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SMALL BOWEL OBSTRUCTION WITH INTRA-OPERATIVE SURPRISE

Dr. Sujith M.*, Dr. Ambikavathy M. and Dr. Akshay M. Bhumkar

MS. Surgery, MVJ Medical College and Research Hospital, Dandupalya, NH-4, Kolathur, P.O Hoskote, Bangalore, Karnataka, India.

***Corresponding Author: Dr. Sujith M.**

MS. Surgery, MVJ Medical College and Research Hospital, Dandupalya, NH-4, Kolathur, P.O Hoskote, Bangalore, Karnataka, India.

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INTRODUCTION

Intestinal obstruction is one of the most common surgical emergencies encountered all over the world. It is defined as obstruction in forward propulsion of the contents of the intestine either due to dynamic, adynamic or pseudo-obstruction. It is predisposed by varying underlying anomalies and diseases, which are difficult to define preoperatively. Through intestinal obstruction can be diagnosed easily, the underlying cause except postoperative adhesions and external hernias are difficult to be diagnosed preoperatively. Early diagnosis of obstruction, adequate preoperative resuscitation, skillful operative Management, proper technique during surgery and intensive postoperative treatment carries a grateful result. The diagnosis and management of the patient with intestinal obstruction is one of the most challenging emergencies that a general surgeon can encounter in his practice. Although the mortality due to acute intestinal obstruction is decreasing with better understanding of pathophysiology, improvement in diagnostic techniques, appropriate fluid and electrolyte resuscitation, much potent anti-microbials and surgical management, but still mortality ranges from 3% for simple obstruction to as much as 30% when there is vascular compromise or perforation of the obstructed bowel. This is further influenced by the clinical setting and related co-morbidities.[1] Most of the mortalities occurs in elderly individuals who seek treatment late and who are have associating pre-existing diseases like, diabetes mellitus, COPD.

HISTORICAL REVIEW

An acute intestinal obstruction has been known to mankind since ancient times. Several variance of intestinal obstructions like intussusception, strangulated hernia, were known to the ancient Egyptians. Hippocrates was one the earliest to identify Intestinal obstruction. Proxogorous in 350 BC recorded the earliest operation, by creating an enterocutaneous fistula to relieve obstruction. Apsyrtus in 300 BC introduced bowel puncture to decompress distended bowel. Even in India, Sushruta in the 6th century wrote the oldest known descriptions of intestinal surgery. Ambrosis Pare (1510-1590) was first to recognize obstruction is Pathological. For severe cases he used mercury in water, lead bullets smeared with mercury. Franco in the year 1561 did the first Surgery on strangulated hernia. Amsterdam in 1676 suggested opening of the abdomen to treat intussusception and volvulus. Bonetos in 1679 treated intussusception by surgical intervention La Peyronie in 1723, reported that he excised the devitalized bowel and created an artificial anus and mucous fistula, which was closed later on. The mortality rate has significantly reduced due to Fluid replacement, intestinal decompression and antibiotics, as well as improvements in surgical and anaesthetic techniques i.e. in simple intestinal obstruction. However, the challenge today still remains in recognition and treatment of strangulating intestinal obstruction.

ANATOMY

Small intestine: Small intestine has three parts namely: the duodenum, the jejunum, and the ileum (figure 24.15). The small intestine measures approximately 6 m in length (may vary from 4.6 to 9 meters). The 2 major accessory glands associated with small intestine are liver and pancreas.

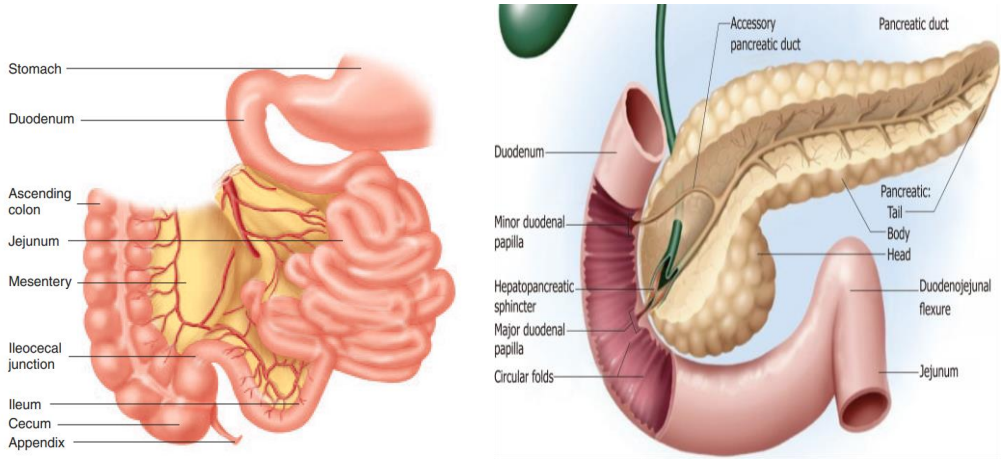

Figure 1: Anatomy.

Duodenum: The Term Duodenum means '12' which is suggestive that duodenum is 12 inches. (about 25 cm in length). The duodenum nearly completes an arc/ concavity as it curves (180 degree) within the abdominal cavity, which accommodates the head and uncinate process of the pancreas. The beginning of duodenum is with a short superior (First) part, where it exits the pylorus of the stomach, and ends in a sharp bend, joining the jejunum. Duodenum is divided into four parts as follows: Superior or First part descending or second part, transverse or third part and ascending or fourth part

Blood supply: The Blood supply is carried to duodenum by branches of the gastroduodenal artery and superior mesenteric artery namely: Superior pancreaticoduodenal artery of gastroduodenal and inferior pancreaticoduodenal artery of superior mesenteric artery.

Veins: Venous drainage ends in splenic, superior mesenteric, and then to portal veins.

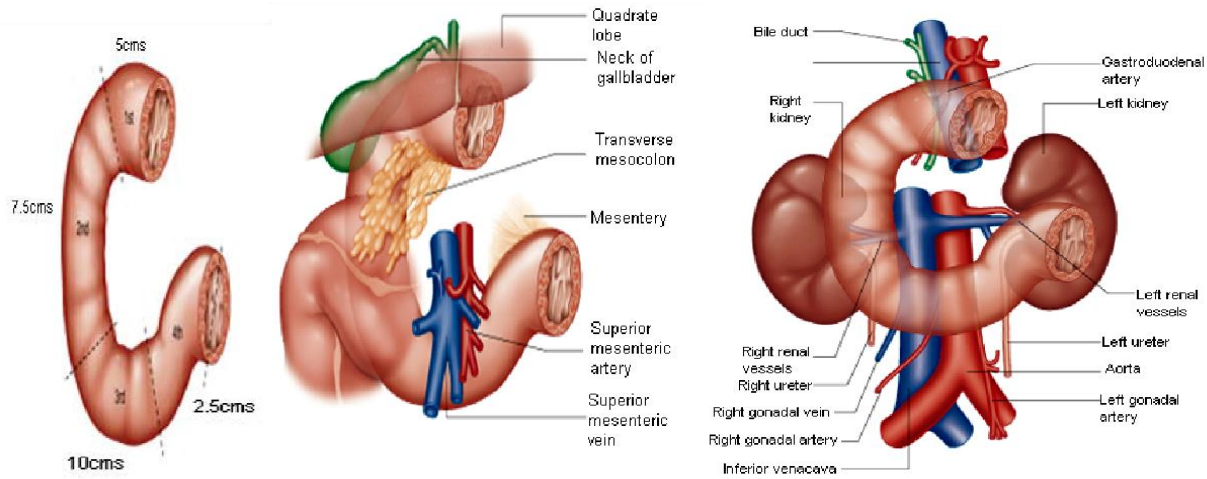

Figure 2: The four parts of the duodenum. B. and C. The relations of the duodenum: anterior surface and posterior surface respectively.

Nerves

Innervations from parasympathetic nervous system namely anterior and posterior vagal trunks which passes through celiac plexuses and innervate duodenum via celiac trunk.

Jejunum and ileum: The jejuno-ileum consists of nearly 60 percent of the GI tract amounting to approximately 6m in length of which the jejunum, constitutes of 2/5th of entire length of the small intestine, which is around 2.5meters in length, whereas the ileum amounts to the remainder of 3/5th measuring about 3.5meters.They occupy the central and lower segment where they are surrounded by the abdominal colon of the abdominal cavity. There is a gradual decrease in diameter as one progresses from jejunum to ileum, jejunum plays a major role in absorption of nutrition compared to ileum. Jejunum and ileum are arranged in a series of coils attached to the posterior abdominal wall by mesentery and anteriorly they are covered by peritoneum except mesenteric borders where they continue over the tissue to cover mesentery. Jejunal and ileal walls are made of mucosa, submucosa, muscularis externa and serosa / adventitia. The jejunum and ileum are distinguished from one another intra operatively by the following features:

JEJUNUM	ILEUM
Wall thicker	Wall thinner
Lumen larger	Lumen smaller
Fat on mesentery	Fat on ileum and mesentery
Promine plicae circulates	Les prominent plicae circulates
single line of arterial arcade	Several lines of arterial arcade
Sparse Peyer's patches	Abundant Peyer's patches

Mucus membrane of lower segment of Ileum show characteristic lymphoid tissue aggregation along the antimesenteric border which are called Peyer's patches, which are visible through walls of ileum

The mesentery: The mesentery , like a complex fan, has a root about 15 cms long , attached to the posterior abdominal wall along a line running diagonally from the left side of the second lumbar vertebral body to the right sacroiliac joint , crossing successively the horizontal part of the duodenum, aorta, inferior venacava, right ureter, and right psoas major, its average breadth from its root to the intestinal border is about 20 cm, but is greater at intermediate levels, its two peritoneal layer contains: the jejunum, ileum. The amount of fat distribution varies alongside jejenum, illeam branches of superior mesenteric vessels, its nerves and lymph nodes

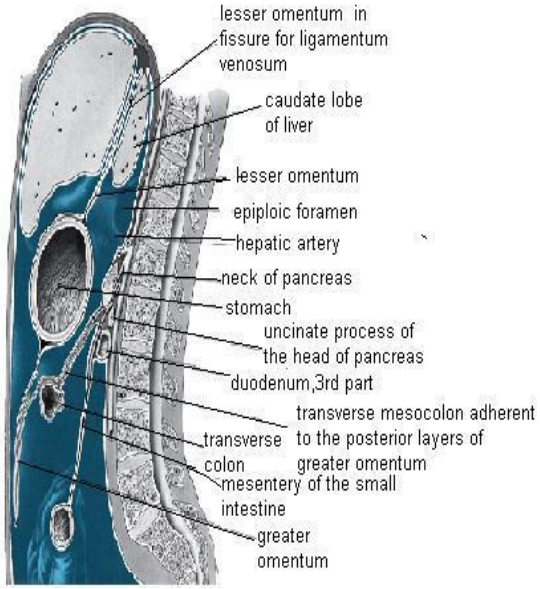

Figure 3: Mesenteries of the intestinal loops.

Blood supply: From superior mesenteric artery, branches of which, reaching the mesenteric border , extend between the serosal and muscular layers, from these, numerous branches traverse the muscle , supplying it and minute vessels pass to glands of villi which arise from an intricate submucosal plexus. The veins follow the arteries.

Nerve supply: These are supplied from the vagus and thoracic splanchnic nerves through the coeliac ganglia and superior mesenteric plexus.

Large intestine

The large intestine arches around the small intestine; it is around 1.5 meter in length, commencing in the right Iliac region, passing upward to touch caudal surface of liver, reaches the left hypochondrium by bending leftwards, descend caudally to left iliac region and extends along posterior wall of pelvis to anus; parts of large intestine are Appendix, Ceacum, colon proper which itself is divided into four parts, ascending colon, transverse colon, descending colon and sigmoid colon; rectum and anal canal. Certain important locations in Large intestine namely, Illeocecal junction, hepatic flexure, splenic flexure and rectosigmoid junction. The chief function is to absorb fluids and solutes.

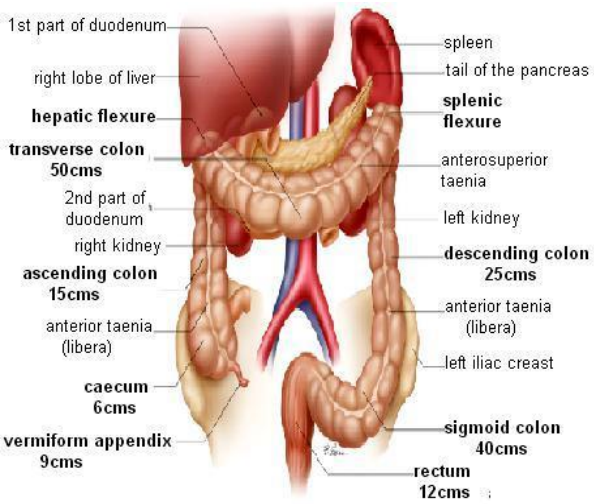

Figure 4: Overview of the abdominal colon and its relations.

Caecum: A large blind pouch which extends caudally from ileocecal junction, its 7cm wide and 6 cm in length, posteriorly resting on Iliac muscle. Posteriorly lies the retrocaecal recess with appendix as its content. Anteriorly its relations are Abdominal wall, Greater omentum and Ileum. Appendix usually is a narrow blind tube arising from the apex of ileocaecal junction with wide variation in the position and a size upto 20cms in length and 10cms in width.

Ileocaecal valve: Its also known as Ileocaecal junction, which separates caecum from colon .The terminal ends of ileum opens on its posteromedial aspects of the caeco-colic junction It is mechanically closed by the distensions of caecum and prevents the reflux of caecal contents into the ileum and regulates the flow of ileal

contents. DiDio and Anderson[52] used the term ileal pylorus, which is anatomically correct, rather than the term ileocecal valve and stated that the ileum opens into a transitional zone between the cecum and the ascending colon, thereby asserting that the name "ileocecal valve" does not have any anatomic meaning. The cadaveric valve is formed by two parallel transverse folds which project within the colon and form a transverse slit of 1-1.5 cm, the folds unite to form frenulum. the protrusion of the small bowel into the colon is formed by the circular muscle of the terminal ileum which is covered by the mucosa. In living subjects, the ileocecal valve has a papillary shape with a conoid ileal projection or intrusion into the cecum. Kumar and Phillips[53] stated that the superior and the inferior ileocecal ligaments are responsible for the competence of the ileocecal valve. The purpose of the ileocecal valve is not definitely known. Bogers and Van Marck[54] wrote in a review in 1993, "Based on the available data from the literature, evidence is accumulating for a sphincteric function."

CASE REPORT

Mr. Jaffrulla Khan, 55year/Male, Patient presented with complaints of pain abdomen since 10 days, initially in periumbilical region which gradually progressed to involve the whole abdomen, moderate to severe grade, colicky type, aggravated after food. History of distension of abdomen since 4 days. Associated with vomiting since 1 day, 4-5 episodes, contains food particles, non bilious, non blood tinged. Past history:

History of CVA 20 years back, right side hemiparesis. Known case of hypertension since 5 years on regular treatment.Chronic smoker since 25 years. No history of previous abdominal surgery**.**

On examination: Patient was conscious, oriented, Temperature- 99 F, Pulse- 100bpm ,Bp- 160/100 mmHg, Spo2- 94%o at room air.

Per abdomen Inspection- abdomen grossly distended, no scars, Palpation- diffuse tenderness, guarding and rigidity present, Percussion- no obliteration of liver dullness. **Auscultation** - bowel sounds absent **Rectal examination- normal**.**Rest of the systemic examination - within normal limits.**

INVESTIGATIONS

Total Bilirubin- 2mg/dl, Direct Bilirubin- 1.4mg/dl, SGOT- 52 IU/dl, SGPT- 27 IU/dl, ALP-662 IU/dl, Total Protein - 5.5 g/Dl, Albumin- 3.2 g/dL, PT- 22.6, INR-1.82, APTT- 55.5. CBC, RFT, Serum Electrolyte normal. **USG abdomen & pelvis: F/S/O small bowel obstruction with moderate ascites.**

Figure 5: Erect x-ray abdomen & pelvis: multiple air fluid levels.

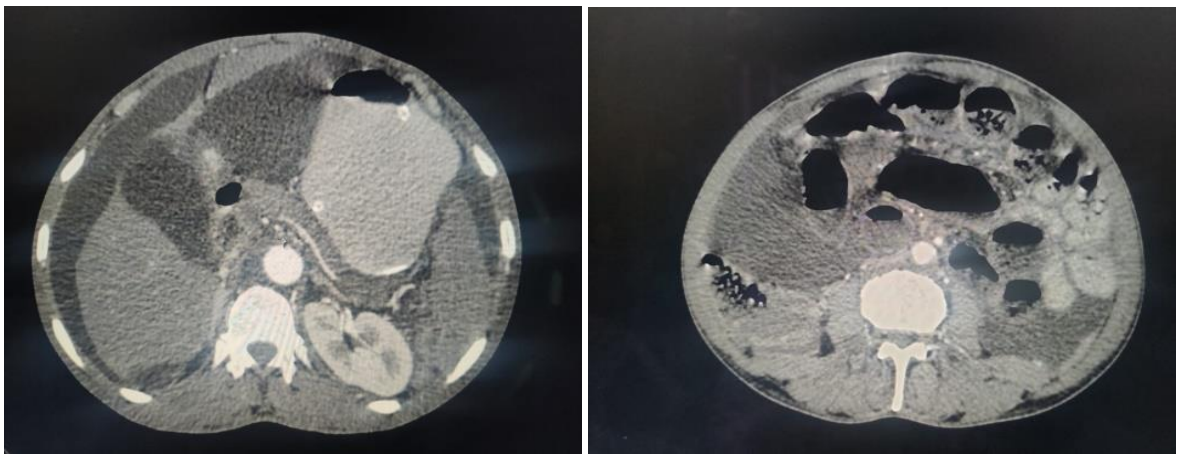

Figure 6: CECT abdomen & pelvis.

Thrombus causing complete occlusion of celiac axis and SMA Over distended gall bladder with thin imperceptible walls mainly in its body and fundic region - to consider for gall bladder perforation. Gross ascites with mild smooth peritoneal thickening-likely perforative peritonitis from their origin till their branching which are reformed by collaterals with faint opacification and small calibered branch vessels distal to post- occlusion segment (likely due to poor collateralization)---F/S/O mesenteric arterial thrombosis. Significant stenosis of IMA and mild to moderate stenosis of right renal artery.

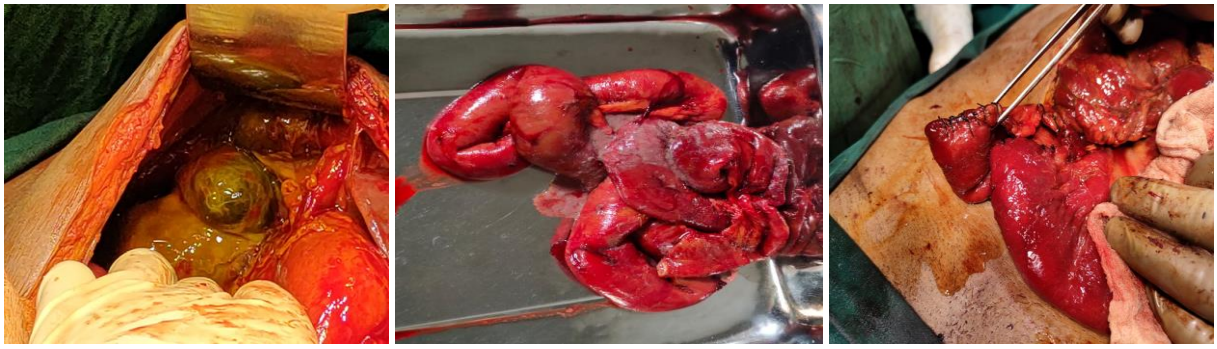

Figure 7: Patient was taken up for emergency laparotomy.

Intra operative findings:((Figure 7) Bilious peritoneal fluid of nearly 2L was noted.Gall bladder- gangrenous with multiple perforations. Bowel was inspected- multiple gangrenous patches noted approximately 100cm away from DJ junction, extending upto 20cm short of IC junction.

Procedure: Cholecystectomy done. Resection and anastomosis of jejunum and ileum done. Thorough wash given. Sub hepatic and pelvic drain placed. Peritoneal fluid for C/S and gangrenous bowel for HPE sent. Post operatively patient was managed with higher antibiotics (meropenem), analgesics, DVT prophylaxis, 4 FFP transfusion. Post operative events: Bilious drain was observed from POD1 with daily output of 200ml which continued till day 12. He underwent ERCP with CBD stenting for biliary leak and made an uneventful **recovery.**

Histopathological Report: Larger and small segment of Small Intestine: (85cm & 26cm): Shows features of mucosal ulceration, congestion and transmural infarction (Gangrenous changes). Mesenteric vessels: No significant pathology. Gallbladder: Acute Gangrenous Cholecystitis

DISCUSSION

Mesentric ischemia: can be classified as acute and chronic ischemia. Usually seen in patients aged above 55yrs, mostly males with H/o smoking, recent cardiac surgeries, trauma, obese, HTN. Acute ischemia- with or without occlusion (venous, arterial – central or peripheral). Most commonly affects SMA, due to thrombus, atherosclerosis, AF, TAO, Polyarteritis nodosa. **In setting AMI, gangrenous cholecystitis has been reported, as cystic artery is a terminal artery with no terminals. However, such a presentation is rare. In our case, patient presented with AMI manifesting as Bowel infarction along with gangrenous cholecystitis, the later was Intra Operative Surprise**. Gold standard investigation of choice- angiography and CECT. Treatment: laparotomy with resection and anastomosis of non- viable bowel, anti-coagulants, smoking cessation. Revascularization of SMA (embolectomy, angioplasty) can be done if patient is fit for the same.

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