

Pattern of Pneumoperitoneum in Generalised Secondary Peritonitis: A Descriptive Observational Study in a Tertiary Care Hospital in Trans Himalayan Region

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ABSTRACT

Pneumoperitoneum is the presence of air in peritoneal cavity. Surgical pneumoperitoneum occurs when there is leakage of air and visceral contents into the peritoneal cavity and leads to secondary peritonitis. This study was aimed to determine the pattern of pneumoperitoneum in the patients admitted with secondary generalised peritonitis and find the possible etiology of peritonitis which may guide for the plan of surgery. This descriptive observational study was conducted in the Department of Surgery Dr. Rajendra Prasad Government Medical College Kangra at Tanda consisting of all the patients having acute generalised secondary peritonitis presented in emergency department or Surgery outdoor patient department over a period of one year from 2016 to 2017. This study reviewed 153 patients admitted with secondary generalised peritonitis. Out of which only 135 patients were having pneumoperitoneum and included in study. The most common surgical interventions done were Cellan Jones Omental Patch Closure in 108(80%). The median time of operation was 50 minutes with the minimum time of 30 minutes and maximum time of 120 minutes. Perforations are more common in gastroduodenal area in patients having pneumoperitoneum with peritonitis.

Key Words: Peritonitis, Tertiary care hospital, North India, Management, Pneumoperitoneum

INTRODUCTION

Pneumoperitoneum is the presence of air in peritoneal cavity. It may be surgical or non-surgical pneumoperitoneum. Surgical pneumoperitoneum occurs when there is leakage of air and visceral contents into the peritoneal cavity and leads to secondary peritonitis. Secondary peritonitis is a common life threatening surgical emergency. Even after many advances and optimal treatment, it is still characterized by high mortality of about 20%-60% and high morbidity of about 50%.¹

Approximately 90% of cases of spontaneous pneumoperitoneum are the result of acute abdominal conditions that

will subsequently require emergency surgery.² The prompt and accurate diagnosis of peritonitis made by clinical signs and supported by diagnostic tests, e.g., abdominal X-ray, chest X-ray, ultrasound and CT scan is required for this life threatening condition.

Data suggest that imaging, particularly computed tomography, has an important role in patients without peritonitis to improve diagnostic certainty. Although imaging did not improve the diagnostic sensitivity, it has been reported a significant improvement in the early diagnosis of serious conditions,³ which seemed to be associated with decreased mortality. This

finding also highlights the importance of maintaining vigilance regarding the possibility of occult bowel compromise in patients with an equivocal physical examination.

Treatment of peritonitis and intra-abdominal sepsis always begins with general care i.e. volume resuscitation, correction of potential electrolyte and coagulation abnormalities, and empirical broad spectrum parenteral antibiotic coverage.⁴ However, the specific treatment usually involves surgery to repair the perforation or resection of a small part of intestine and a temporary colostomy or ileostomy may be needed.

The proposed surgical procedure depends on the anatomical site of infection, the degree of peritoneal inflammation, the generalized septic response, the patient's underlying condition, and the available resources at the treatment centre.⁵ Death is usually rapid in peritonitis and could be due to sepsis, cascade of infection and multi system organ failure.

This study was aimed to determine the pattern of pneumoperitoneum in the patients admitted with secondary generalised peritonitis and find the possible etiology of peritonitis which may guide for the plan of surgery.

METHODOLOGY

This descriptive observational study was conducted in the Department of Surgery Dr. Rajendra Prasad Government Medical College Kangra at Tanda consisting of all the patients having acute generalised secondary peritonitis presented in emergency department or Surgery outdoor patient department over a period of one year from 2016 to 2017. Only the patients having

pneumoperitoneum with generalised secondary peritonitis over the age of 10 years were included in the study period. Exclusion criteria were terminal stage of pregnancy, pregnant female and children below 10 years. The data was collected from the department of surgery regarding investigations, type of surgery, site of perforation, possible etiology entered and cleaned in Microsoft Excel spreadsheet. The data was entered and cleaned in Microsoft excel, and analysed using Epi Info version 7.2.4. The categorical variables were expressed in terms of frequencies, and proportions, whereas continuous variables were expressed as mean and standard deviation.

RESULTS

This retrospective study reviewed 153 patients admitted with secondary generalised peritonitis. Out of which only 135 patients were having pneumoperitoneum and included in study. The age of patient ranged from 13 years to 90 years with a mean age of 44.4 years. 121(89.6%) patients out of 135 were male and 14(10.4%) were female.

The most common surgical interventions done were Cellan Jones Omental Patch Closure in 108(80%) and Repair of Perforation 11(8%). Others included Modified Graham's Omental patch Closure 8(6%), Resection and Anastomosis 5(3.7%) and colostomy formation in 2(1.5%) patients with colonic perforation following sigmoid colon malignancy and Appendectomy in 1(0.8%) patient (Table 1). The median time of operation was 50 minutes with the minimum time of 30 minutes and maximum time of 120 minutes.

Surgery Performed	Number of patients	%
Cellan Jones Omental Patch Closure	108	80
Modified Graham's Omental Patch Closure	08	6
Resection and Anastomosis	05	3.7
Repair of perforation	11	8
Appendectomy	1	0.8
Colostomy	02	1.5

Intra operatively source of pneumoperitoneum was identified. In our study, duodenum was the most common site of perforation in 109(80.7%) patients. Ileum was the next common site of perforation in 10(7.40%) patients. Gastric perforation was found in 7(5.2%) patients and jejunal perforation in 3(2.2%) patients followed by colonic perforation in 2(1.5%) patients. Appendix was the least common site of perforation in peritonitis patients with pneumoperitoneum in only one patient (Table 2).

Site of Perforation		Number of patients	%
Gastric (Gastric ulcer)		7	5.2
Duodenum (Duodenal ulcer)		109	80.7
Jejunum (Blunt trauma abdomen)		3	2.2
Ileum	Typhoidal perforation	10	7.4
	Penetrating trauma abdomen	3	2.2
Appendix (perforated appendix)		1	0.7
Colon (colonic malignancy)		2	1.5

DISCUSSION

Pneumoperitoneum is the abnormal collection of air in the peritoneal cavity and remains a reliable source of visceral rupture.⁶ Pneumoperitoneum which require surgery constitutes about 85-90% of all pneumoperitoneum cases.⁷

During exploration, the site of perforation was assessed and managed according to the etiology and patient's condition. In our study, the most common site of perforation was duodenum in 109(80.7%) patients followed by ileum in 13(9.60%) patients and gastric in 7(5.20%) patients. Patil et al and Bali et al had also observed duodenum as most common site of perforation in 41%, 37.5% of cases respectively.⁸⁻⁹

Further it was found that gastroduodenal area was most common site of perforation comprising 116 (85.9%) patients. 16(11.9%) patients were having small bowel perforation and 2(1.5%) patients had large bowel perforations. Appendix was the least common site among patients of peritonitis with pneumoperitoneum in our study. Various studies also reported appendix as rare cause of intra-abdominal air leak with an incidence of 0-7%.¹⁰

Among the peptic ulcer disease, duodenal ulcer perforation was more common than gastric ulcer with duodenal : gastric ratio of 15.6:1 which is also similar to the studies done by Ghosh et al.¹¹ In another series Jhobta et al and Shanker et al reported duodenal : gastric ulcer perforation

ratio as 7:1 and 4.5:1 respectively which is comparable to our study.^{9,12} Jhobta et al in his study had also reported 22 cases of tubercular perforation out of 92 cases of small bowel perforation.⁹ However there was no such case of tubercular small bowel perforation in our study.

Omental patch closure (Cellan jones and Modified graham) was the most common surgery done in 116(85.9%) patients in our study with duodenal ulcer perforation and gastric ulcer perforation. We did not observe any omental patch leakage after omental patch repair of perforation. In a study by Malik et al, the most common operative procedure for gastric and duodenal ulcer perforation was omental patch repair in 20(40%) patients.¹³ Patil et al also reported omental patch repair as most common procedure and was considered preferred surgical method of closure as it is easy to perform technically straightforward and gives comparable results to that of definitive surgery in peptic ulcer perforations.¹⁴

In our study appendectomy was done in 1(0.80%) patients having pneumoperitoneum with perforated appendix and primary repair of perforation in 11(8%) patients with enteric perforation. Resection and anastomosis was done in 5(3.7%) patients of traumatic small bowel perforation and 2(1.5%) patients had intraoperative stoma formation in form of colostomy in colonic malignancy perforation. The median time of operation

was 50 minutes. In the western countries, appendicectomy and resection and anastomosis are the most common surgeries performed in secondary peritonitis.¹⁵

CONCLUSION

Perforations are more common in gastroduodenal area in patients having pneumoperitoneum with peritonitis. Both clinical and radiological findings in patients of peritonitis are important in identifying the surgical pneumoperitoneum and early surgical intervention which may be life saving for the patient.

REFERENCES

1. Angus DC, van der Poll T. Severe Sepsis and Septic Shock. *N Engl J Med* 2013 Nov 21;369(21):2062-3
2. Miller RE: The radiologic evaluation of intraperitoneal gas (pneumoperitoneum). *CRC Crit Rev Radiol Sci* 4:61-84, 1973
3. Marshall JC. Intra-abdominal infections. *Microbes Infect* 2004 Sep;6(11):1015-25
4. Blot S, De Waele JJ. Critical Issues in the Clinical Management of Complicated Intra-Abdominal Infections. *Drug* 2005;65(12):1611-20.
5. Sartelli M, Viale P, Catena F, Ansaloni L, Moore E, Malangoni M, et al. 2013 WSES guidelines for management of intra-abdominal infections. *World J Emerg Surg* 2013;8(1):3.
6. Winek TG., Mosely HS, Grout G, Luallin D, Pneumoperitoneum and Its Association With Ruptured Abdominal Viscus *ArchSurg.* 1988;123(6):709-712.
7. Kadkhodaie HR , Vaziri M. Asymptomatic Spontaneous Pneumoperitoneum. *Shiraz E Medical Journal.* 2008 Oct; 9(4):198-200
8. Dinesh HN, Sachin V, Sreekanth, et al. Clinical evaluation and management of peritonitis secondary to hollow viscous perforation. *J. Evolution Med. Dent. Sci.* 2016;5(19):950-953
9. Jhobta RS, Attri AK, Kaushik R, Sharma R, Jhobta A. Spectrum of perforation peritonitis in India-review of 504 consecutive cases. *World J Emerg Surg.* 2006;1(1):26
10. Campos Canelas AL , Fernandez HM, Crociati Meguins L, Silva Barros S, Crociati Meguins EM, Ishak G, Rodrigues De Moraes LA. Pneumoperitoneum in association with perforated appendicitis in a Brazilian Amazon woman. Case report. *G Chir.* 2010 Mar;31(3):80-2.
11. Ghosh PS, Mukherjee R, Sarkar S, Halder SK, Dhar D. Epidemiology of Secondary Peritonitis: Analysis of 545 Cases. *Int J Sci Stud* 2016;3(12):83-88
12. Shanker MR, M. Nahid, Prajwal S. A clinical study of generalised peritonitis and its management in a rural setup. *Int Surg J.* 2018 Nov;5(11)
13. Malik S, Singh A, Sidhu DS, Nagpal N, Sharma D. A prospective study to assess clinical profile and golden period for operative intervention in patients with perforation peritonitis. *Int Surg J* 2018; 5:1492-8.
14. Patil PV, Kamat MM, Milan MH. Spectrum of perforative peritonitis-A prospective study of 150 cases. *Bombay Hosp J.* 2012; 54:38-50
15. Malangoni MA, Inui T (2006) Peritonitis the western experience. *World J Emerg Surg* 1:25.

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