ORIGINAL RESEARCH PAPER

General Surgery

KEY WORDS: Perforation peritonitis, Peptic ulcer disease, Gastric perforation, Blunt trauma abdomen, Typhoid perforation, Exploratory laparotomy.

A CLINICAL STUDY & MANAGEMENT OF PERFORATION PERITONITIS"

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ABSTRACT

Peritonitis due to perforation of viscus, either traumatic or non-traumatic is an important cause of morbidity and mortality in an emergency. Remarkably, however, only within the last century has significant progress been made in the successful treatment of the disease. The reduction in mortality from 90% at the turn of the century to the estimated 10-15% also includes support of improved and effective antibiotics along with our understanding of inflammatory response. Since presentation of a case of perforation peritonitis varies from mild dull aching pain to frank guarding and rigidity with associated symptoms, there is also a need to know the spectrum of presentation as well as the most frequent among them. Peritonitis as such has such diverse etiology and thus there is a need to enlist the different etiologies leading to the disease. Aims and Objectives: The purpose of this study was to evaluate the relative incidence of various causes of perforation and also to find the incidence of G.I. perforation in relation to age, group and sex of the patient. Importance has also been given to the clinical presentation, relevant investigations and various modalities of treatment. Materials and methods: This study has been based on the analysis of 50 cases of gastro-intestinal perforation admitted to AIMS, B G Nagara from October 2008 to April 2010. These were the cases which were admitted consecutively and were treated in the Department of General Surgery. Cases were admitted on emergency basis. Results : Out of 50 patients presented to emergency department with features of perforation peritonitis, 24 patients (48%) of them were found to have peptic ulcer perforation. This was followed by appendicular perforation (20%). Tubercular perforation is relatively rare. Mortality rate was found to be 4%, the cause of which was diagnosed as septicaemia. Conclusion: Surgery is the line of management of perforation peritonitis. Early diagnosis with appropriate investigations and treatment with antibiotics, fluid and electrolyte balance and exploratory laparotomy is always advocated for better patient compliance and relatively low mortality.

INTRODUCTION:

Gastro-intestinal perforation is a common emergency encountered in a surgeon's practice and is still having a high morbidity and mortality. Causative factors and site of perforation vary enormously. Perforation of stomach and small intestine is on increase. An increasing proportion of elderly patients in western societies and availability of powerful NSAIDS continue to provide a fertile ground for upper gastro-intestinal tract ulceration and its complications. Perforation is usually seen in 3rd-4th decades, with a male preponderance and the epidemiological trend is not the same worldwide. There is decrease in incidence in the west but in some countries (Hong Kong) it's been on rise. Stress and strain has been mentioned a possible cause. Majority of the perforation of stomach or duodenum are due to complication of peptic ulcers and incidence of this disease has been declining for the past 3 decades with concomitant use of antacid secreting drugs. Also another condition posing problems of management is spontaneous perforation of gastric malignancy. The diagnosis and treatment of perforation peritonitis remains a formidable problem as long as acid peptic disease, typhoid, tuberculosis, appendicular perforation and amoebiasis are still the common causes for perforation. The diagnosis and treatment of the perforation remains a formidable problem; the mortality of which depends on early approach to the hospital, quick diagnosis, and prompt surgical treatment, appropriate and adequate antibiotics. Thorough peritoneal lavage, adequate fluids and electrolyte replacement are the factors which improves the progress. However, there has been a reduction in morbidity and mortality due to better knowledge about the pathology, fluid and electrolyte imbalance and advances in anaesthesia and antibiotic therapy. As Sir Cuthbert Wallace quotes "*It is better to check than being waiting*" is always advantageous to do an early surgery. The study presented here is aimed to analyse the incidence, causative factors, different modes of presentations, management of cases of peritonitis of both traumatic and non traumatic origin. An attempt is made to identify the prognostic factor which determines the mortality and morbidity. Relevant literature about perforation, advances in management and recent trends has been reviewed and presented in this study.

MATERIALS AND METHODS:

This study has been based on the analysis of 50 cases of gastro-intestinal perforation admitted to government medical college srikakulam 2016 to April 2017. These were the cases which were admitted consecutively and were treated in the Department of General Surgery. Cases were admitted on emergency basis. Patients and their attendants' consent were taken for all the cases in the study and ethical clearance was obtained from the committees. Cases were selected in the age group between 15yrs to 65 yrs. Both the sexes were included and cases included perforation of both traumatic as well as non traumatic perforation. Cases were selected on the basis of clinical diagnosis and were confirmed by investigations. In all the cases, monitoring of the vital signs with pre operative correction of fluid and electrolyte imbalance and broad spectrum antibiotics were started. The investigations done in the selected cases were as follows: Blood: routine examination of haemoglobin along with complete haemogram, blood grouping and typing, renal function tests, serum electrolytes, WIDAL (in suspected cases). Urine: includes estimation of urine sugar, albumin and microscopic examination. Radiology/ imaging: plain X-ray chest and abdomen (erect) to detect free gas under the diaphragm. Ultrasound abdomen is done to see the presence of free fluid in the peritoneal cavity and to rule out associated injury to solid viscera (in traumatic cases). Paracentesis: it was done only in selected cases (just for confirmation in cases where X-ray showed no gas under the diaphragm). Surgery: Laparotomy was done in almost all the cases under general anaesthesia (2

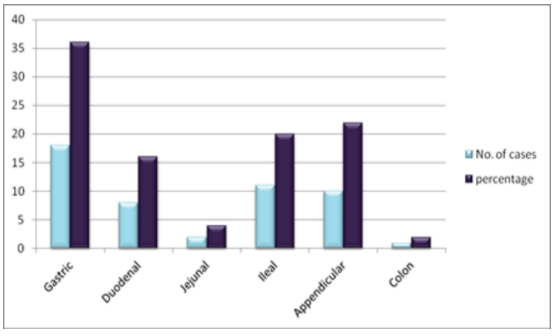
appendicular perforations were done under spinal anaesthesia). Incision was taken depending upon the suspected site of pathology and when not confirmed, a right paramedian or midline incision was taken. Viscera were inspected and site of perforation was identified. Appropriate surgical procedure was performed. In almost all cases of gastric perforation, tissue from the edge of the ulcer was sent for histopathological examination. Peritoneal lavage with saline was carried out and peritoneal cavity was drained using chest tube drain. Post operative patients were put in naso-gastric tube with continuous aspiration, intravenous fluids, and appropriate antibiotics. Pantoprazole/ rabeprazole were given in cases of peptic ulcer perforation. Vital signs were monitored along with intake-output chart and biochemical parameters. Recovery was observed and complications which occurred were noted and treated accordingly. Regular follow-up of the patients was carried out for a month.

RESULTS:

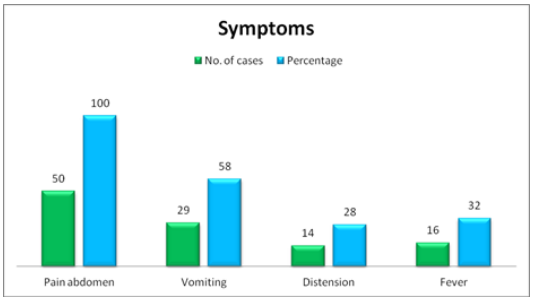
The total of 76 emergency laparotomies was done from October 2008 to April 2010 of which 50 cases of only gastro-intestinal perforation was taken and 36% of cases were found to be due to gastric perforation. Our study revealed the following site of perforation in the gastro-intestinal tract. According to aetiology of the perforation, peptic ulcer perforation was the major causative factor leading to peritonitis. This was followed by appendicular perforation. Tubercular perforation was least common.

Past history: Chronic pain abdominal pain was seen in 22 cases. Previous history of fever in the recent past was found in 7 cases, out of which 3 cases were found to be typhoid, which was followed by pain abdomen. Previous history of drug intake (NSAID's) was found in 13 cases of peptic ulcer perforation. 2patients had previous history of tuberculosis that had been treated with anti-tuberculosis treatment. Habits: 27 patients were chronic smokers and 16 of them were also alcoholics. 10 patients were chronic alcoholics. General condition: Dehydration was seen in 22 cases. Tachycardia was seen in 34 cases and shock in 4 cases. Signs in cases of gastro-intestinal perforation: Tenderness along with guarding/ rigidity was the classical signs noted in patients with perforation peritonitis. Apart from these signs, obliteration of liver dullness and absent bowel sounds was also noted.

Graph 1: Site of perforation



Graph 2: Symptoms



Graph 3: Symptoms based on aetiology

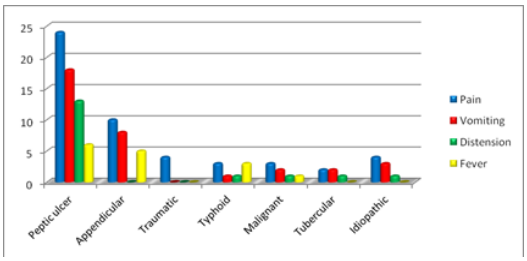
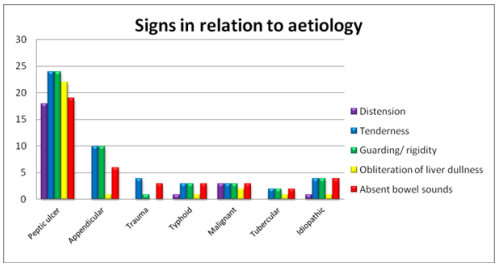


Table 1: Signs in cases of gastro-intestinal perforation

Abdominal signs	No. Of cases	Percentage
Distension	23	46%
Tenderness	50	100%
Guarding/ rigidity	47	94%
Obliteration of liver dullness	28	56%
Absent bowel sounds	40	80%

Distension was seen in 23 (46%) cases. Guarding/ rigidity in 47 (94%) cases and tenderness were elicited in all the cases. Bowel sounds were absent in 40 (80%) cases. Obliteration of liver dullness was noted in 28 (56%) cases.

Graph 4: Signs in relation to aetiology

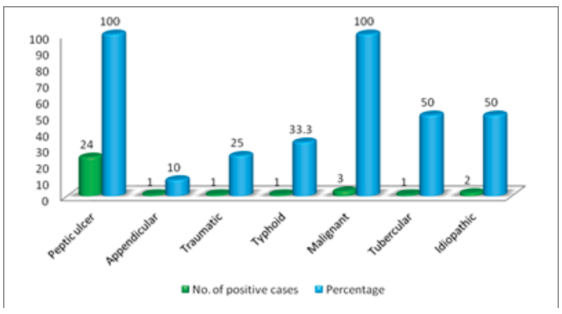


Pneumoperitoneum in relation to aetiology

INVESTIGATIONS RADIOLOGY:

X-ray chest and erect x-ray abdomen was taken immediately after the clinical diagnosis of the perforation was made in all the cases to look for free gas under the diaphragm. This was found in 33cases (66%) in our study. Few cases also showed dilated bowel loops and presence of free fluid.

Graph 5: Pneumoperitoneum in relation to aetiology



Ultrasonography of the abdomen: It was relatively done in all the patients in whom perforation was suspected (including traumatic cases to rule out any associated injuries to the solid viscera). Evidence of perforation was indirect and presence of free fluid with echogenicity was suggestive of perforation. WIDAL test: It was positive in 3 out of 11 cases of ileal perforation.

Abdominal paracentesis: It was done in only about 12 out of 50 cases; indications being for the diagnosis in those patients whose clinical presentation were not suggestive of perforation and with no clinical signs of peritonitis. The aspirated fluid was also sent for cytological, biochemical and microbiology laboratories for further evaluation.

TREATMENT:
General: Ryle's tube aspiration, intravenous fluids with 5% dextrose, dextrose saline, haemacel, appropriate antibiotics. All the cases were subjected to laparotomy.

Anaesthesia: General anaesthesia was given for all the patients after endotracheal intubation except for 2 cases where spinal anaesthesia was given (2 cases of appendicular perforation).

In 36 non traumatic perforation cases, appropriate pre-operative diagnosis was made. In case of malignant gastric perforation, a preoperative diagnosis of peptic ulcer perforation was made. One case of ileal perforation was diagnosed as peptic ulcer perforation pre-operatively. The true nature of the diagnosis was confirmed by laparotomy and preoperative diagnosis accuracy was about 90% with regard to the cause of perforation. 2 cases of jejunal perforation were noted, both of them being traumatic. Graham's technique of simple closure of the perforation was done followed by omental pedicle patch in almost all the patients of peptic ulcer perforation. Cellon Jones technique of closure of perforation with a free omental patch was done in few cases. Tissue for biopsy was taken in 6 cases of gastric perforation. 1 case of gastric perforation was because of malignancy and for that gastric resection followed by gastro-jejunostomy was done. All 3 cases of typhoid ulcer perforation were found to be in the ileum and were treated by simple closure in 2 layers after trimming the edges. Both the cases of tubercular perforation were in the ileum. In one patient, resection of the diseased segment followed by end-to-end anastomosis was performed. Anti-tubercular treatment was advised for 18 months. All the patients of appendicular perforation were treated with appendicectomy. Out of 4 traumatic perforation cases, 2 cases had jejunal perforation and one had ileal perforation all of which was repaired in 2 layers. One case had perforation of anterior wall of stomach and was treated by Graham's technique. Before closing the abdomen, a through wash was given with saline and drains were kept in either one or both the flanks. Post- operatively all the vitals were monitored and necessary investigations done. Patients were treated with adequate fluids, antibiotics and blood transfusion in selected cases.

POST OPERATIVE COMPLICATIONS:
Post operatively 24 patients (48%) had complications.

Table 2: Complications

Complications	No. Of cases	Percentage
Wound sepsis	12	24%
Chest infection	5	10%
Wound sepsis & Chest infection	3	6%
Residual abscess	3	6%
Burst abdomen	1	2%

Most of the cases had wound sepsis as the post operative complication followed by chest infection which was seen in 5 cases. 3 cases had both wound sepsis and chest infection and also residual abscess. Burst abdomen was seen in 1 case and the same patient developed incisional hernia after 8 months of surgery.

Table 3: Complication in relation to aetiology

Complications	p.ulcer	appendicular	trauma	typhoid	malignent	TB	Idiopathic
Wound sepsis	7	2	2	0	0	0	1
Chest infection	5	0	0	0	0	0	0
Wound sepsis &Chest infection	3	0	0	0	0	0	0
Residual abs.	0	0	0	0	0	1	2
Burst abdomen	0	0	1	0	0	0	0

Mortality:
2 of 50 cases died post operatively in which one had Malignant Gastric perforation (on 8th post operative day) and the other had Malignant Descending colon perforation (on 5th post operative day). Cause of death in both the case was diagnosed to be from septicaemia.

DISCUSSION
Gastrointestinal perforation constitutes 20 % of total emergency operations in our hospital. In our institution, appendicitis ranked first in the abdominal emergencies followed by perforation and obstruction in that order. This pattern is observed globally[1, 2.In] our study of 50 cases, the incidence of peptic ulcer perforation was highest constituting 48 %. This was followed by appendicular (20%), traumatic (8%) and typhoid (6%) perforation. Tubercular perforation (4%) and malignant perforation (6%) constituted the rest. N.D. Swadia[3] and colleagues (1979) found an incidence of 59.12% of peptic ulcer perforation, 17% typhoid, 15.65% appendicular and 6.38% traumatic perforation in their analysis of 658 cases. In our study, the incidence of peptic ulcer perforation and appendicular perforation correlates with the study but variation was seen in incidence of typhoid perforation. The incidence of typhoid Perforation has reduced mainly as a result of availability of highly effective antibiotics. The increased incidence of traumatic perforation in our studies was mainly due to increasing road-traffic accidents and assaults.

In our study, the commonest site of perforation is anterior wall of stomach (pylorus) followed by ileum, appendix, duodenum and jejunum but M C Dandapat[4] (1991) and D C M Rao[5] (1984) found that for gastrointestinal perforation the commonest site is duodenum, followed by ileum, stomach and appendix.

Age incidence:
The maximum incidence of perforation irrespective of pathology was seen between 40-49 years. Other studies observed an age trend between 30-39 years (M C Dandapat et al[4] 1991). S N Mathur[5] (1991), D C M Rao[6] (1984) had reported similar incidences.As peptic ulcer is more common in younger age group (3rd – 4th decade) and as it is the cause of perforation in 48% of our cases, the incidence in 4th decade is understandable. S N Mathur[8] (1995), W T Siu et al[7] (1987) have reported similar incidences. Appendicular perforation was seen in younger age group in our study, same as the incidence which was observed by Dandapat[4] (1991). Malignant perforation was noted in older age group (Schwartz et al[9]). Traumatic perforation was more common in 4th decade. Similar incidence has been reported by Jen Feng Fang et al[10] (1999) and J P Evans[11] (1973).

Sex Incidence:
The ratio of men to women with all types of perforation irrespective of pathological perforation was 5.25: 1. M.C. Dandapat[14] reported a sex incidence of 8.4:1.In peptic ulcer perforation the sex incidence showed remarkable predominance in the ratio of 5:1. Peptic ulcer perforation is predominantly seen in male and it is seen in our study. Similar observation was seen by Illingworth et al[12] (1968) & W T Siu et al[8] (1997).

Clinical Features:
Pain Abdomen, Vomiting, Distension and fever were the predominant symptoms in our study. Pain abdomen was seen in all cases and similar finding has been reported by Kachroo[13] (1984) and J C Baid[14] (1988). In peptic ulcer perforation, most of our patients gave history of pain in the epigastric region, it has been reported by S N Mathur[15] (1991). History of fever in the recent past followed by pain abdomen was a diagnostic tool for typhoid perforation clinically. S K Nair[23] (1981) and M A Noorani[16] (1997) have observed similar history. Fever was also seen in few cases of appendicitis next to pain which was also found in a study conducted by Sir. Zachari Cope[17] (1957).Non steroidal anti-inflammatory drugs are known to precipitate peptic ulcer disease and even give

rise to complications like perforation, bleeding etc; Mechanism of action being mediated through prostaglandin synthesis blockade. 13 of 24 cases of peptic ulcer perforation revealed the history of NSAIDS injection. W T Siu[8](1997) found 6 of 33 patients revealed the same.Dehydration was the common cause after gastric perforation and was most consistent physical sign in our patients occurring in about 44% of cases; a feature also observed by S K Nair[23](1981). Dehydration occurs mainly as a result of accumulation of fluid in the peritoneal cavity, intestine and due to vomiting apart from other causes.Tachycardia was commonly seen in cases who presented with intestinal and appendicular perforation (due to shrinkage of circulation fluid volume). In our study, tachycardia was noted in 68% cases. J C Baid[4] noted it in 77% of cases in his study. On examination of abdomen, tenderness was recorded in all the cases, distension in 23 cases, guarding/ rigidity in 47cases, obliteration of liver dullness in 28 cases, absent bowel sounds in 40 cases. Distension was not found in majority of appendicular perforation as there is only little spillage and localisation of peritonitis. In most of the study conducted worldwide, tenderness was present in all the cases of gastro-intestinal perforation. In a study conducted by J C Baid and T C Jain[18] (1988)- 54 cases found distension in 46 cases, guarding/ rigidity in 54 cases, obliteration of liver dullness in 28 cases and absent bowel sounds in 29 cases. The study correlates almost with the above mentioned study with regard to signs of perforation.

Investigations:

Even though presence of gas under the diaphragm is a hallmark of hollow viscus perforation, absence of this does not exclude the possibility of perforation. This sign is visualised only in about 75% of perforation cases. In our study, we found it in 66% of cases.N William and N W Everson[21] (1997) have quotes "in 60-70% of cases the free gas under can be detected". M C Dandapat and collegues[14] (1991) notices gas under the diaphragm in 72.35%. Our study correlates well with the above mentioned study. In only 1 of 10 cases of appendicular perforation, gas under the diaphragm was noted. This may be due to confinement of the perforation as well as absent air in the lumen. Ultrasound abdomen is readily available, non-invasive, easily repeatable investigation to find out the free fluid in the peritoneum due to gastro-intestinal perforation and more importantly in the diagnosis of injury to the solid organs in the traumatic cases associated with hollow viscus perforation. M D Tripathi and collegues[19] (1991) found the result quite decisive and Heinz Neugebauer[20] (1999) in the study of 70 cases found peritoneal free fluid in all the cases. In our study, we found free fluid in almost all the cases in which we did ultrasound. This was confirmed by laparotomy. Abdominal paracentesis was done in 12 cases where X-ray showed no free air and in traumatic cases. S P S Rao et al[22] (1997) obtained positive results in 96% of cases of gastro-intestinal perforation. So, paracentesis should carry out more deligently in all cases of perforation and not only it will show the peristalisis but also may help to detect site of perforation and associated visceral injuries in cases of trauma. WIDAL test was positive in 3 cases in our study. S K Nair et al[23] (1981) demonstrate positive test in 72.5%. M K Chauhan and S K Pandey[25] (1982) in 70% and S Vaidyanathan et al[24] (1996) in 73.3% of cases

Treatment:

Out of 24 peptic ulcer perforations, cases of 16 gastric and 8 cases of duodenal perforation, none of the cases were taken for definitive surgery. The decision was based upon the operative finding of contamination of the peritoneal cavity. Almost all of the patients presented after 8-10hrs, frank peritonitis was expected and thus definitive surgery was not performed in presence of gross contamination. Thus simple closure of the perforation was performed with omental patch. Worldwide literature is in agreement with the same. Malignant gastric perforation was managed by partial gastrectomy followed by gastro-jejunostomy. M C Dandapat[4] (1991) in his study did the same. Malignant colonic perforation was managed by Hartman's procedure (permanent colostomy) after closure of perforation. Ileal growth perforation was managed by resection and anastomosis. For typhoid perforation, after trimming the edges, simple closure of the perforation was done in 2 cases. 1 case had multiple perforations and thus resection and anastomosis was done. S Vaidyanathan[24] (1986) and M A Noorani et al[16] (1997) have reported the operation of choice as simple closure of perforation in 2 layers.For all the cases of appendicular perforation, appendicectomy was done and most of the literatures suggest the same.

Post operative complications:

48% patients developed post operative complications in our study where wound sepsis was the commonest (24%). This is may be due to the fact that contamination of surgical incision occurs and also patients being anaemic or malnourished. M C Dandapat[4] (1991) reported wound sepsis in 13.5% of gastrointestinal perforation. Most of the appendicular perforation did not have much complication. This is a result of less contamination and younger age patients who can withstand surgery. Many patients had chest infection as a complication (10%). This may be due to prolonged immobilisation and associated COPD in old patients. One patient of traumatic perforation had burst abdomen which was operated and treated. 8 months later, same patient presented with incisional hernia and underwent mesh repair.

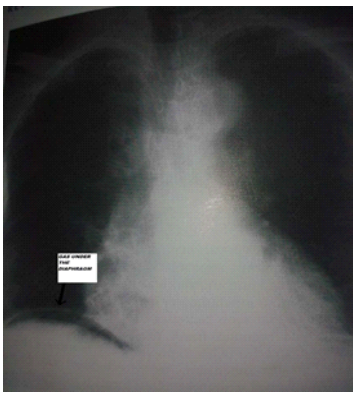
MORTALITY:

Overall mortality in our study was 4%, both of which were malignant perforations (gastric malignancy and colonic malignancy). The cause of death was diagnosed as septicaemia. Worldwide literature shows a decrease in mortality of gastro-intestinal perforation. This ranged from 25% in 1940 as reported by DeBakey[26] to 95% as reported by Hastings[79] (1961). This decrease in mortality may be attributed to the use of appropriate antibiotics, adequate resuscitation and advanced surgical techniques.Recent studies suggest a mortality rate of less than 5% (George L Jordan et al[26] and R A D Booth[28]). Our overall mortality rate of 4% correlates well with other studies

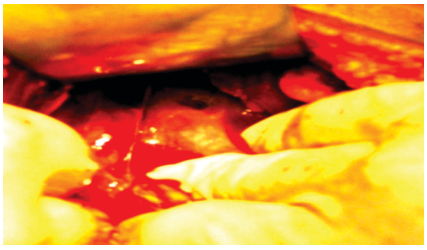
CONCLUSION:

As majority of the perforation was due to acid peptic disease, appropriate treatment of ulcer disease may reduce this dreaded complication. This has been achieved with the concomitant use of proton-pump inhibitors and anti H-pylori treatment. Early recognition and treatment of appendicitis will further reduce the incidence. Surgery is the main modality of treatment in case of perforation peritonitis and is advised after adequate resuscitation. This results in low mortality. However, further exclusive studies are required to confirm the results.

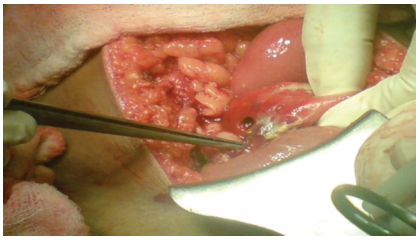
GAS UNDER DIAPHRAGM SUGGESTIVE OF HOLLOW VISCUS PERFORATION



PERFORATION IN THE ANTERIOR WALL OF STOMACH

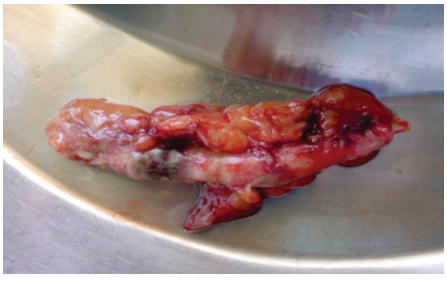


TYPHOID ILEAL PERFORATION

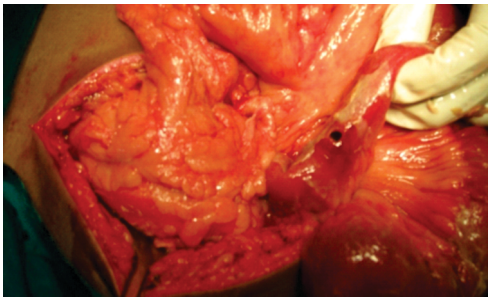


TRAUMATIC PERFORATION OF STOMACH

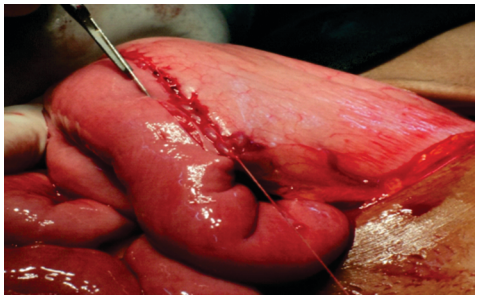
PERFORATED APPENDICITIS



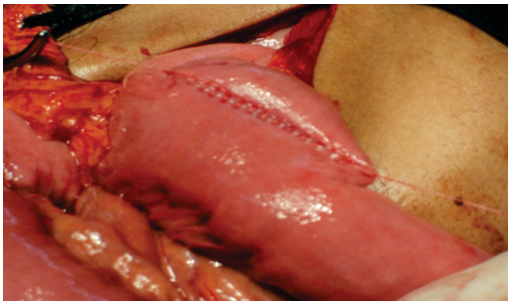
ILEAL PERFORATION IN A TYPHOID PATIENT



GASTRO-JEJUNOSTOMY FOLLOWING MALIGNANT GASTRIC PERFORATION



JEJUNO-JEJUNOSTOMY FOLLOWING MALIGNANT GASTRIC PERFORATION



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