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RESEARCH ARTICLE

EVALUATION, MANAGEMENT AND OUTCOME OF GASTROINTESTINALPERFORATIONS

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Abstract

Background: GIT perforation in an emergency is the third most frequent reason for explorative laparotomy.The occurrence of perforated peptic ulcers has decreased with thedevelopment of proton pump inhibitors. The methods for identifying and treating stomach and colon-rectal perforations have significantly changed with the development of laparoscopy and endoscopy

Methods: All patients admitted and treated with perforation secondary to Hollow viscous perforation in surgical wards admitted during the period of JAN 2020 to JULY 2022 at Maharaja s institute of medical sciences, Vizianagaram Patients with Hollow viscus perforation admitted will be evaluated and the diagnosis will be made with history, clinical features and X-Ray Abdomen erect posture to support the diagnosis. Each case will be studied as per the proforma developed specifically for this study. Follow-up assessments will be done at first and third month during the postoperative period.

Results: All the 30 cases weremanaged surgically with emergency laparotomy under General Anaesthesia.Out of 30 cases, 13 were appendicular perforations, 14 were acid pepticperforations in gastroduodenal region with single case of malignant gastricperforation, 1 idiopathic colonic perforation and 1 typhoid ileal perforation werenoted.

Conclusion: Most common age of presentation is 3rd and 5th decade with male preponderance.Gastroduodenal perforation was the commonest cause of gastrointestinalPerforation followed by appendicular perforation. Peptic ulcer disease is most common etiology of GI perforation followed by appendicularperforation.

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Introduction:-

Acute abdomen is the cause of 40% of admissions for surgical emergencies. The most frequent acute abdominal emergencies are caused by perforations in the digestive system. The surgeon faces a serious challenge when making a diagnosis because of the different atypical presentations that resemble other abdominal illnesses.The typical intense acute stomach pain and lack of other symptoms inhospitalized patients with unrelated illnesses are two extremes of the clinicalpresentation of gastro intestinal perforations. To lower the significant morbidityand mortality associated with late-stage presentation, prompt identification andtreatment is crucial for these illnesses. A complete grasp of the anatomy,microbiology, pathophysiology, and therapy, including resuscitation, antibiotics,source control, and physiologic support, are essential for successful treatment..

Aim and objectives:-

The study's objective is to assess

- Causes of gastro intestinal perforations
- The indications
- Clinical indicators
- The examinations
- Various methods for treating gastrointestinal perforation

Material and Methods:-

Sourcesofdata:

All patients admitted and treated with perforation secondary to Hollow viscous perforation in surgical wards admitted during the period of JAN 2020 to JULY 2022 at Maharaja s institute of medical sciences, Vizianagaram.

Methods:-

Patients with Hollow viscus perforation admitted were evaluated and the diagnosis made with history, clinical features and X-RayAbdomen erect posture to support the diagnosis. Every was case studiedas per the proforma developed specifically for this study. Follow-upassessments was done at first and third month during the postoperativeperiod.

Gastric ulcer perforation:

One malignant gastric ulcer perforation was found at the prepyloric region, and there were two benign gastric ulcer perforations at the lesser curvature. Due to delayed presentation (later than 24 hours).All stomach ulcers were biopsied. Two benign-appearing ulcers were treated by simple closure with vicryl and omental patch repair. Distal Gastrectomy and Roux-en-Y Anastomosis were used to treat one case of ulcer with a malignant appearance in the prepyloric region. There were no difficulties following the procedure. H2 blockers orproton pump inhibitors were prescribed to the patients.

Duodenal ulcer perforation:

There were 12 perforations of duodenal ulcers. Each perforation of a duodenal ulcer was spontaneous. These perforations were sealed using the Roscoe Graham procedure, which involved grafting a pedicle to the omental region to close the holes.There was one instance of a posterior duodenal ulcer perforation, whichshowed up as a collection along the transverse mesocolon and hepatic flexureof the colon. One case of duodenal perforation with delayed presentationwas managed with adequate resuscitation and omental graft repair, expired on postoperative day 9 with respiratory failure.One duodenal perforation developed burst abdomen on postoperative day 8.Risk factors like obesity, respiratory compromise with hypoproteinemia andmild anemia was addressed appropriately with re-exploration of abdomen todrain intra-abdominal abscess. The case was adequately managed withantibiotics and discharged on POD 15.

Ileal perforation:
Typhoid fever history was found in one case of ileal perforation, and this was verified by the Widal test. Vicryl was used to close the perforation in twolayers, interrupted, in a plane perpendicular to the lumen and perforation axis.

Appendicular perforation:
In all 13 cases perforations were found at the tip. So, appendectomy was done along with burying of the base.
Sigmoid perforation:
Single case of sigmoid perforation managed with resection of damaged bowel and colostomy. Postoperative period was uneventful.

Post operative management:
Ryle's tube was aspirated regularly till removalIVfluids –Dextrose,-Dextrose with normal saline.-Ringer lactate-Normal salineAntibiotics used wereCefaperazone, Metronidazole, Gentamicin. NPO followed by liquid diet, semisolid and solid diet at case appropriatetiming.

Inclusion criteria
- Cases of acute perforation due to peptic ulcer disease
- Cases of perforation of small bowel due to disease
- Cases of appendicular perforation
- Perforation of caecum and colon

Exclusion criteria
- cases of esophageal perforation/rupture
- cases of perforations of hepatobiliary system
- cases of iatrogenic perforation during laparotomy, and gynecologicalperforations
- cases of delayed presentation with shock and septicemia who's generalcondition did not warrant any operation management even after allresuscitative measures
- cases of traumatic perforation both blunt and penetrating types

Results:-
This study was done on the basis of data obtained from 30 cases(N=30).Duodenal perforations constitute 40% of the cases while appendicularperforations constitute 43.3% of the study sample. Gastric perforationconstituted 10% while sigmoid and ileal perforation constituted 3.3%of cases.Sixty seven percent of the sample were males while 33% of the sample were females.Majority of the patientswere manual laborers by occupation.Pain abdomen is the chief presenting complaint in all the 30 cases withpredominance at varying sites. Duration of pain in the abdomen ranged from 1to 4 days. Radiation of pain to Right iliac fossa noted in 8 cases.53.3% of patients complained of abdominal distension while 80% of thepatients complained of vomiting. 50% of the patients elicited the history offever in course of disease. Past history of typhoid fever was elicited in thecase of ileal perforation.Past surgical history of appendectomy was elicited by two cases of duodenalperforation while hernioplasty history was reported by 4 patients.Eight patients were receiving therapy for hypertension, while four patientswere receiving treatment for diabetes. 10 patients with duodenal perforationand two patients with gastric perforation has taken treatment for peptic ulcerdisease while 5 patients with duodenal perforation elicited history of non-steroidalanti-inflammatory drug usage. Pallor was noted in 14 patients. Signsofdehydrationwerenotedin18patients.15 patients hadhigh temperature.Bilateral basal consolidation of lungs marked by crepitations were notedin6cases while bilateral diffuse wheeze was noted in 4 cases.Gas under diaphragm was noted in 17 cases while appendicular perforationwas diagnosed in 13 patients with USG. Thirty-three percent of the cases had serum albuminbetween2.5to3.5.Renal function tests and Serum electrolyte estimation were done to the cases.Allthe30caseswemanaged surgically with emergency laparotomy under General Anesthesia.Out of 30 cases, 13 were appendicular perforations, 14 were acid pepticperforations in gastroduodenal region with single case of malignant gastricperforation, 1idiopathic colonic perforation and 1 typhoid ileal perforation wasnoted.All of the cases were operated on the same day of presentationMost of the cases had a toxic fluid output of around 500 to 2000 ml.

Complications:
Burst abdomenoccurred single case, reexploration was done to drain intra-abdominal abscess and tension suturing was done.Wound infectionwas identified in Six cases. Culture and sensitivity tests were conducted ineach instance, and two cases required secondary suturing.A Single case of duodenal perforation expired on postoperative day 9with respiratory failure (table-1).

Table 1:- Operative Procedure – Morbidity And Mortality.

Site	Operative Procedure	Cases No. of	Morbidity	Mortality
Duodenum	SC with OP	12	2 wound infection 1 burst abdomen	1
Stomach	Distal gastrectomy with Roux- en- Y Anastomosis	1	1 wound infection	-
Closurein2layers	2	-	-	
Ileum	Closurein2layers	1	-	-
Appendix	Appendectomy	13	3 wound infection	-
Colostomy	1	-	-	

Discussion:-

Sahil Singla et al, in their study conducted at tertiary care hospitalat Rohtak with a sample of 100 perforation peritonitis cases, found 26% of thesample belongs to age group 21-30 yrs. Male to female ratio was 8:1 in theirstudy with Mean age of 31 years (range from 13 to 85 years) [1].Campbell Francis et al, study done at tertiary hospital, SouthNigeria observed in 104 perforation cases induced peritonitis, that it wascommon in age group of 21-30 with mean age of 35.4years. Age range was 2-87years [2]. This is similar to other studies in tropical countries and in sharpcontrast to that obtained in western countries where the disease is commonerin older age groups. The disease is significantly more common in males. The male to female ratio was 5:1.Mean age of sample in the present study was 38.43 with range of 12 to 62 yrs. Incidence ofperitonitis due to hollow viscus perforation in our study is low in extremities ofages i.e., 10% in <19yrs and 7% in elderly population with age >60yrs. 23% ofsample belongs to age group of 50-59yrs while the other 23% of the samplebelongs to age group of 30-39yrs. Male to female ratio is 2:1 in our study.

The present study was in accordance with studies done by Sahil Singla et al, Campbell Francis et al, male preponderance and mean age of presentation [1,2]. But the common age group of presentation was different in our study, with 30-39yrs and 50-59yrs being mostly inflicted, which was in contradiction to the above mentioned studies

WithSingla et al.studyall of the 100 patients had recent stomachpain. Vomiting (64%), stomach bloating (38%), and fever (22%) wereadditional symptoms. Every patient in the current investigation had abdominalsoreness as far as physical symptoms are concerned. In 82% of cases, rigidityand guarding were seen. Tachycardia (68%), shock (14%), and absence of bowel sounds (93%), among others, were also noted[1].

Francis et al reported the common presenting features werefever 91.3%, abdominal pain 97.8%, abdominal distension 94.5% andguarding 91.3%. Generalized peritonitis was present in 95.6%. constipationwas other symptom reported by patients observed to be around 66.3% in thestudy [2].

In our study, Duodenal perforations constitute 40% of the cases while appendicular perforations constitute 43.3% of the study sample. Gastric perforation constitute 10% while sigmoid and ileal perforation constitute 3.3% each of the study sample. All the cases noted to have single perforation

In study done by Singla et al, the most common site of perforation came out to be gastroduodenal (43 cases) followed by terminal ileum (upto 30 cm proximalto ileocecal junction) which was seen in 30 cases (30%). Amonggastroduodenal perforations, more common site being pylorus part of stomach(28 cases) followed by 1st part of duodenum (15 cases). Other sites wereappendix (10 cases), jejunum (5 cases), colon (7 cases) and rectum (5 cases).According to the study done by Francis et al, the most common site ofperforation was Ileum (28.30%), followed by appendix (27.4%), duodenum(17%) jejunum (12.3%) stomach (8.5%) and the colon was the least(7%).Ratio of proximal (stomach to ileum) to distal (appendix and colon) was2:1. About 1 in 5 had multiple perforations (table-2).

Table 2:- Site of perforation in various studies.

Site of perforation	Our study	Francis et al	Singla et al
Gastroduodenal	50%	25.5%	43%
jejunal	0	12.3%	5%
Ileal	3.3%	28.3%	30%
Appendicular	43.3%	27.4%	10%
Colorectal	3.3%	7%	12%
total	30 cases	104 cases	100 cases

Out of 30 cases in our study, 13 were appendicular perforations, 14 were acid peptic perforations in gastroduodenal region with single case of malignant gastric perforation, 1 idiopathic colonic perforation and 1 typhoid ileal perforation were noted. Traumatic and iatrogenic perforations were excluded from the study.
Ten patients with duodenal perforation and two patients with gastric perforation has taken treatment for peptic ulcer disease while 5 patients with duodenal perforation elicited history of non-steroidalanti-inflammatory drug usage.
In developing world, patients tend to be young male smokers while in developed countries; patients tend to be elderly with multiple comorbidities and associated use of non-steroidal anti-inflammatory drugs (NSAIDs) or steroids. NSAIDs, Helicobacter pylori (H. pylori), physiological stress, smoking, corticosteroids and previous history of PUD are risks factors for PPU. Tobaccois thought to inhibit pancreatic bicarbonate secretion, leading to increased acidity in duodenum. Alcohol consumption is known to damage gastric mucosa and stimulate gastrin secretion. ZollingerEllisonSyndrome is caused by a gastrinsecreting tumor of the pancreas that stimulates the parietal cells in stomach resulting in gastrointestinal mucosal ulceration. Over 90%of patients with ZES develop peptic ulcers and typically these ulcers arerefractory to proton pump inhibitor therapy. ZES should be suspected inpatients with multiple or refractory peptic ulcers, jejunal ulcers, family history ofPeptic Ulcer Disease and associated diarrhea. All patients with ZES should be screened forMultiple Endocrine Neoplasia 1 (MEN1) syndrome. In a study byAnjaneya .T et al at bangalore Duodenal ulcer perforation topped their list they found a high incidence in spite of introduction of relatively powerful H_2 receptor blockers and proton pump inhibitors[7].

In the study done by Francis et al, commonest cause ofperforation was perforated appendix 29 (31.5%), perforated peptic ulcerdisease 21(22.8%), traumatic perforation 16 (17.4%) and typhoid perforation12 (13%). Iatrogenic perforation 7 accounted for (7.6%) and malignantperforation (three colon and one stomach) was 4(4.4%). A patient hadperforation due to tuberculosis while in two others the cause could not beidentified. In the study done by Singla et al, the most common etiology ofperforation and peritonitis was peptic ulcer disease (41 cases). Second mostcommon etiology was enteric fever (15 cases) followed by tuberculosis (13cases), appendicular perforations (10 cases), malignancy (2 cases) and blunttrauma (9 cases)[1].

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Perforated appendix (31.5%) was the commonestcause of gastro intestinal perforation in the present study. Appendectomy was done for perforated appendix.Poverty, ignorance and delayed presentation are important factors resulting in these patients presenting with complicated disease as they initially self-medicated andwere treated by traditional healers before seeking help in hospitals. Thesepatients had appendectomy and copious peritoneal lavage except for two whohad limited right hemicolectomy because of an unhealthy cecum. In a study by Nimmagadda N

et al they opined that percutaneous drainage was often required in patients who underwent immediate surgical intervention for appendicular perforation[6]. The present study concurred with the placement of percutaneous drains at the time of surgery.Fewer cases of typhoid enteric perforation (13%) were observed in the present study. This may be attributed to more availability of better potable water,better hygiene and proper disposal of fecal materials since transmission ofsalmonella is mostly faeco-oral. Primary repair is most common procedure in these cases.

Malignant colorectal perforations are a rare cause ofperforation peritonitis in developing countries. It accounted for only 3.3% inthis present study. This is a sharp contrast to that seen in developed countries weremalignancy is a major cause accounting for 15-20% of GIP. Treatmentchoices depend on the surgeon's experience, the patient's overall health, andthe severity of the peritonitis. It has a significant morbidity and fatality rate.Staged procedures give the best outcome. Exteriorizing colostomy was donefor colonic perforation.

Most of the cases had a toxic fluid output of around 500 to 2000 ml in the present study. The character of toxic fluid was purulent in 13 cases, bilious in 16 casesand feculent in one caseE. coli was the most prevalent bacterium found in peritoneal fluid cultures,followed by klebsiella and pseudomonas, according to Singla et alstudy [1].

This was consistent with the results of a study conducted by Gupta et al., who revealed that E. coli was the most common pathogen isolated, accounting to 25-71% of cases [5]. Klebsiella sp. and Pseudomonas sp. came next. Eight to 59.1percent of cultures were reported sterile. In their investigation on the impact of enteric fever on ileal perforation, Capoor et al. reported similar findings and discovered that E. coli was the predominant isolate (23.4% of cases) [3].

In the present study a single case of duodenal perforation was expired on postoperative day 9 with respiratory failure. This case of duodenal perforation with delayed presentation was managed with adequate resuscitation and omental graft repair, succumbed on postoperative day 9 with respiratory failure.Francis et al, observed the Mortality rate in their study as 17.4%. Overall mortality due to perforation peritonitis ranges from 6-27% [2]. Patients who presented late had a higher mortality (13.1%) compared to mortality of 4.3% in patient who presented early but was not found to be statistically significant (p=0.88). Several works reported late presentation as a predictor of mortality.Nitin Agarwalet al in their study opined thatsmall bowel perforation was the commonest form of perforation and the mortality rate associated with peritonitis remains unchanged [4].According to Singla et al., the mortality rate in their study was lower than thatin other investigations. This can be as a result of early referrals, better transportation options and early involvement in tertiary care facilities.Patients who arrived late to the hospital had an increased risk of both mortality andlength of hospital stay. According to the results of the current study, the majority ofpatients who presented within 24 hours of the onset of their symptoms weredischarged early, while 62.5% of patients who presented after 72 hoursrequired a hospital stay of at least 10 days. Delay in presentation, which canresult in a number of problems such dyselectrolemia, sepsis, and shock, is asignificant factor in the patient's increased morbidity.in a study bu Ankit Gupta, Praveendra K. Sachan, Saurabh Agrawal used APACHE-II score to predicted death risk with a p value of 0.001[8].

Conclusion:-

Most common age of presentation is 3rd and 5th decade with male preponderance.Gastroduodenal perforation was the commonest cause of gastrointestinalPerforation followed by appendicular perforation with the present study.Peptic ulcer disease is most common etiology of GI perforation followed by appendicularperforation. Delayed hospitalization was the major cause of perforationin appendicitis with wound infection as most common complication. Mortality percentage observed in the present study was 3.3%

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