

Postoperative Paralytic Ileus - A Hidden Surgical Entity

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Abstract: Background: Postoperative paralytic ileus is a challenging problem for surgeons. The age-old complication requires scrutiny in the term of etio-pathogenesis, diagnosis and treatment to give benefit to patient. Aim: To study etiology & pathophysiologic mechanism, risk factors & associated complications, different techniques for rapid diagnosis and different management strategies for postoperative paralytic ileus. Method: The study is carried out on patients -admitted in municipal general hospital of Ahmadabad. Out of 417 patients studied during the period of August 2013 to September 2015, 27 patients developed paralytic ileus in surgical ward. Data were collected in the prescribed performa consisting details of patient's history, clinical findings, pathological and radiological findings, operative findings, post operative course and complications, and outcome. Results: Observation and analysis of the data of present series was interesting and important aspects were compared with standard series. Septicemia and hypokalemia were the common preoperative predictors for development of paralytic ileus. Conclusion: preoperative predictors significantly determine the development and severity of postoperative paralytic ileus and hence preoperative and intraoperative measures to reduce ileus should be considered, whenever possible. [Sameer P NJIRM 2017; 8(6):30-35]

Key Words: paralytic ileus, postoperative

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Introduction: Ileus is a latin word derived from 'Eileos' which is originally a greek word for intestinal colic, which means to squeeze or roll up tightly. In the medical context, ileus refers to impairment of intestinal motility. Postoperative ileus, therefore is a malfunction of intestinal motility after major intra-or extra abdominal surgery.¹

Paralytic ileus refers to absence of bowel movement and inability to tolerate oral intake from non-mechanical intestinal causes that disrupt the normal coordinated propulsive activity of gastrointestinal tract.^{2,3}

Postoperative ileus affects many patients and can cause significant discomfort to the patient and prolongs the hospital stay. This condition falls into two distinct classifications. These have recently been defined, based on a systemic review and global survey.⁴

- i. Postoperative ileus is defined as the obligatory period of gut dysfunction occurring immediately after surgery with resolution being signaled by passage of flatus or stool and tolerance of an oral diet.
- ii. Prolonged postoperative ileus is defined as two or more of a) nausea/vomiting, b) inability to tolerate an oral diet over the preceding 24h period, c) absence of flatus over the preceding 24h period, d) abdominal distension or e)

radiologic evidence of bowel distension without mechanical obstruction – occurring on or after day 4 postoperatively without prior resolution of postoperative ileus.

It is believed that normal ileus in postoperative state lasts 0 to 24 hours in small intestine, 24 to 48 hours in stomach and 48 to 72 hours in the colon.²

Some degree of postoperative ileus is normal after all abdominal and some non-abdominal surgeries, but it resolves within 4-5 days. It becomes a cause for concern when the ileus becomes unduly prolonged.

Pathophysiology of postoperative paralytic ileus: Three common pathways have been identified in the pathogenesis of postoperative ileus, which could be associated with many clinical conditions. These include 1) Neurogenic inhibitory reflexes, 2) Inflammatory pathways and 3) Pharmacologic pathways.

Apart from the prolonged hospital stay and the consequent increase in the cost of health care resources-delayed enteral nutrition, delayed ambulation resulting in atelectasis, deep vein thrombosis etc. and rarely complications like perforation of bowel are the additional serious complications which can occur. Postoperative ileus is multifactorial in origin. It is important to understand

the pathophysiological mechanisms so the correct and rational treatment can be provided.

Aims of Study: The aim of the study is to analyze the data obtained from patients who had developed paralytic ileus after surgery in form of 1) to study and understand etiopathology, 2) to study the risk factors and associated complications, 3) to study different techniques of rapid diagnosis, 4) to study different management strategies for postoperative paralytic ileus and (5) to learn about overall progress of the patient. The study and conclusions are important in the sense of assessing various aspects of this age-old complication in context of present time.

Method: The study is carried out on patients - admitted in municipal general hospital of Ahmedabad. Permission of Ethical committee have been taken. Pre-Operative & Other Necessary Consent have been taken of all patients. Out of 417 patients studied during the period of August 2013 to September 2015, 27 patients developed paralytic ileus in surgical ward. All cases were studied according to general proforma which included clinical details about symptoms, signs, laboratory & radiological investigations, surgery details, complications, postoperative observation & follow up of 4-6 months.

All the patients received - standard care for Preoperative anaesthesia risk assessment⁵, Necessary systemic antibiotics⁵, Preoperative bowel preparation⁶ and Haemodynamic and nutritional support.

Aetio-pathogenesis of postoperative ileus in clinical practice are⁷ : A) septicemia B) intra-peritoneal inflammation, collection, abscesses C) Peritonitis D)Retroperitoneal haematoma E) Pneumonia F) Deficiency of Na⁺, Cl⁻, K⁺, Mg⁺⁺ G) Anaemia H) Uraemia I) Drug induced J) Others.

It is critically important to differentiate physiological intestinal dysmotility from pathological postoperative ileus as also from mechanical intestinal obstruction. The factors that need to be taken in to consideration while distinguishing the physiological from pathological causes are: the nature of surgery, intraoperative complications and comorbidities.

In the absence of mechanical intestinal obstruction, it is generally agreed that a patient has pathological postoperative ileus if the following clinical features

persist for more than 5 days after open surgery and 3 days after laparoscopic surgery: a) loss of appetite b) Not tolerating oral diet c) vomiting d) inability to pass flatus e) abdominal discomfort & feeling of abdominal distension f) mild degree of abdominal tenderness g) sparse bowel sounds.

If ileus persists beyond 3 to 5 days postoperatively, evaluation of patient in the form of repeated and thorough clinical examinations, laboratory & radiological tests is warranted to detect specific underlying cause and also to rule out mechanical obstruction.

Observation: Out of 417 patients studied - 27 patients developed paralytic ileus. Hence, the incidence of postoperative paralytic ileus in the present study was found to be approximately 6.47%.

In our study the incidence of postoperative paralytic ileus was found to be highest in the 6th decade of life which shows an increase in incidence with increase in age.^{8,9}

Table 1: Age group of patients

Age Group (Years)	Number of patients (n= 27)	%
10-20	3	11.11%
21-30	2	7.41%
31-40	6	22.22%
41-50	5	18.5%
51-60	7	25.92%
61-70	3	11.11%
71-80	1	3.70%

In our study of 417 patients – 216 patients were male and 201 patients were female. Out of 27 patients who developed postoperative paralytic ileus 19 were male (70.37%) and 8 were female (29.62%). The ratio of male to female is almost 7:3.

This is consistent with the study performed by millan¹⁰ and colleagues to study the ‘Risk factors for prolonged postoperative ileus after colorectal cancer surgery’ 2012 and study performed by Chapius¹¹ and colleagues- An observational study of 2400 consecutive patients-‘ risk factors for prolonged ileus after resection of colorectal cancer’ 2013.

Table 2: Preoperative Predictors of Paralytic Ileus

Preoperative Predictors	Number of patients	Percentage %
Septicemia	20	74.07%
Hypokalemia	17	62.96%
Peritonitis	12	44.44%
Anaemia	7	25.92%
Age > 50	7	25.92%
Diabetes	5	18.52%
Altered RFT	4	14.81%
Opiate Usage	4	14.81%
Hypothyroid state	2	7.40%

In our study Septicemia and hypokalemia were found to be most common etiological factors for development of paralytic ileus, followed by Peritonitis. Others like preoperative use of opiates is also an important factor leading to development of ileus.¹²

The most common clinical features observed in this study are depicted below.

Table 3: Clinical Features in patients of Postoperative Paralytic ileus

Clinical Features	Number of patients	% of patients
Symptoms		
Anorexia	27	100%
Abdominal pain	27	100%
Nausea	18	66.67%
Vomiting	8	29.63%
Delayed passage of flatus/stool	27	100%
Belching	15	55.56%
Signs		
Abdominal distention	19	70.37%
Sparse bowel sounds	24	88.89%

In our study amongst 19 patients with the abdominal distension –symptomatic discomfort was found to be more in patients with an increase in abdominal girth by more than 4 cms and sparse or absent bowel sounds were found in 24 out of 27 patients.

Postoperatively the above mentioned clinical features impose a great amount of discomfort to the patients, hence symptomatic management modalities at this stage are very important to provide relief as well as to

treat the patients which includes - Restrict oral intake, Nasogastric decompression, Intravenous support, Correction of electrolyte imbalance, Use of analgesics like NSAIDs instead of Opiates, Antiemetics, Prokinetics etc.

Operative procedures which were followed by paralytic ileus: All patients who developed paralytic ileus were found to have been operated for open abdominal surgeries as compared to laparoscopic procedures. Hence the incidence is more in open abdominal surgeries as compared to laparoscopic procedures.

Amongst the patients who underwent open surgeries 21 were emergency surgeries for the acute nature of the disease and 6 were done on elective basis - indicating a clear cut prevalence of paralytic ileus in patients who underwent emergency surgeries for acute procedures.¹²

Table 4: Operative procedures

Surgeries	Number of patients	% of patients
Exploratory laparotomies	16	59.25%
EL+ bowel anastomosis	5	18.52%
EL+enteric perforation closure	5	18.52%
EL+peptic perforation closure	2	7.40%
Other laparotomies	4	14.81%
Open appendicectomy	7	25.92%
Acute perforated appendicitis	4	14.81%
Acute appendicitis	3	11.11%
Other surgeries	4	14.81%

Exploratory laparotomy: Procedures requiring Anastomosis of bowel or stomach were associated with development of Postoperative paralytic ileus followed by those requiring closure of bowel or stomach perforations. Overall the incidence of postoperative ileus was more in patients who underwent Exploratory Laparotomy.

Open Appendicectomies: incidence of Paralytic ileus was more in patients with perforated Appendicitis with localized peritonitis who were operated on acute and emergency basis.

Other abdominal operations in which postoperative ileus developed were attributed to prolonged duration

of operation, anemia, adhesions, and other etiological risk factors.

Post operative laboratory & radiological investigations done to diagnose paralytic ileus & to rule out septicemia, post-op abdominal condition & pulmonary complications.

Laboratory tests to diagnose paralytic ileus includes:

- A) complete blood picture
- B) serum electrolytes
- C) Blood urea and creatinine
- D) Liver function tests
- E) Total Proteins
- F) Prothombine time
- G) Serum amylase & lipase

Radiological investigations done to diagnose paralytic ileus includes: X ray Abdomen in upright position, Ultrasonography of abdomen, CT Scan of abdomen.

Fig 1: showing dilated & gas filled large bowel loops & elevated Diaphragm on upright abdominal X ray.



Table 5: Table of complications

Associated Complications	Number of patients (n=27)
Intestinal obstruction	3 (11.11%)
Residual abscess	5 (18.52%)
Subphrenic abscess	2 (7.40%)
Pelvic abscess	4 (14.81%)

Measures to reduce postoperative paralytic ileus ⁷:

- 1) Preoperative measures:** a) to keep the patient nutritionally balanced b) to keep electrolytes level in order c) to control infection d) control of diabetes e) maintain haemoglobin level above 10mg/dl f) avoid preoperative opiates.

- 2) Intraoperative measures:** a) minimize handling of bowel b) epidural anaesthesia, whenever possible c) laparoscopic approach is preferred d) avoid excessive intraoperative fluid administration.

- 3) Postoperative measures:** a) early enteral feeding b) early mobilization c) Correct electrolyte abnormalities d) Consider mu-opioid antagonists e) avoid excessive intraoperative fluid administration.

In our study 10 patients had associated medical disorders which affect the outcome, duration of persistence of paralytic ileus and lead to fluid electrolyte imbalance, nutritional impairment and they influence the management protocol as total gut irrigation and aggressive total parental nutrition cannot be given to these patients.

Discussion: Postoperative ileus is a clinically and economically important consequence of major abdominal surgery. There is considerable heterogeneity with respect to its definition, and there remains a need for uniformity in endpoint reporting.

In this study of 27 patients, the commonest age of presentation for postoperative paralytic ileus formation was 51-60 years. This may be due to aging is associated with an increased colonic transit time, and anesthetic disturbance to colonic motility is often aggravated in the elderly.

The pathophysiologic basis of an ileus is multifactorial, and key contributing factors include -generation of an inflammatory response, administration of opioids, autonomic dysfunction, disturbances in gastrointestinal hormone activity, and electrolyte fluctuations.

With the improvement in renal function and potassium level - there was a significant improvement in the bowel motility. Use of higher antibiotics and control of diabetes in preoperative and postoperative period reduced the burden of this dreaded postoperative complications.

Absent or sparse bowel sounds and abdominal distension were observed to be amongst the most common signs of postoperative ileus in our study. The clinical presentation of ileus resembles that of small bowel obstruction. Here bowel sounds are characteristically diminished or absent, In contrast to

the hyperactive bowel sounds that usually accompany mechanical small bowel obstruction. Inability to tolerate liquid and solid by mouth, nausea, no flatus and lack of bowel movements are the most common symptoms.

In this study postoperative complications which occur in association with paralytic ileus are- residual abscess (5 patients), pelvic abscess (4 patients), intestinal obstruction (3 patients), & subphrenic abscess (2 patients). These conditions are either consequences or cause of postoperative paralytic ileus is not specifically known but when present in a postoperative period are associated with increased morbidity. Residual pelvic or other peritoneal abscess are amongst the common complications found in above patients. Hence adequate peritoneal lavage and drainage during surgery and postoperative appropriate higher antibiotics for gram positive, gram negative and anaerobic coverage should be considered.

Prolonged postoperative ileus remains a serious clinical problem and is often difficult to differentiate from early postoperative small bowel obstruction.

Preoperative and postoperative early use of highest level of antibiotics in appreciation of gram positive, gram negative and anaerobic septicemia should be considered. Early usage of central lines, total parenteral nutrition, peritoneal lavage and adequate usage of drains is also equally important during operative procedures to prevent postoperative intra peritoneal collections and minimize the incidence of postoperative ileus.

Treatment modalities for management of postoperative paralytic ileus: current management of prolonged ileus is mainly directed at prevention of the problem by minimizing the precipitating factors because active treatment has largely been unsatisfactory unless an aetiological cause has been identified and addressed. Traditionally, the treatment of postoperative ileus revolved around – delayed oral feeds, nasogastric decompression, intravenous fluid, correction of electrolytes disturbances and observation.

Now a days- multimodal fast tract programmes that include use of minimally invasive surgical techniques, use of epidural anesthesia, early mobilization, early enteral feeding, and the use of prokinetic agents have

been in many studies shown to decrease the length of hospital stay following a variety of abdominal and pelvic surgeries and reduce the postoperative morbidity including the incidence of ileus.^{13,14}

In the absence of clear guidelines for treatment when faced with such a problem, an algorithmic approach at diagnosis and management, which is predominantly conservative and non-operative, yields the best results. Multimodal approach for fast tract surgery holds promising results in the prevention of this difficult problem.

Conclusion: Preoperative predictors significantly determine the development and severity of postoperative paralytic ileus and hence preoperative and intraoperative measures to reduce ileus should be considered, whenever possible.

Every efforts should be made to convert an emergency and acute surgical condition to a semi emergency and subsequently an elective surgical condition so that the dreaded complications of postoperative paralytic ileus can be taken care of and reduced significantly.

However, the incidence of postoperative paralytic ileus in surgical practice in present era has reduced but still remains an important cause of postoperative morbidity.

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References:

1. Medpagetoday. MedPage Today-MEV Healthcom- Management of Postoperative ileus following bowel resection-OVERVIEW-cited on internet 24 July 2015. Available from: <http://www.medpagetoday.com/pdf/MEVH04/pages.cfm?section=02-overview.cfm>
2. Andrews JM, Dent J. Small intestinal motor physiology. I: Sleisenger and Fordtrain's Gastrointestinal and Liver disease. Pathophysiology/Diagnosis/Management. 7th ed, Vol II, Saunders, Philadelphia 2002.

3. Jorgensen H, Wetterslev J, Moiniche S, Dahl J. Epidural local anaesthetics versus opioid-based analgesic regimens on postoperative gastrointestinal paralysis, PONV and pain after abdominal surgery. *Cochrane Database Syst Rev* 2000, CD001893.
4. Vather R, Trivedi S, Bissett I. Defining postoperative ileus: results of a systemic review and global survey. *J. Gastrointestinal Surg.* 2013; 17: p 962-72.
5. Courtney Townsend, R.Daniel Beauchamp, B.Markevers, Kenneth L.. Sabiston text book of surgery ,18thed-vol 1, Saunders- Elsevier 2008; 12:p 252-268
6. Makhanlal Saha, *Bedside Clinics In Surgery* ,Academic Publishers 2004,Sec-vi, p745-746
7. Schwartz S, Brunnicardi F, Billiar T, Dunn D, Hunter J, Pollock R. *Schwartz's principles of surgery.* 10th ed . New York : McGraw-Hill ; 2014 , p1151-1153.
8. Kronberg U, Kiran RP, Soliman MSM, Hammel JP, Galway U, Coffey JC, Fazio VW. A characterization of factors determining postoperative ileus after laparoscopic colectomy enables the generation of a novel predictive score. *Ann . Surg .* 2011; 253: p78-81.
9. Vather R, Bissett IP. Risk factors for the development of prolonged post-operative ileus following elective colorectal surgery. *Int. J. Colorectal dis.* 2013: p1-7.
10. Millan M, Biondo S, Fracalvieri D, Frago R, Golda T, Kreisler E. Risk factors for prolonged postoperative ileus after colorectal cancer surgery . *World J. Surg.* 2012; 36: p179-185.
11. Chapius PH, Les Bokey MS, Keshava A, Rickard MJFX, Stewart P, Young CJ, Dent OF. Risk factors for prolonged ileus after resection of colorectal cancer: An observational study of 2400 consecutive patients. *Ann Surg* 2013; 257: p909-915.
12. Artinyan A, Nunoo-Mensah JW, Balasuramian S, Gauderman J, Essani R, Gonzalez-Ruiz C, Kaiser AM, Beart RW, Jr. Prolonged postoperative ileus –definition, risk factors, and predictors after surgery. *World J. Surg.* 2008; 32 : p1495-1500.
13. Nelson R, Edwards S, Tse .B. Prophylactic nasogastric decompression after abdominal surgery. *Cochrane database Syst Rev* 2005, CD004929.
14. Ochsner A, Gage IM, Culting RA. Treatment of ileus by splanchnic anesthesia. *JAMA* 1928, 90 : p1847-53

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