmj.e2156
- [5]. Addiss DG, et al. The epidemiology of appendicitis and appendectomy in the United States. Am J Epidemiol. 1990;132(5):910–25.
- [6]. Varadhan KK, Neal KR, Lobo DN. Safety and efficacy of antibiotics compared with appendicectomy for treatment of uncomplicated acute appendicitis: meta-analysis of randomised controlled trials. BMJ. 2012;344, e2156.
- [7]. Andersson RE, Petzold MG. Nonsurgical treatment of appendiceal abscess or phlegmon: a systematic review and meta-analysis. Ann Surg. 2007;246(5): 741–8.
- [8]. AL-Joubori A.K., Acute appendicitis: Clinical, histopathological and bacteriological study, Dipl. Thesis, College of medicine, University of Baghdad (1994)
- [9]. Anderson A. and I. Berghahi, Acute appendicitis in patients over 60, Ann. Surg., 44, 445-447 (1978)

- [10]. Willis A T, Ferguson I R, Jones P H, Phillips K D et al.) Metronidazole in prevention and treatment of bacteroides infection after appendicectomy. *Brit Med*] 1976; 1: 318-321.
- [11]. Leading article. Lincomycin and clindamycin colitis. *Brit Med*] 1974; 4: 65.
- [12]. Ernmerson A M. The microbiology and treatment of lifethreatening infections. Research Studies Press. Chichester. 1982; 111-112.
- [13]. Addiss DG, Shaffer N, Fowler BS, Tauxe RV. The epidemiology of appendicitis and appendectomy in the United States. *Am J Epidemiol* 1990;132: 910-25.
- [14]. 10 Wexler, H. M. (Oct 2007). "Bacteroides: the good, the bad, and the nitty-gritty"). *Clinical Microbiology Reviews*. 20 (4): 593–621. ISSN 0893-8512. PMC 2176045 . PMID 17934076. doi:10.1128/CMR.00008-07
- [15]. Tenailon, Olivier; Skurnik, David; Picard, Bertrand; Denamur, Erick (2010-03-01). "The population genetics of commensal *Escherichia coli*". *Nature Reviews Microbiology*. 8 (3): 207–217. ISSN 1740-1526. doi:10.1038/nrmicro2298.
- [16]. Ryan KJ; Ray CG (editors) (2004). *Sherris Medical Microbiology* (4th ed.). McGraw Hill. p. 370. ISBN 0-8385-8529-9.
- [17]. *Pseudomonas* entry in LPSN [Euzéby, J.P. (1997). "List of Bacterial Names with Standing in Nomenclature: a folder available on the Internet". *Int J Syst Bacteriol*. 47 (2): 590–2. ISSN 0020-7713. PMID 9103655. doi:10.1099/00207713-47-2-590.]
- [18]. "Citrobacter SPP.". *Pathogen Safety Data Sheet — Infectious Substances*. Public Health Agency of Canada. 2012.
- [19]. Tan, Wen-Si; Muhamad Yunus, Nina Yusrina; Tan, Pui-Wan; Mohamad, Nur Izzati; Adrian, Tan-Guan-Sheng; Yin, Wai-Fong; Chan, Kok-Gan (13 June 2014). "Freshwater-Borne Bacteria Isolated from a Malaysian Rainforest Waterfall Exhibiting Quorum Sensing Properties". *Sensors*. 14 (6): 10527–10537. doi:10.3390/s140610527.
- [20]. Masalha M; et al. (2001). "Analysis of Transcription of the *Staphylococcus Aureus* Aerobic Class Ib and Anaerobic Class III Ribonucleotide Reductase Genes in Response to Oxygen". *Journal of Bacteriology*. 183 (24): 7260–7272. PMC 95576 . PMID 11717286. doi:10.1128/jb.183.24.7260-7272.2001.

*Dr. Vivek Bhasker. "Bacterial Profile In Histologically Proven Acute Appendicitis Cases." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)* 16.7 (2017): 67-69.