# Appendicular Perforation due to *Streptococcus pneumoniae* in an elderly male: A rare case report from North India

**Abstract-**

*Streptococcus pneumoniae* is an uncommon cause of appendicitis. We have reported an unusual monomicrobial infective cause *(S. pneumoniae*) of appendicular perforation in an elderly male. In this rare case from North India, appendicitis was caused by *Streptococcus pneumoniae*, leading to Appendicular perforation in a 63 year old elderly male who was alcoholic, hypertensive and had coronary artery disease. The isolated Pneumococcal strain was sensitive to all the tested antibiotics and the identification was confirmed by Vitek-2 compact. But the patient expired inspite of antibiotic administration and appendectomy. Appendicitis due to monomicrobial infection is uncommon. Also appendicitis due to *S. pneumoniae* is extremely uncommon. Our case emphasizes that *S. pneumoniae c*an cause appendicitis leading to appendicular perforation. It may become fatal, if not treated immediately especially in case of extremes of age and associated risk factors. *Streptococcus pneumoniae* should be considered as a possible cause by surgeons treating abdominal infections. Further studies are needed to establish a proper risk factor for Appendicitis caused by *Streptococcus pneumoniae*.

**Keyword:** Appendicular perforation, monomicrobial, *Streptococcus pneumoniae*, Appendicitis.

**Manuscript:**

**Introduction:** *Streptococcus pneumoniae* can cause wide spectrum of infections, typically in young children and in elderly above 60 years old; ranging from pneumonia, meningitis, bacteremia and otitis media. Pneumococci can also cause a number of invasive pneumococcal disease, such as osteomyelitis, endocarditis, pericarditis, septic arthritis, primary peritonitis, rarely brain abscess and hemolytic uremic syndrome[1,2,3].. Appendicitis being the most important cause of surgery in developing countries, is polymicrobial in nature. A number of aerobic and anaerobic bacteria are responsible for appendicitis, including *Bacteroides fragilis*, *Streptococcus spp*, *Escherichia coli* and *Klebsiella spp*. In this case report, we have reported an unusual monomicrobial infective cause *(Streptococcus pneumonia*e) of appendicular perforation in an elderly male with hypertension and coronary artery disease.

**Case Report:** A 63 year old elderly male patient reported to our setting with complaints of right lower abdominal pain since 1 week associated with fever and food emesis which was aggravated since 1 day. On per abdominal examination, tenderness and guarding rigidity was noted. No other significant findings were noted on physical examination. Patient was a known case of hypertension since 12 yrs and coronary artery disease since 6 yrs (on medication). He was also chronic alcoholic.

Patient had pain in right lower abdomen on and off since 1 yr and was taking medication for abdominal pain. Since 1 month, the pain was not relieved by medication and even got aggravated since 1 week. An ultrasonography was performed 1 week before, which showed Sub-acute Appendicitis, mild prostatomegaly and right simple renal cortical cyst.

Since 1 week patient repeatedly came to the out-patient department due to right lower abdominal pain and on the basis of ultrasonographic finding patient was advised for urology referral and was given Ciprofloxacin and Metronidazole empirically along with symptomatic treatment (pantoprazole, ondansetron and Hyoscine butylbromide).

Samples for complete blood count and C Reactive Protein were sent. No other biological or radiological examination was done as the patient was immediately shifted to Operation theatre. The abdomen was opened by Mc-Burney incision. An inflamed, enlarged, and perforated appendix with peri-appendicular pus was found perioperatively and rest of the peritoneal cavity

including stomach, liver, small and large bowel was clean. A pus sample was collected per-operatively, and sent to the microbiology laboratory for bacteriological analysis. The appendicectomy was done and appendix was sent for histopathological examination. Peritoneal lavage was given and pelvic and sub-hepatic drain was placed locally. Diagnosis of Acute appendicular perforation was made.

Gram stain(pus) of direct smear showed many polymorphonuclear cells and many gram positive cocci in pair. Pus was inoculated aerobically on Blood agar and MacConkey's agar. After incubation blood agar showed growth of alpha hemolytic draughtman's appearance colonies [figure 1]. There was no growth on MacConkey's agar. The organism was identified as *Streptococcus pneumoniae* by standard procedure. Antimicrobial Sensitivity was done on blood agar and it was found to be sensitive to penicillin (10 units), cefotaxime (30mcg), erythromycin (15mcg), Linezolid(30mcg), Teicoplanin, Vancomycin(30mcg), Chloramphenicol(30mcg) and clindamycin(2mcg). The identification of bacteria was later confirmed by Vitek-2 compact using panel of GP card (Automated ID&AST). Further the histopathological examination report suggested inflammatory reaction due to Acute Peri-appendicitis.

Post-operatively patient was started on ceftriaxone and metronidazole. On first postoperative day the patient collapsed, was resuscitated but did not survive.

**Discussion-** *Streptococcus pneumoniae* is one of the commonest cause of community acquired pneumonia and second most common cause of purulent meningitis, but intra-abdominal pneumococcal infection is rarely seen [1,2,3]. The virulence of some pneumococcus serotypes may contribute to this rare infection, without predisposing conditions [4]. Pneumococcal appendicitis are rarely found in appendectomy cases (approximately 0.3%)[5,6]. The common predisposing factor for pneumococcal infection are alcoholism, splenectomy, HIV, steroid use, diabetes mellitus, connective tissue diseases, hemophilia A, and intravenous drug use [7,8]. In this present case, the risk factor for invasive pneumococcal infection can be correlated to age and alcoholism.

Appendicitis is usually polymicrobial in nature. Polymicrobial isolates from case of perforated appendix are reported by Stone et al and Gerome et al[9,10]. Ronchetto and Pistono had also reported seven cases of monomicrobial infection from 43 intraoperative samples of appendicular pus. However, *Streptococcus pneumoniae* was isolated in only two cases, although polymicrobial (in association with Bacteroides fragilis and Escherichia coli)

[11]. . Bhattacharya et al., reported single etiological agent for appendicitis[12]. In the year 2015, Ghadage et al., had reported appendicitis due to *S.pneumoniae* in a seven year old female child[13] . Cortese et al., in the year 2019 reported primary peritonitis due to *Streptococcus pneumoniae* in a 68 year old Caucasian women, yet no proof of appendicitis was found [14]. But monomicrobial cause of appendicitis is rare. In the recent year only few studies had reported monomicrobial appendicitis due to *S.pneumoniae* in children; not in adult. In the year 2022, Chikhaoui et al., had reported similar case in a seven year old male child[15]. However in these cases the patients were fully recovered following treatment and none had reported appendicular perforation and mortality due to the same.

**Conclusion**: Appendicitis due to monomicrobial infection is uncommon. Even appendicitis due to *Streptococcus pneumonia* is extremely uncommon. Our case emphasizes that *Streptococcus pneumoniae c*an cause appendicitis leading to appendicular perforation. It may become fatal, if not treated immediately especially in case of extremes of ages and other associated risk factors. Thus, *Streptococcus pneumonia*e should be considered as a possible cause by surgeons treating abdominal infections.

**References:**


1. Dugi DD 3rd, Musher DM, Clarridge JE 3rd, Kimbrough R. Intraabdominal infection due to Streptococcus pneumoniae. Medicine (Baltimore). 2001;80: 236–44.

2. Musher DM. Infections caused by Streptococcus pneumoniae: clinical spectrum, pathogenesis, immunity, and treatment. Clin Infect Dis. 1992;14: 801–7.

3. Litarski A, Janczak D, Cianciara J, Merenda M. Spontaneous bacterial peritonitis due to streptococcus pneumonia--Case report. Pol Przegl Chir. 2011;83:283–6.

4. Thomas D, Perpoint T, Dauwalder O, et al. In vivo and in vitro detection of a superantigenic toxin Vbeta signature in two forms of streptococcal toxic shock syndrome. Eur J Clin Microbiol Infect Dis. 2009;28:671–6.

5. Heltberg O, Korner B, Schouenborg P. Six cases of acute appendicitis caused by Streptococcus pneumoniae. Eur J Clin Microbiolo. 1984:141-43.

6. Dan M, Igor D, Miriam Z, Sergio S, Carlos. Primary Streptococcus pneumoniae appendicitis in a child: Case report and Review. Ped Infect Dis Jour. 2003;22(3):282-84.

7. Jennifer A, Mark A. Pneumococcal appendicitis in a man with HIV infection. N Engl J Med. 1993;328:1282.

8. Taylor SN, Sanders CV. Unusual manifestations of invasive pneumococcal infection. Am J Med. 1999;107(14):12-24S.

9. Stone JH. Bacterial flora of appendicitis in children. J Pediatr Surg. 1976;11-37.

10. Gerome P, Bourilhon N, Soullie B, Foucher B, Otto MP, Milou F. Acute appendicitis due to both Klebsiella pneumoniae and serotype 35B Streptococcus pneumoniae, an emergent serotype. Ann Biol Clin(Paris). 2011;69(4):485-88.

11. Ronchetto F, Pistono PG. More on Pneumococcal appendicitis. N Engl J Med. 1993;329:1428.

12. Bhattacharya S, Kanungo R, Natarajan MK, Mahalakshmi VN, et al. Unimicrobial appendicitis due to non-vaccine serotype of Streptococcus pneumoniae: Implications for and Management and Prevention. Ind J Med Microbiolo. 2001;19(2);30:59-6.

13. Ghadage et al., Appendicitis in a Child due to Streptococcus Pneumoniae : A Rare Case Report. Journal of Clinical and Diagnostic Research. 2015 Jan, Vol-9(1): 03-04.

14. Cortese et al. Streptococcus pneumoniae primary peritonitis mimicking acute appendicitis in an immunocompetent patient: a case report and review of the literature. Journal of Medical Case Reports (2019) 13:126.

15. Chikhaoui A. A rare case of Pneumococcal Appendicitis in a Child. Case reports in Pediatrics.2022;9262149.