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Contents

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Original Article

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Challenges of Complicated Enterocutaneous Fistulas

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Abstract

Enterocutaneous Fistulas are a common presentation in general surgical wards, and despite advances in the management of these lesions, they are still responsible for a significant mortality rate, ranging from 5-20%, due to associated sepsis, nutritional abnormalities, and electrolyte imbalance. Enterocutaneous fistulas are more commonly seen in post-operative setting. An enterocutaneous fistula (ECF) is a potentially catastrophic postoperative complication. It seems prudent, then, for every surgeon to have a thorough grasp of optimal treatment strategies for ECF to minimize their patients' mortality. Ultimately, the algorithm must begin with prevention. Morbidity associated with fistulas is significant; the principle cause of death are sepsis and malnutrition [9]. Special mention is given in this article to complicated fistulas such as those with high output, abdominal sepsis and large abdominal defects. There is stress on diversion of fecal matter through ileostomy at a normal site of intestines at a distance of fistula site and damage / devitalized and inflammed gut (Proximal loop ileostomy) and fistula repair at comparatively early stage to prevent the further complications of sepsis and malnutrition. This plan gives a framework for the difficult task of successfully treating the postoperative ECF with a multidisciplinary approach.

Keywords: Enterocutaneous Fistula; Nutritional Support; Sepsis; Proximal Loop Ileostomy.

Introduction

Enterocutaneous fistulas (ECF) present as devastating complications following postoperative abdominal surgery and as secondary manifestations due to primary intra-abdominal pathologic processes. Management challenges focus on fluid resuscitation, nutritional supplementation, electrolyte replenishment, control of sepsis, containment of effluent, skin integrity and surgery. Patient and family remain integral to the plan of care, as their physical and psychological challenges will be many.

Particularly difficult are complicated fistulas of those associated with large abdominal defects. Mortality rates in these cases may reach 60%-80%. The current treatment of intestinal fistulas coupled with a multidisciplinary approach has helped to decrease the mortality rate to 15-30%.

Earlier study suggests that about 95% of ECFs were postoperative and ileum was found to be the most common site of ECF [1]. Forty-nine percent of fistulas were high output and 51% were low output.

Enterocutaneous fistulas (ECFs) can occur as a complication following any type of surgery on the GI tract. Indeed, more than 75% of all ECFs arise as a postoperative complication, while about 15-25% of them result from abdominal trauma or occur spontaneously in relation to cancer, irradiation, inflammatory bowel disease, or ischemic or infective conditions. The etiology of ECFs can thus be characterized as postoperative, traumatic, or spontaneous [3].

Postoperative Causes

Postoperative causes of ECFs include the following:

- Disruption of anastomosis
- Inadvertent enterotomy - Especially occurs in patients with adhesions, when dissection can cause multiple serosal tears and an occasional full-thickness tear
- Inadvertent small bowel injury - Occurs during abdominal closure, especially after ventral hernia repair, malnutrition.

Enteroatmospheric fistula (EAF), a special subset of ECF, is defined as a communication between the gastrointestinal (GI) tract and the atmosphere. It can occur as a complication of "damage control" laparotomy (DCL) and results in significant morbidity and mortality [5]. Their etiology is complex and ranges from persistent abdominal infection, anastomotic dehiscence, and adhesions of the bowel to fascia with a laparostomy. As EAFs almost never close spontaneously, definitive repair usually requires major surgical intervention [8].

Disruption of anastomosis can result from inadequate blood flow due to an improper vascular supply, especially when extensive mesenteric vessels have to be ligated. Tension on anastomotic lines following colonic resection, restoration of continuity without adequate mobilization, or a minimal leak or infection can lead to perianastomotic abscess formation, resulting in disruption, as seen in patients with anterior resection for rectal carcinoma. In addition, if anastomosis is performed in an unhealthy bowel (eg, diseased, ischemic), it can lead to disruption and cause an ECF.

Inadvertent picking up of the bowel during abdominal closure can result in a small-bowel fistula; this especially can occur with the use of open inlay mesh or intraperitonealonlay mesh repair by the laparoscopic method, when the viscera comes in contact with the mesh, leading to adhesions and sometimes to disruption

Output of the Fistula

The type of ECF, as based on the output of the enteric contents, also determines the patient's health status and how the patient may respond to therapy. ECFs are usually classified into 3 categories, as follows[2]:

- Low-output fistula (< 200mL / day),
- Moderate-output fistula (200-500mL / day)
- High-output fistula (>500mL / day)

A high-output fistula increases the possibility of fluid and electrolyte imbalance and Etiology.

Type I ECF originate from esophageal, gastric and duodenal sources;

Type II from small bowel;

Type III from large bowel; and

Type IV from large abdominal wall defects greater than 20cm

Favorable Factors for Spontaneous Closure

Spontaneous closure of an ECF is determined by certain anatomic factors. Fistulas that have a good chance of healing include the following:

- End fistulas (eg, those arising from leakage through a duodenal stump after Pólyagastrectomy)
- Jejunal fistulas
- Colonic fistulas
- Continuity-maintained fistulas - These allow the patient to pass stool
- Small-defect fistulas
- Long-tract fistulas

In addition, a fistulous tract of more than 2 cm has a higher possibility of spontaneous closure. Spontaneous closure is also possible if the bowel-wall disruption is partial and other factors are favorable. If the disruption is complete, surgical intervention is necessary to restore intestinal continuity.

Unfavorable Factors for Spontaneous Closure

When an ECF is associated with adverse factors, then spontaneous closure does not commonly occur, and surgical intervention, despite its associated risks, is frequently required. In these patients, the outcome is less likely to be good

Factors preventing the spontaneous closure of an ECF can be remembered by using the acronym FRIEND, which represents the following

- *F*oreign body
- *R*adiation
- *I*nflammation / infection / IBD
- *E*pithelialization of the fistula tract
- *N*eoplasm
- *D*istal obstruction - A distal obstruction prevents the spontaneous closure of an ECF, even in the presence of other favorable factors; if present, surgical intervention is needed to relieve the obstruction.

In addition, lateral duodenal, ligament of Treitz, and ileal fistulas have less tendency to spontaneously close.

Complicated Enterocutaneousfistulas

- Complete distal intestinal obstruction.
- Adjacent infection or abscess.
- Fistulas associated with large abdominal wall defects.
- Fistulas associated with the loss of continuity of the gut
- Fistulas associated with the gut pathology.
- Fistular opening more than 2 cm .
- Continued high output from the fistula in spite of nothing orally and on continuous parenteral nutrition.
- Bleeding from the fistula.
- Epethialised tracts.
- Adjacent foreign material like mesh or sutures.

Work up

In addition to the routine haematalogical work up for management offistula,some special investigations are required:

Fistulography

Fistulography is conventionally performed 7-10 days after the presentation of an ECF and provides the following information:

- Length of the tract
- Extent of the bowel-wall disruption
- Location of the fistula
- Presence of a distal obstruction

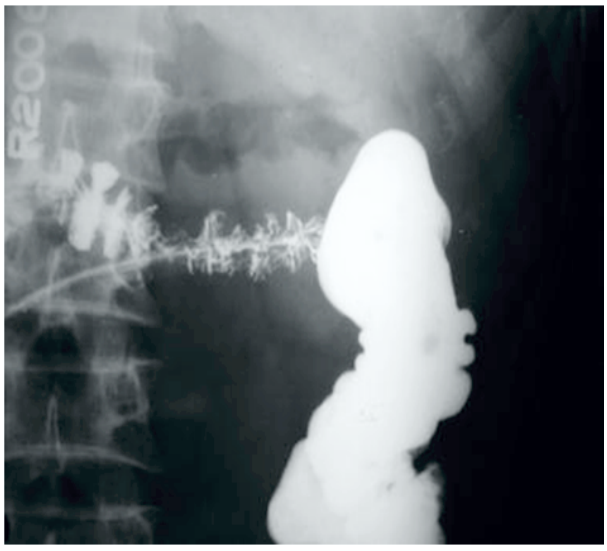

Image: Fistulogram showing the long tract of fistula

Water-Soluble Contrast Enema

The different types of tracts that can be seen by using a water-soluble contrast enema (WCE) in patients with ECF with failure of low colorectal anastomosis may be classified as follows [16]:

- I - Simple, short blind ending, <2 cm
- II - Continuous linear, long single, >2 cm
- III - Continuous complex, multiple linear

Tract Positions are as Follows:

- Anterior - Ventral, 10-o'clock to 2-o'clock position
- Posterior - Dorsal, 4-o'clock to 8-o'clock position
- Lateral - Right (2-o'clock to 4-o'clock position) or left (8-o'clock to 10-o'clock position)

Additional tract features seen with a WCE include the cavity (pooling of contrast within space) and / or a stricture (narrowing of anastomosis, with hold of contrast). The presence of a stricture and a large cavity on WCE predicts failure of healing.

Computed Tomography

Computed tomography (CT) is useful for demonstrating intra-abdominal abscess cavities. Such cavities can occur if an ECF has an indirect tract when it first drains into an abscess cavity and then drains to the exterior cavity. If an ECF is associated with intra-abdominal sepsis, then interloop abscesses may be present.

Approach Considerations

The conventional therapy for an enterocutaneous fistula (ECF) in the initial phase is always conservative. Immediate surgical therapy on presentation is contraindicated, because the majority of ECFs spontaneously close as a result of conservative therapy. Surgical intervention in the presence of sepsis and poor general condition would be hazardous for the patient.

However, patients with an ECF with adverse factors, such as a lateral duodenal fistula, an ileal fistula, a high-output fistula, or a fistula associated with a diseased bowel, may require early surgical intervention.

Role of Surgery

Proximal diversion of fecal matter by making ostomies can reduce the complications related to continuous exposure to sepsis in complex fistulas.

Early surgical intervention is required in all complicated enterocutaneousfistulas. Nonsurgical therapy may allow for spontaneous closure of the fistulas, though this can be expected in less than 30% cases and that also depends upon the nutritional status of the patient, sepsis and underlying cause. Drainage of intraperitoneal abscesses, resection of devitalized parts, repair of the damaged parts of gut can be attempted at the same sitting along the proximal diversion. This avoids the subsequent laparotomies at a later stage.Closure of the ostomy can be done after 8-12 weeks when the general condition of the patient improves (never before 6 weeks) and healing of the distal segment of gut. After doing proximal ostomy, enteral nutrition can be started at the earliest. Early start of enteral nutrition decreases the bacterial translocation and the tropic effects on the intestinal mucosa.

Aims and Objectives

A prospective study of the role of early proximal loop ileostomies in cases of complicated entero-cutaneous fistulas-A study of 80 cases (2005-2015).

Material and Methods

This study was conducted on 80 cases of complicatedenterocutaneous fistulas, all were post –operative and majority were of high output type.After resuscitation and supportive management, early exploration was done. Resection of devitalized part, drainage of infected foci, repair of the damaged part of intestine and proximal loop ileostomy was done. Routine and other relevant investigations were done.

Preparation of the Patient

Surgical planning for fistula repair was individualised according to the pt's condition and intra-operative findings.

Appropriate Pre-Operative Assessment Included

1. Ensure that the patient is euvolemic.
2. Blood transfusions and TPN as required.
3. Proper coverage of antibiotics.
4. Central venous line
5. Foley's catheterization

Intra-Operative Findings

During exploration, following points were noted:

1. Collection in peritoneal cavity.
2. Site, size and number of fistulas.
3. Condition of gut.
4. Intra peritoneal and interloop abscesses.
5. Any evidence of obstruction distal to fistula
6. Condition of other viscera

Procedure Done

- Drainage of collections.
- Exploration,lysis of adhesions and mobilisation of the entire gut.
- Resection of devitalised part.
- Repair of the fistular segments or resection anastamosis in single layer with interrupted non absorbable sutures.
- Proximal loop ileostomy (PLI) from the comparatively healthy part of gut(at least 30 -40 cm from the damaged / inflamed / diseased gut).
- Abdominal drain in pelvis.
- Closure of the main wound in two layers

Observations

- AGE INCIDENCE: 10-50 yrs (Majority 20-40 yrs).
- SEX INCIDENCE: Males:57 Females:23
- FISTULA OUTPUT: High output: = 60 cases Low output: = 20 cases
- ETIOLOGY : Post-operative

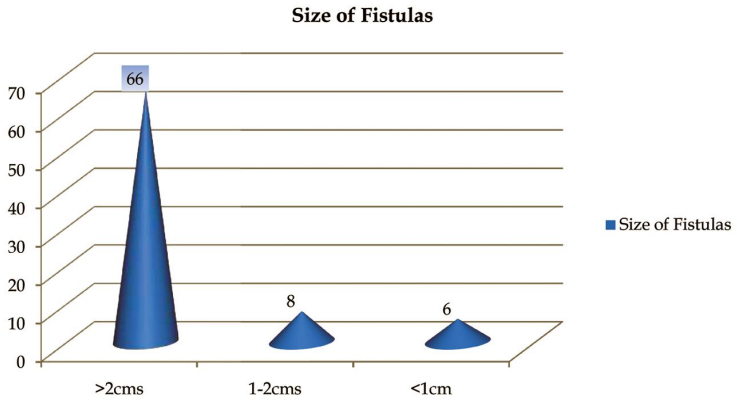

Fig. 1: Size of fistula

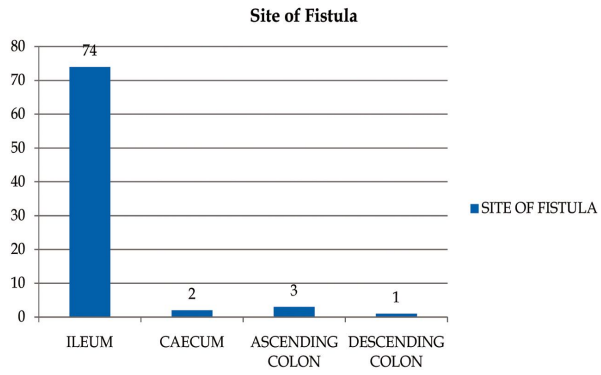

Fig. 2: Site of Fistula

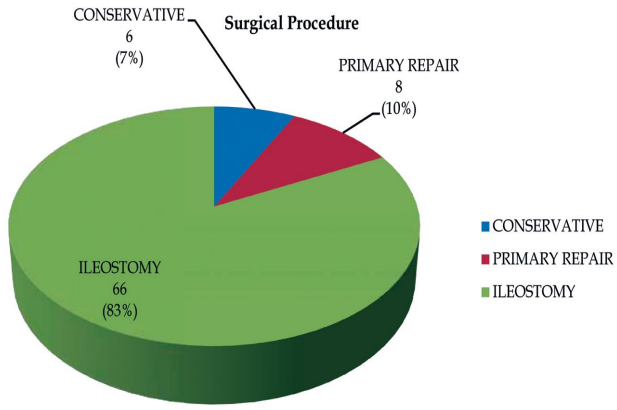

Fig. 3: Surgical Procedures done in the study

▪ Re - Exploration After Primary Repair	: 6 cases (All in which primary repair was done)
▪ Ileostomy Closure (After 8-10 weeks)	: 66 cases
▪ Post Operative Wound Infection	: 31 cases
▪ Post Operative Wound Dehiscence	
Complete	: 1
Incomplete	: 19
▪ Follow Up (Any Faecal Dicharge After Ileostomy Closure)	: Only 1 case having small amount of faeculant discharge with normal bowel habit. - Managed conservatively
▪ Peri-Operative Mortality	: 9 cases (due to septicaemia)

Fig. 4: Table of Results of the study

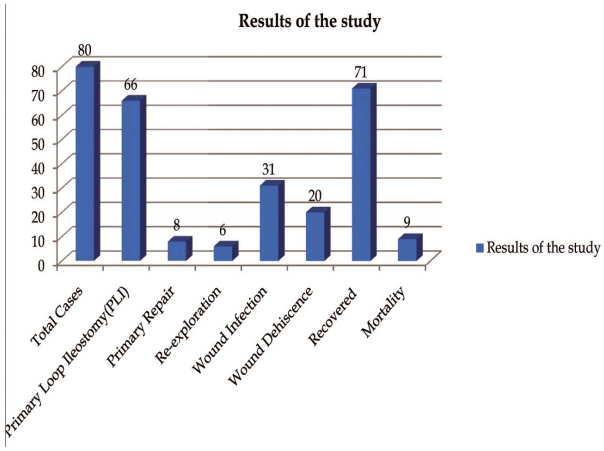

Fig. 5: Chart showing Results of the study

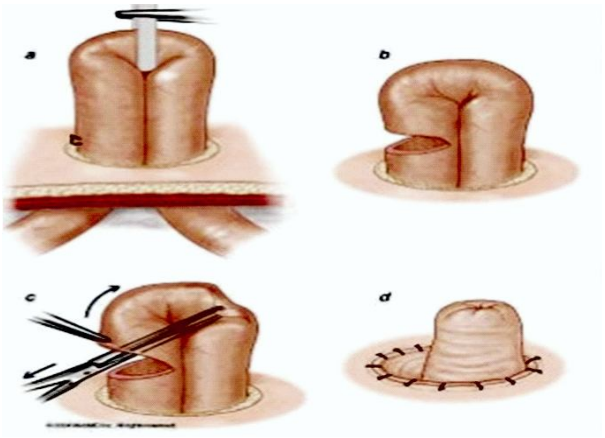

Fig. 6: Technique of ileostomy

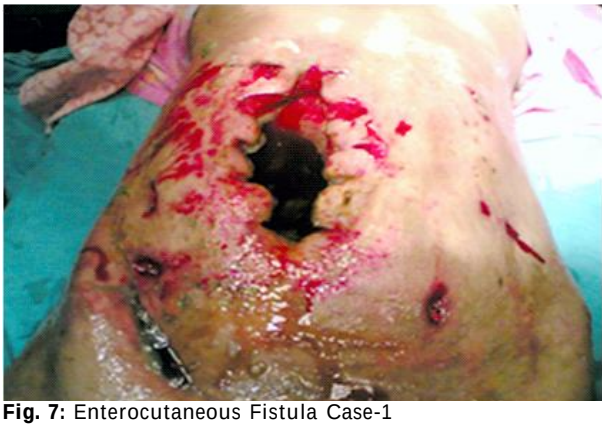

Fig. 7: Enterocutaneous Fistula Case-1

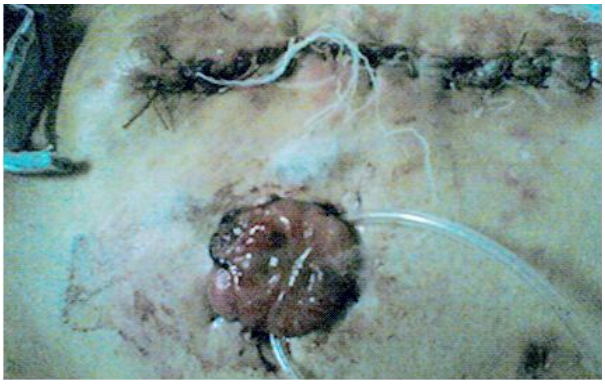

Fig. 8: Fistula Repaired And Proximal Loop Ileostomy Done...Case-1

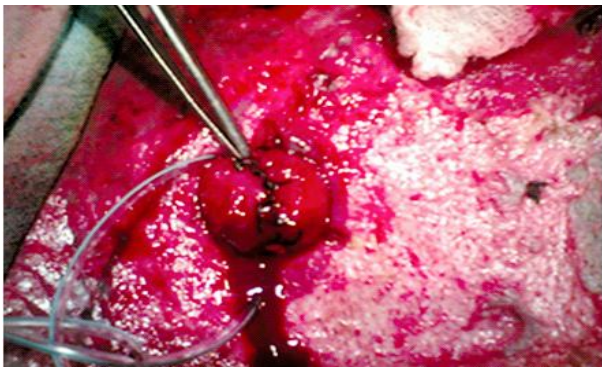

Fig. 9: Ileostomy Closed And Loop Kept Outside To See For Leakge..Case-1

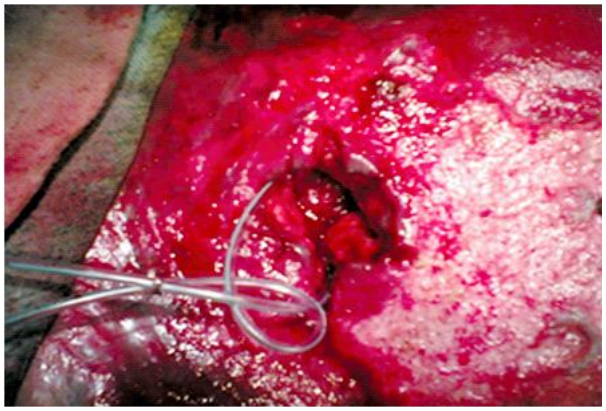

Fig. 10: Closed Ileostomy Put Inside Peritoneal Cavity But With Catheter Support . Case-1

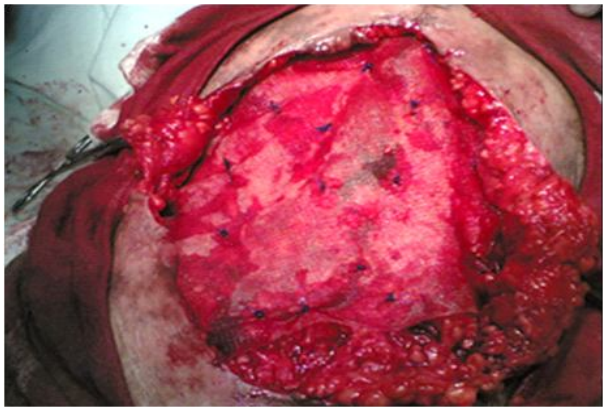

Fig. 11: Patient Had Burst Abdomen.Abdominal Wound Closed With Mesh Interposition And To Wait For Healing By Secondary Intention. Case-1

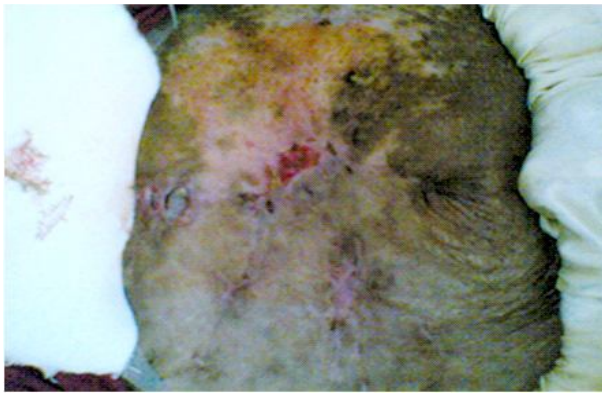

Fig. 12: Completely Healed Wound .Case-1

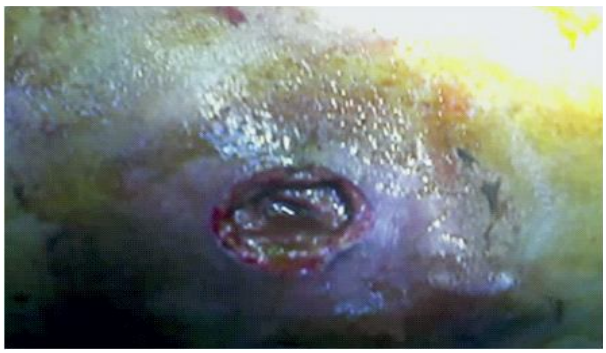

Fig. 13: Enterocutaneous Fistula Case-2

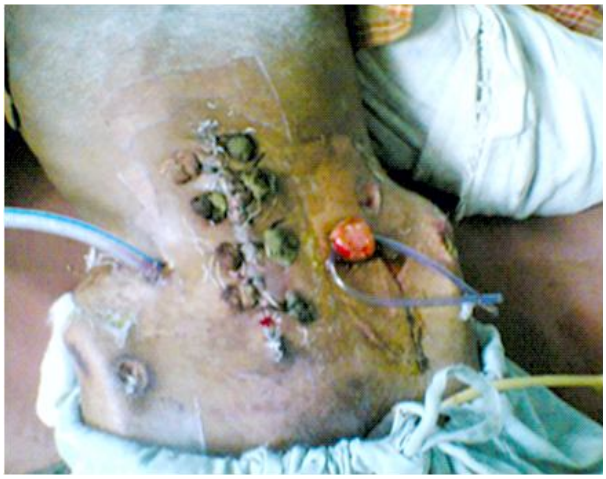

Fig. 14: Fistula Repaired with Proximal Loop Ileostomy Case-2

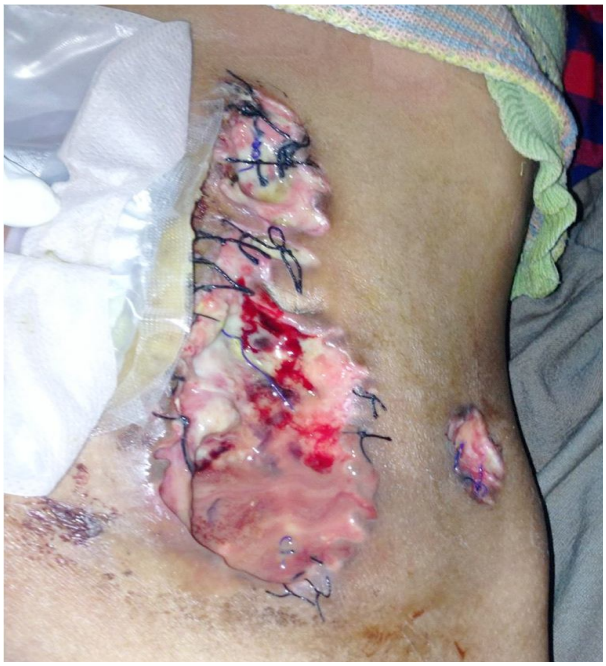

Fig. 15: Post operativeEnterocutaneous fistula

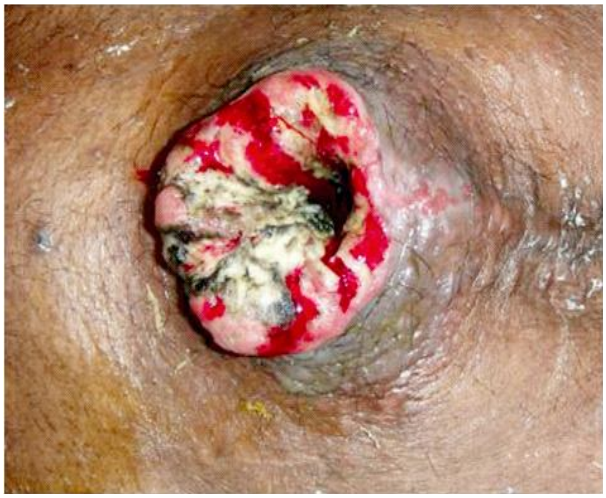

Fig. 16: Showing Wound Dehiscence

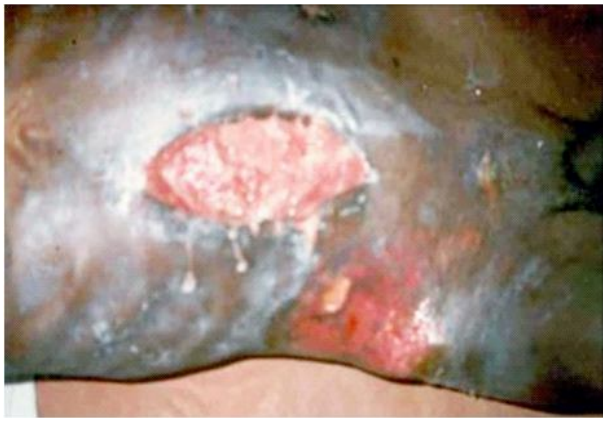

Fig. 17: Showing Excoriation of Surrounding Skin

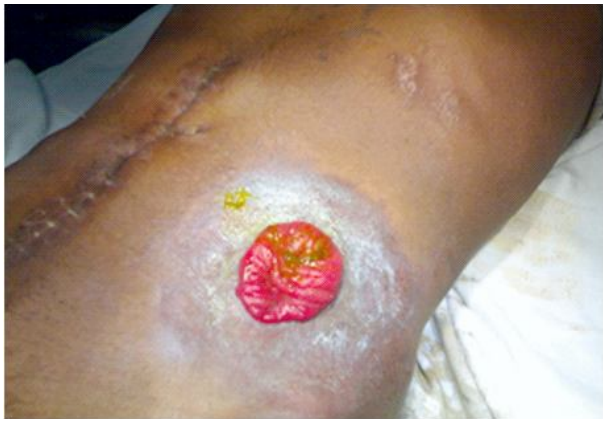

Fig. 18: Wound Healed.Ileostomy Working. Case-2

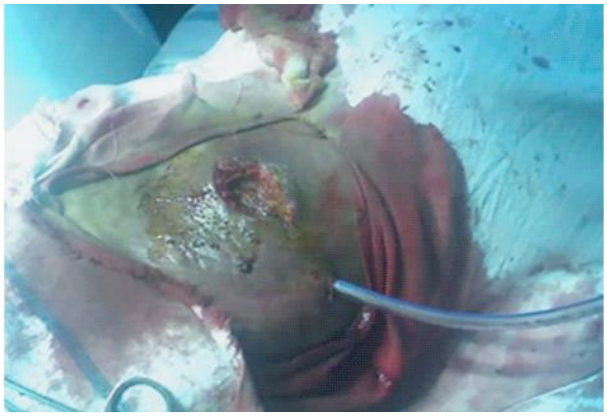

Fig. 19: Enterocutaneous Fistula With Drain In Peritoneal Cavity. Case-3

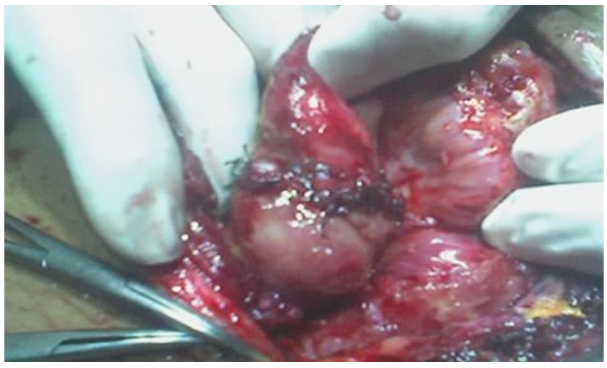

Fig. 20: Fistular Site Repaired .Case-3

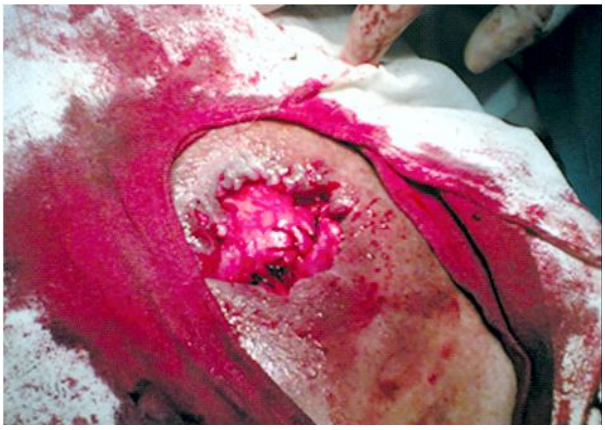

Fig. 21: Wound With Fistula Repaired. Case-3

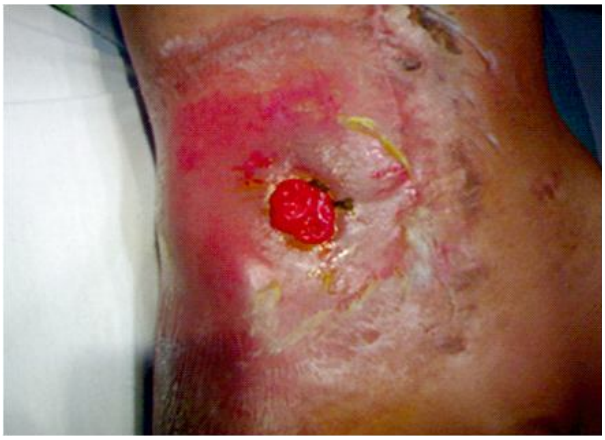

Fig. 22: Healed Abdominal Wound With Ileostomy. Case-3

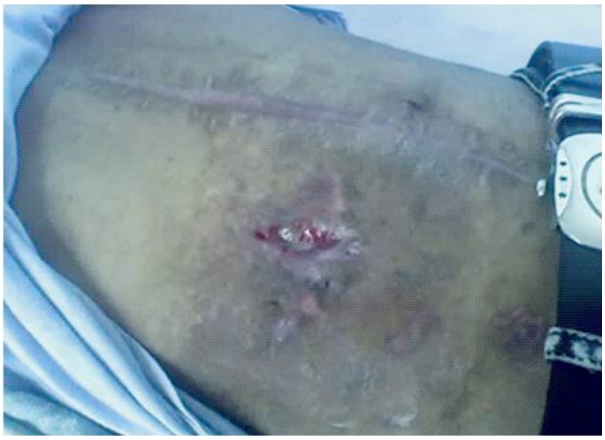

Fig. 23: Completely Healed Wound After Ileostomy Closure. Case-3

Discussion

- In our study, majority of the patients presented with complicated type of enterocutaneous fistulas.
- In 66 out of 80 cases,exploration with drainage of intra-peritoneal collections, resection of the devitalized part and repair of the gut was done and proximal loop ileostomies were created.

- These patients did well post operatively without any major post-operative complications in most of the cases.
- Those 6 cases in whom primary repair was done,had to be re-explored and treated on the same line of proximal loop ileostomy. They also responded well post-operatively except 9 cases (died during the course of treatment).
- Proximal loop ileostomy (P L I) with repair of the damaged part of gut showed good results and less morbidity and mortality in the present study.
- P L I also avoids re-laparotomies at later stages as ileostomy closure can be carried out by exploring the same area of ileostomy site.
- P L I is better than exteriorization of the fistula segments as that part of gut is badly inflamed adherent and has septic focus, so more chances of ileostomy related complications.
- P L I provides sufficient time for the healing of repaired part of gut and inflammation of adjacent loops of gut to settle down.

Conclusion

- Our study concludes that in cases of complicated entero-cutaneous fistulas, early proximal loop ostomies / ileostomies along with the repair of fistula sites gives good results and less morbidity and mortality.
- This procedure can be considered in the management of complicated entero-cutaneous fistula.
- Medical and nursing care demand a complementary,interdisciplinary approach if successful closure of anenterocutaneous fistula is to be achieved. The patientandfamily are challenged by physical and psychological stressors, which often result in weeks and even months of hospitalization. As health-care practitioners,we must remember to treat the patient as a whole person and not just 'as a hole.' The fistula should notbecome the only focus of care, but rather an elementof the overall treatment plan.

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Original Article

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Laparoscopic Cholecystectomy Versus Small Incision Cholecystectomy in Symptomatic Gallstones Disease

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Abstract

Objective: To compare the results and outcomes of the laparoscopic cholecystectomy (LC) with the small incison cholecystectomy (SIC). Place and Duration of Study: Department of Surgery, SIMS from August 2014 to august 2016. *Methodology:* Patients with symptomatic gallstones that were referred and enrolled in the study for LC or SIC. Operation, anaesthesia, analgesics and postoperative care were standardized. The patients were assessed for operation time, postoperative pain, nausea, vomiting, hospital stay, return to work time and complications in the postoperative period on day 1, 1 week, 1 month and 3 months, postoperatively. *Results:* Of 145 patients, 82 underwent LC and 63 underwent SIC. Both groups were matched for age, gender, BMI, clinical findings and ASA grading. The mean duration of operation was 68 and 58 minutes in the LC and SIC groups, respectively ($p = 0.0059$). Duration of hospital stay and return to regular activities were shorter after LC compared to SIC. Pain scores, nausea and vomiting were the same in both groups, although the frequency of intra-operative complications were greater in LC compared to SIC. *Conclusion:* Outcome and complications of SIC were comparable with those of LC.

Keywords: Gallstone; Laparoscopic Cholecystectomy; Small Incision Cholecystectomy; Complications.

Introduction

Cholecystectomy is a commonly performed surgical procedure for patients suffering from symptomatic gallstones. Open cholecystectomy (OC) was the method of choice for gallbladder surgery for almost a century. Gradually, surgeons opted to perform this operation through smaller incisions and in early 1980's small incison cholecystectomy (SIC), was debuted. Patients undergoing SIC had a quicker recovery and less complications compared to those undergoing conventional OC. Cholecystectomy, using a laparoscope or laparoscopic cholecystectomy (LC), in late 1980's was greatly accepted by patients and employed by surgeons because it left a much smaller scar but further investigation and comparison of the results with those of SIC was not done at the onset. Most studies focused on the comparison of LC and OC and emphasized the better outcome of LC. At present, it is well understood that patients undergoing LC have a better and shorter recovery time compared to those undergoing OC. Some consider LC the method of choice for surgical removal of the gallbladder with stones. However, there is no definite evidence supporting the preference of this method over SIC. Several studies have compared the results of SIC and LC and reported less cost and shorter duration of operation in the SIC procedure compared to LC but the complications, morbidity and mortality were the same in both methods and sometimes even less complications were seen in the SIC group. Patients' quality of life 3 months after surgery was also evaluated in a study done on 257 patients administered with questionnaires. The study showed no significant difference between the two groups. In a review study in 2008, 59 randomized clinical trials and 5,556 patients were evaluated. It was shown that SIC had a shorter duration of operation compared to LC. However, no significant difference was detected between the two groups in terms of hospital stay, rate of switching to

open surgery, complications, morbidity, mortality and postoperative outcome. In a study evaluating the data in Cochrane Library, 56 randomized clinical trials and 5,246 patients were evaluated in three groups OC, SIC and LC which showed similar results and stated that SIC and LC were almost similar in terms of complications and mortality. SICs had significantly lower cost. There is a consensus that the surgical cost of LC is significantly greater than OC and SIC. The aim of the present study was to compare the methods of LC and SIC and evaluate the advantages and disadvantages of each of these procedures.

Methodology

All patients presenting to the outpatient clinic of the study centre suffering from symptomatic gallstones and being candidates for surgery were included in a prospective study. An informed written consent was obtained from all patients. This study was approved by the institute ethics committee. The study was conducted from August 2014 to august 2016. Patients younger than 18 years of age, association with the common bile duct (choledochal) stone, cholangitis, jaundice, pregnancy, moderate to severe systemic disease with ASA (American Society of Anaesthesiology) grading > 2, history of upper abdominal surgery, mental illness, obesity with BMI > 45 kg / m2 and acute cholecystitis were excluded from the study. All patients underwent general anaesthesia. Fascia and skin were sutured similarly in all patients. SIC was performed through an oblique right sub-costal incision. At first, a 5 cm incision was made on the skin and after entering the abdominal cavity, the incision was extanded upto 7-8 cm, if necessary. At the end of surgery and after applying the sutures, the length of incision was measured again using a ruler. If the incision was longer than 8 cm or another procedure had been performed other than the cholecystectomy i.e. common bile duct exploration, the patient was excluded from the study.

Duration of operation was calculated from the moment of surgery until the completion of skin suturing.

Level of pain was determined using the visual analogue scale (VAS) which was performed 24 hours after surgery. Patients had to be NPO for upto 12 hours postoperatively and after that if the patients had no vomiting, a liquid diet was started for them. Tramadol was injected for pain control immediately after transferring the patient to the ward every 6 hours for a total of 2 doses. At the time of discharge from the hospital, patients had oral nutrition, no vomiting and a pain scale of below 4 at rest. Antibiotic was administered at the time of indcution of anaethesia with 1.5 g of intravenous Cefuroxime. After the operation, antibiotic administration continued only if advised by the surgeon. Hospital stay was defined as days of hospitalization due to the cholecystectomy surgery during the 30-day postoperative period. Patients were followed-up one week, 1 month and 3 months after discharge.

Results

A total of 145 patients were enrolled in this study, out of which 82 (56.25%) underwent LC and 63 (43.75%) underwent SIC. Patients were matched in terms of age and gender. The mean age of all patients was 45.8 ± 15.3 years. This variable was 48.3 ± 14.1 years for the SIC and 49.4 ± 16.2 years for the LC group. There were 115 females (79.87%) and 29 males (20.13%). In the SIC group of 63 patients, 49 (77.78%) were females and 14 (22.22%) were males. In the LC group of 81 patients, 66 (81.49%) were females and 15 (18.51%) were males. The mean BMI was 29.8 ± 5.4 kg / m2 in patients. This rate was 27.7 ± 4.3 kg / m2 in the SIC and 29.98 ± 6.8 kg / m2 in the LC group. No statistically significant difference was detected in this respect (p = 0.28).

Patients in both groups were in ASA grades of 1 and 2. Both groups were similar in the normal range in terms of blood cell count and liver enzymes. Ultrasound was performed for all patients and indicated gallstones. No significant difference was detected between the two groups in terms of ultrasound report. The mean duration of operation was 60.6 ± 16.5 minutes in the SIC and 70.3 ± 23.4 minutes in the LC group. Difference between the two groups was statistically significant (p = 0.0059). Excessive bleeding requiring blood transfusion during the operation did not occur in any patient and none of the cases required re-operation in the first 48 hours after surgery. Damage to the bile ducts during surgery was not reported in any group. But a case of trauma to the common bile duct was detected in the follow-up of one case of LC. The mean score of postoperative pain 24 hours after surgery, according to VAS was 5.18.This score was 4.6 ± 1.6 in the SIC and 4.6 ± 1.9 in theLC group (p = 1.00). Incidence of nausea 24 hours aftersurgery was 22.2% in the SIC and 17.3% in the LCgroup (p = 0.84). A total of 2 (3.3%) of patients in the SICand 3 (3.7%) of patients in the LC had vomiting (p = 0.09).The mean duration of hospital stay was 2.9 ± 0.5 days inthe SIC and 2.4

± 1.1 days in the LC group (p = 0.001).Time to return to regular daily activity was 3.39 ± 1.8days in the LC and 9.54 ± 2.6 days in the SIC group(p = 0.0001). In the follow-ups, 2 patients after LC presented with abdominal pain, nausea, vomiting and jaundice in the first. One patient in the LC andone patient in the SIC group developed wound infection. Cardiovascular complications or morbidity and mortality did not occur in any patient.

Discussion

This study shares many similarities with other studies. However, some differences were observed which are described as follows: Gallstone disease is more prevalent among women and obese individuals. In this study, the mean BMI of patients was 28.8 kg/m2. This rate was reported to be 27.3 kg/m2 by Ros, 27.5 kg/m2by Keus and 23.4 kg/m2 by Watanapa. These show patients suffering from gallstones are usually overweight. Another point noticed in this study is the duration of operation. This duration was shorter in SIC group compared to LC. The results obtained by Ros and Keusare also in accordance with this very finding indicating that the duration of operation in SIC is 12 – 14 minutes shorter than that of LC (SIC = 94 minutes and LC = 108minutes, SIC = 60 minutes and LC = 72 minutes,respectively. In all studies, SIC had a shorter duration compared to LC and this is a definite advantage of SIC over LC. In some areas, the LC technique seems advantageous and its plus points carry more weight than those of SIC. In this study, patients in LC group had a shorter hospital stay which was in agreement with Ros. In general, most studies reported shorter hospitalizations in LCgroup. Some studies reported similar hospitalizations in both groups of LC and SIC. Although Keusand McGine stated hospital stay was shorter in SIC group (3.7 versus 4.1 days), this difference was not statistically significant. In this study, patients in LC group resumed their regular daily activities significantly sooner than those in SIC group. This finding was in accordance with those of Rosand Keus. Most studies found similar results although LC is morecostly. As for other complications, statistically significant differences between these two methods were not observed. There is always a higher risk of trauma to the bile ducts during the operation in LCtechnique. In this study, there was one case of trauma to the bile ducts in LC group. Ros reported higher incidence of trauma and complications during theoperation in LC group. Keus reported 5 cases of surgical complication in LC and 3 cases in SIC group.Therefore, a higher frequency of complications is more likely to occur in LC.Postoperation pain, 24 hours after the surgery, was not significantly different in the two groups. However, the highest frequency and the mean pain score were greater in SIC group. In Ros study, level of pain 24 and 48 hours after the operation was greater in the SIC group.2 In this study, two groups had no difference in terms of nauseaand vomiting postoperatively; though, Squirrel reported higher prevalence of vomiting in LC group.3 No mortality occurred in either group. Similar studies did not report any mortalities either; however, mortality has been reported to be 0.1% in LC.

Conclusion

Final outcome and surgical complications of SIC are comparable with those of LC. It can be recommended to use SIC in the educational hospitals as the method of choice for most of the patients. LC may be confined to those who need to return to work more quickly or young patients for whom aesthetics is an important concern.

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Original Article

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Comparison of Anterior to Posterior Laproscopic Partial Fundoplication

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Abstract

Objective: The aim of the study was to compare between anterior to posterior laparoscopic partial fundoplications. *Patients and Methods:* During a 2-year period, 50 patients with gastroesophageal reflux disease were enrolled in this study, comparing a partial posterior (Toupét, n = 26) fundoplication and an anterior partial wrap (Watson, n = 24). All patients were assessed postoperatively, and the 6-month follow-up. *Results:* Both patient groups were strictly comparable. All operations were completed laparoscopically, and no serious complications were encountered. Post fundoplication symptoms were recorded with no difference between the groups. *Conclusions:* When performing a laparoscopic partial fundoplication, the posterior modification (Toupét) offers advantages in terms of better reflux control compared with an anterior type (Watson).

Keywords: Fundoplication; Posterior modification; Dysphagia; Gastroesophageal junction.

After the invent of minimal invasive techniques for fundaoplication in 1991, There has been increasing interest in the surgical management of gastroesophageal reflux disease [1,2]. The most frequent post fundoplication symptoms are dysphagia, difficulty or inability to belch and vomit, postprandial fullness, bloating and pain, increased rectal flatus [5,6]. A recent randomized clinical trial suggested that laparoscopic total fundoplications were associated with more obstructive complaints in the early postoperative period than after open procedures [7]. However, other similar trials have not been able to confirm these potential hazards with the laparoscopic technique [8,12]. A large randomized trial with open antireflux surgery has reported that posterior partial fundoplications are associated with less troublesome complaints of gas–bloat / rectal flatus [13]. In addition, a recent trial comparing a total with a partial anterior fundoplication performed laparoscopically suggested similar advantages with this partial fundoplication [14]. It has been argued that some partial fundoplication procedures augment various constituents of the valvuloplasty components of the competence in the gastroesophageal junction and as a consequence were associated with a very low incidence of mechanical complications [15]. To further optimize the design and function of antireflux surgery, the question then arises: Which type of partial fundoplication that maintains clinical efficacy in terms of reflux control with a concomitant minimization of post fundoplication complaints?

Methods

Fifty patients with chronic gastroesophageal reflux disease were registerd for antireflux surgery. The patients who were selected had no previous major abdominal open surgery. All patients had pre operative endoscopic evaluation and many had even been on antisecretory medications for few days to weeks.

Starndard operative techniques were followed in all Laparoscopic fundoplications. started with dissection of haitus followed by esophageal mobilization, posterior crural repair was done with

non absorbable sutures. The gastric fundus was dissected, and then short gastric vessels was divided using harmonic. in patients subjected for Toupét fundoplication [16], the fundus was wrapped behind the esophagus to encircle 180-200° of the esophageal circumference. The same sutures were fixed to the left crura and left lateral wall of oesopahgus. Same thing done on right side, sutures fixed to the right crura and right lateral wall of oesopahgus. The fixation as done with non abosrbalble sutures.

According to watson, in anterior fundoplication [17,8], the distal esophagus is mobilized for reduction of the hiatus hernia and allow a mobilization of 4-6 cm of the intraabdominal esophagus. After retracting the anterior segment anteriorly the crual sling was repaired with interupted, non absorbable sutures. Then the intraabdominal segment of the esophagus was fixed to the crura by suturing the postero lateral aspect of the esophagus, avoiding injury to the vagus. The angle of His was reconstituted by placing interrupted unabsorbable sutures between the seromuscular layer of the superomedial aspect of the fundus of the stomach and the inferior surface of the diaphragm. A 120° anterior lateral fundoplication was thus performed between the medial aspect of the gastric fundus and the anterior aspect of the muscle layer of the esophagus, taking care to avoid branches of the anterior vagus nerve.

Post Operative Assessment

All patient were interviewed preoperatively and then at regular intervals during the first 6 months after the operations. Symptoms related to Gastroesophageal reflux and also to those specifically related to the post fundoplication procedure were noted. each symptom was scored from 1 to 3 (1, no symptoms; 2, mild-to-moderate symptoms; 3, severe symptoms). Dysphagia was scored using visual analogue scale (0-10; 0 = no dysphagia to 10 = total dysphagia) that was independently applied for solids and liquids and also a previously validated dysphagia score [19]. Endoscopic investigation of the esophagus and the upper gastrointestinal tract was performed postoperatively.

Results

Although both the surgeries are effective in reducing reflux-associated symptoms, but in our study, we observed a significant difference ($P < 0.001$) among the groups. There were only fewer patients complaining of heartburn and acid regurgitation after a posterior partial fundoplication.

In terms of only post fundoplication complaints, it was observed in our study that there was no much differences between the 2 procedures. we found an improvement in dysphagia scores from 6 weeks to 6 months postoperatively. Even with ability to belch, there was no significant deifference bwtween the two groups. ability to vomit was imporoved after the anterior partial fundoplication. There was no much difference with dyspeptic symptoms, whether pre- or postoperative period .

Discussion

Although Laparoscopic antireflux surgery has some complications, the surgery has benefits over long term medical treatment and also on cost [20-23]. The improvement in skills and technology with excellent results minimising the compliations in the laparoscopic antireflux sugery, is now becoming the choice of surgery. Still One of the most troublesome complication being persistent dysphagia, whereas persistent difficulties affect only 5-10% of the patients [23]. Persitant dyspahgia or gas related symptoms may be one of the deciding factor in choosing surgery as an approriated treatment option or not. All these problems have led to the investigation of a range of modifications of Nissen's original procedure, which seek to improve outcome in patients after antireflux surgery.

Division of the short gastric vessels have failed to improve the overall outcome for patients undergoing a total fundoplication [14,24,25]. For a long time, use of a large bougie in the esophagus was advocated to avoid a too-tight total wrap. There are various data available now to support the use of a similar indwelling device to reduce obstructive symptoms [26]. The results of a trial comparing a laparoscopic anterior partial fundoplication with a Nissen total fundoplication showed a reduced incidence of dysphagia and gas-related problems in the in the first group [14] with equivalent control of reflux in both at 6 months follow-up. A subsequent longer follow-up of patients having a similar anterior partial fundoplication suggested reassuring outcomes [27]. The debate, however, the debate continues whether some of the side effects of a total fundoplication can be avoided by doing a partial fundoplication without jeopardizing the efficacy by which reflux is controlled [30-32].

The present study, tried to address whether there are any important differences between the anterior

and the posterior partial fundoplication in terms of reflux control and side effects. The trial incorporated 50 GERD patients, with follow-up upto 6 months only. We found significant differences in favor of the posterior fundoplication regarding the level of reflux control. There was inability to demonstrate any differences in obstructive complaints between the 2 partial fundoplications, but interestingly enough, significantly more patients reported an ability to vomit after the anterior fundoplication. This observation probably reflects the efficacy of the respective repair. Flatulence is associated with, if not merely caused, by the ability to vent air from the stomach in the postoperative situation [32-35].

Conclusion

Laproscopic posterior partial fundoplication (Toupét) was had adequate reflux control assessed but an laparoscopic anterior partial fundoplication gave unacceptable results both in terms of reflux control and esophageal acid reflux variables.

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Original Article

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Gastro Instestional Stromal Tumours: Diversity of Presentitions and Treatment Protocols

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Abstract

Introduction: Gastrointestinal stromal tumors (GIST) are specific, C- Kit (CD117) - positive, mesenchymal tumors of the gastrointestinal tract which encompassing a majority of tumors, previously considered gastrointestinal smooth muscle tumors. Diagnosis is based on histological and immunohistochemical examination characterized by c-kit (CD117,CD34) staining. *Objective:* To present diversity of presentations of this disease and treatment protocols based on 4 variety of presentations in our case studies. *Materials and Methods:* We present an analysis of clinical presentation and course, surgical management and pathological features of 4 patients with gastrointestinal stromal tumors treated in our institution. *ResuIt:* Our results confirm that in stromal tumors complete surgical resection remains the mainstay of treatment in localized gastrointestinal stromal tumors. *Discussion and conclusion:* Complete removal of the tumor is curative in localized tumours with no recurrence in 2 yrs follow up. In large lesions with metastasis c-kit targeted chemotherapy and surgery gives a better disease free stage.

Keywords: Gastrointestinal Tumours; Jejunal GIST; Chronic Intussusception; Imatinib; C-Kit; CD-117.

Introduction

Gastrointestinal tumours are rare, but more and more cases are recongnized and treated successfully with surgery and tyrosine kinase inhibitors since 2005 [1,2,3,20]. They are believed to originate from interstitial cells of Cajal or related stem cells. These tumours are diagnosed by CECT and histologically confirmed by the Immunohistochemistry for CD117 and CD34. This article analyse clinical presentation and course, surgical management and pathological features of 4 patients with gastrointestinal stromal tumors treated in our institution. Our results confirm that in stromal tumors complete surgical resection remains the mainstay of treatment in localized gastrointestinal stromal tumors. Clinically, their behavior is difficult to predict, and mitotic count and tumor size seem to be the most effective prognostic factors. It is conceivable that treatment and prognosis of metastatic and non-resectable GISTs, as well as the adjuvant treatment of high-risk, radically excised GISTs will be strongly impacted by the c-kit target therapy.

GIST may be part of a genetic syndrome, but this is very rare. A genetic syndrome is a set of symptoms or conditions that occur together and is usually caused by abnormal genes. The following genetic syndromes have been linked to GIST:

1.Neurofibromatosis type 1 (NF1).

2. Carney triad. Carney triad was originally described in 1977 and consists of Gastric GIST, Extra adrenal paraganglioma, and pulmonary chondromas. The majority of patients are females under the age of 30 years. The GISTs tend to be gastric and lack c-kit or PDGFR1A mutations.

Case Reports

Case 1

72 yr old male patient presented with abdominal pain, anemia and mass in the epigastrium. Upper GI

endoscopy revealed a smooth surfaced mass in the fundus extending to the luman of stomach. No ulceration was seen and mucosa appeared smooth.CT studies showed a smooth filling defect of the stomach giving impression of a leiomyoma.

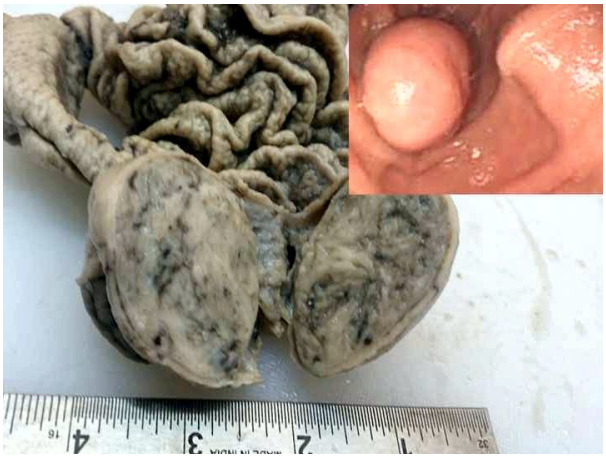

Fig. 1: Gastric GIST endoscopic view and specimen(fixed)

Laparotomy revealed a lobulated mass extending from the cardiac end. Partial gastrectomy done and the specimen studied with microscopy and IHC . The excised lesion was composed of areas of spindle and epithelioid cells, and immunohistochemical analysis showed positive staining withCD117, DOG1 and SMA.

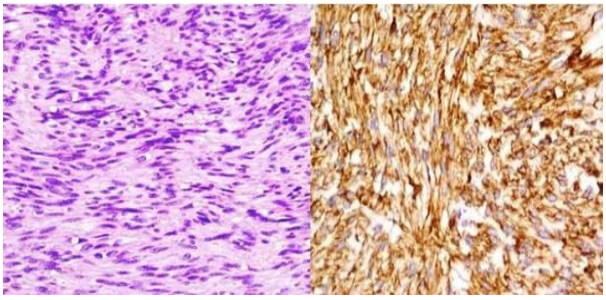

Fig. 2: Histopathological picture of GIST and Immuno-histochemistry

Case 2

48 yr old male patient presented with abdominal mass, anemia, malena. Clinical examination revealed a mass filling the epigastrium, umbilical and hypochodrial areas. Endoscopy could not see after the mid gastric area due to the mass effect. The duration of the symptoms was 1 yr. The CT showed a mass arising from the jejunum infiltrating the major vessels and extending superficially. CT guided biopsy was taken and it revealed spindlecellneoplasia and IHC showed positive CD117. Considering the inoperability patient was put on Imatinib with supportive care but expired in 3 months time.

Case 3

72 yr old female patient presented with features of recurrent bouts of bleeding with diarrohoea and weight loss. The patienthad features of small gut subacuteobstruction. Thecolonoscopy was normal. Upper GI endoscopy showed a bulging mass into the posterior wall of stomach without any mucosal changes.

CT showed a lobulated irregular lesion arising from the 2nd part of the jejunum and the vessels was not infiltrated. She had comorbidities of Coronary disease and Diabetes mellitus.Laparotomy revealed a lobulated reddish growth from the mid jejunum with small adhesion with the omentum. The tumour is resected with jejunum and end to end anastomosis done.

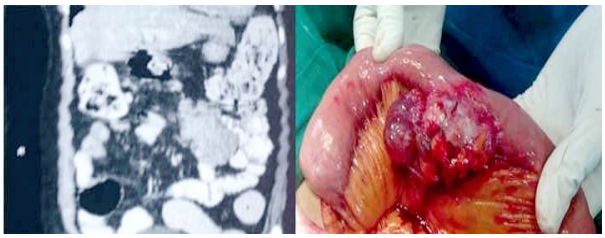

Fig. 3: CECT of the GIST of jejunum and specimen

The mass was more than 15 cms in size and mitotic figures were more than 15/HPF. The immuno-histochemistry revelaed positive CD117. Partially posititve for CD 37.

The patient on Imitanib and in the follow up period for 2 yrs.

Case 4

An adult chronic intussusception. 40 yrs old male patient presented with abdominal pain, diarrhea and bleeding perrectum of 1 month duration. He was investigated with ultrasound and it revealed an ileocolic intussusception. The CECT showed ileocolic intussusception with mass in the wall.

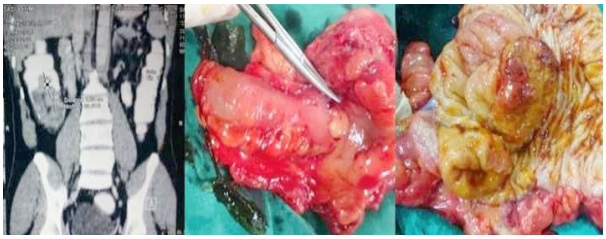

Fig. 4: CT, peroperative and specimen of Chronicintussuception due to GIST

Laparotomy revealed a chronic intussusception with ileocolictype and a well defined mass in the wall of caecumnear the leading end. Rt.

Hemicolectomy was done and the Histopathology and immunochemistry revealed GIST with no metastasis to the nodes.

Analysis

All our patients with GISTs were adults over 40 years old. The incidence peak of diagnosis is 70 years. There is a slight male predominance and all the cases were from high altitude areas of Kerala, (Wayanad and Palakkad).

Main Observations in our Cases were;

1. Most of them had good general condition irrespective ofthe tumour. Feature of slow progressing intestinalobstruction was the presentation. All of them showed the features of Anemia. Post operative period was very smooth without complications.
2. Local resections with margin of 8-10 cms were made in all resected cases and the margins were free of tumour.
3. Distant metastasis were not seen in any case even though the tumour was very large and extending outside the jejunum in one case.
4. Depending on the prognostic criteria Imatinib is given.
5. A wide resection is the best option of treatment for GIST.
6. The number of cases diagnosed as GIST are on increase compared to earlier days probably due to Immunohistochemistry studies.

Discussion

Gastrointestinal stromal tumours (GISTs), first described by Mazur and Clark in 1983, are rare mesenchymal tumours of the alimentary tract . The vast majority of GISTs occur in a sporadic and isolated form, but can be features of multiple neoplastic syndromes. GISTs comprise 0.2% of gastrointestinal tumours and only 0.04% of small intestinal tumours. Jejunal GISTs are the rarest subtype. Only 10–30% progress to malignancy[1,2,3].

Pathology

The tumour originate from the stem cells that differentiate toward the pacemaker cell (Interstitial cell of Cajal) They are believed to result from activating mutations of proto-oncogenes c-KIT or platelet-derived growth factor receptor alpha polypeptide. These mutations increase tyrosine kinase receptor activity, resulting in uncontrolled proliferation of stem cells that differentiate into intestinal cells of Cajal . These cells are called pacemaker cells of the alimentary tract like that of Aurbachs plexus. Gastrointestinal stromal tumors (GISTs) are the most common mesenchymal tumors of the digestive tract. The recent pathological studies classify the gastrointestinal soft tissue neoplasms like leiomyomas, schwannomas, leiomyoblastomas, or leiomyosarcomas, are GISTs based on histology, immunohistochemistry, and molecular study. GIST vary greatly in size from a few millimeters to more than 30 cm, the median size being between 5 and 8 cm. Macroscopically, GIST usually has an exophytic growth and the common intra-operative appearance is that of a mass attached tothe stomach, projecting into the abdominal cavity and displacing other organs. Mucosal ulceration may be present at the summit of the lesion in 50% of cases. On gross appearance they are smooth gray and white tumors which are well circumscribed, usually with a pseudo-capsule. A small area of hemorrhage or cystic degeneration and necrosis may be visible. Gastric GISTs have a solid or nested form, often with a hyalinized stroma that shows myxoid change. GISTs in the small intestine are more often spindled than epithelioid and may show a paragangliomatous pattern. Another characteristic is the eosinophilic structures, composed of collagen, which are stained brightly with periodic acid-Schiff (PAS) stain. GISTs (> 95%) are positive for CD117. In 60%-70% of the patients, IHC for CD34 (mesenchymal/ hematopoietic precursor cell marker) is also positive. Vimentin and smooth muscle actin is positive in 15% to 60%. GISTs (10%-15%) have no detectable KIT or PDGFRA mutations [wild-type GIST (WT-GIST)]. Absence of mutations does not exclude the diagnosis of GIST. DOG1 is a calcium dependent, receptor activated chloride channel protein expressed in GIST; this expression is independent of mutation type and can be used in the diagnosis of KIT-negative tumors [5,6,20].

Immunohistological and pathological tests are diagnostic when results are combined. Immunohistochemical assay for CD117 antigen, an epitope of the KIT receptor tyrosine kinase, is the mainstay of diagnosis. Approximately 95% are positive for CD117 antigens. However, false-positive results may occur due to weak reactivity to other mesenchymal neoplasms. The morphology of jejunal GISTs is varied: tumours may be composed of spindle cells (70%), epithelioid cells (20%) or mixed spindle and epithelioid cells (10%). Similar histological

features may be seen with leiomyosarcomas and leiomyoblastomas. Definite diagnosis therefore relies on a combination of both immunohistochemical assay and morphological histology[7].

A 2002 study by Fletcher et al characterized the malignant potential of GISTs, and is widely cited. The two best predictors were tumor size and number of mitotic figures per high-power field, both of which demonstrated statistical significance [8].

Proposed Approach for Defining Risk of Aggressive Behavior in Gastrointestinal Stromal Tumors, Namely Risk Factor, Tumour Size and Mitotic Figures

Very low risk	<2cms	<5/50HPF
Low risk	2-5cms	<5/50HPF
Intermediate	<5cms	6-10/50HPF
	5-10cms	<5/50HPF
High risk	>5cms	>5/ HPF
	>10cms	Any Mitotic Rate
	Any Size	>10/50HPF

Clinical Manifestations

Of the GIST gastric lesions are the commonest. Jejunal GISTs are very rare with 0.04% of all the GISTs and they are asymptomatic while small and may be diagnosed incidentally from CT, endoscopy, during surgery or from symptomatic liver metastases. Enlargement causes variable symptomatology; Only 70% of the patients with GIST are symptomatic. While 20% are asymptomatic and the tumors are detected incidentally, 10% of the lesions are detected only at autopsy. Symptoms and signs are not disease specific, they are related more to the site of the tumor. Bleeding (30%-40%) comprises the most common symptom after vague abdominal discomfort (60%-70%).

Bleeding is attributed to the erosion into the GIT lumen. Bleeding occurring into the peritoneal cavity due to a ruptured GIST can lead to acute abdominal pain presenting as a surgical emergency. Bleeding into the GI tract lumen, causing hematemesis, melena or anemia, is usually more chronic on presentation. Most of the patients present with vague symptoms, such as nausea, vomiting, abdominal discomfort, weight loss or early satiety [8,9]. Symptoms are usually site specific. These include dysphagia in the esophagus, biliary obstruction around the ampulla of Vater or even intussusception of the small bowel. Lymph node metastases are uncommon in GIST. Distant metastases most commonly occur in GISTs of the peritoneum, omentum, mesentery and the liver. GISTs have a high tendency to seed and hence intraperitoneal or even scar metastases are known to occur. GI bleeding or non-specific GI symptoms such as bloating or early satiety. Around 40% are associated with ulceration, and 28% presenting with overt GI bleeding. Bleeding may be acute (haematemesis or malaena) or chronic (anaemia). Around 20% grow large enough to present with pain, a palpable mass or obstruction secondary to intussusception [9,10,11].

Investigations and Diagnosis

Barium studies identify 80% of GISTs, capsule endoscopy81.1%, CT scans 87% and MRI scans close to 100% . Certain factors make diagnosis challenging. Exophytic growth with minimal or no luminal protrusion, which is common, makes endoscopic diagnosis difficult. Poor bowel filling and necrotic areas make GISTs difficult to visualize on CT and cyst degeneration may be misdiagnosed as abscesses or inflamed intestinal loops[9,12,13]. CECT in most of cases give evidence of the lesions and extend. MRI and SPECT are contributory and not diagnostic as such.

Treatment of Gist

Surgery is the primary treatment of choice in localized or potentially resectable GIST.While removing the tumour avoid rupture and spillage of cells. The tumors are fragile and should be handled with care, with an aim to achieve complete gross resection of the tumor with an intact pseudocapsule and a clearance margin of the bowel. Multivisceral and radical surgery should be avoided where ever possible. Segmental or wedge resection with an aim to obtain histologically negative margins is sufficient. Resection should be accomplished with minimal morbidity. Re-resection is not indicated for patients with an R1 resection. Lymphadenectomy is not required as GISTs have a low incidence of nodal metastases[14].

This is further treated with tyrosine inhibitors as adjuvant or post operative therapy.Imatinib mesylate is a tyrosine kinase inhibitor with activity against ABL, BCR-ABL, KIT, PDGFRA, PDGFRB and CSF1R. Its structure mimics adenosine triphosphate (ATP) and it binds competitively to the ATP binding site of the target kinases. This prevents substrate

phosphorylation and signaling, thereby inhibiting proliferation and survival. Patients with advanced GIST started on imatinib have shown a 35%-49% 9 year survival. The presence and the type of KIT or PDGFRA mutation status are predictive of response to imatinib. Exon 11 mutations occur in the KIT juxtamembrane domain and are the most common mutations in GISTs. Tumors with exon 11 mutations have better response rates to imatinib, with a longer progression free survival (PFS) and overall survival (OS). Exon 9 mutations occur in the KIT extracellular domain; these mutations are specific for intestinal GIST. Exon 9 mutations are associated with a decreased response to imatinib and a poorer PFS. There have been multiple trials testing the most appropriate dosing of imatinib. 400 mg / d has been found to have equivalent response rates and OS compared to higher doses, which are associated with more side effects. Indications for a higher dosing (800 mg / d) include patients with an exon 9 KIT mutation or those with tumors which continue to progress on the standard 400 mg / d dosage [14,15].

Complete resection is with a prognosis of 95% 5-year survival. For GISTs exceeding 10 cm, the National Cancer Institute recommends adjuvant imatinib [16]. Imatinib gives a 14% absolute reduction in recurrence rate, achieving 97% recurrence-free survival. Sunitinib is an approved second-line agent which is effective in many non-responders to imatinib therapy. Personalizing the treatment of GISTs and tailoring treatments to tumor genotype using combination therapies in order to prevent emergence of resistance is essential to optimize patient outcomes [17-20].

Conclusion

GISTs are the most common mesenchymal tumors of the GI system. Improved knowledge of the oncogenic drivers and resistance mechanism operant in GIST has acted as a foundation for the general understanding of the role of targeted therapies in human cancers. Surgery is the primary treatment of choice in localized or potentially resectable GIST. Surgery and imatinib form the first-line therapy and their effectiveness for the majority of patients has been revolutionary.

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Review Report

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Double Pyloric Opening: A Rare Anomaly of the Stomach

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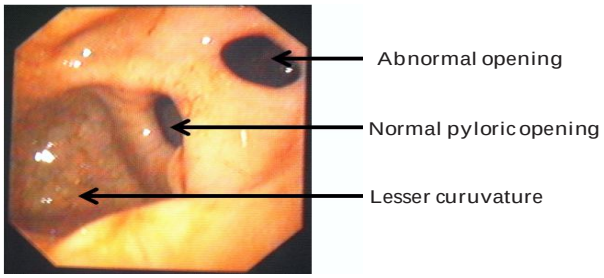
Abstract

Double pyloric opening (DPO) is a condition in which there are two openings of the stomach in to the duodenum with the normal anatomy in the rest of the stomach. DPO may be considered as a gastroduodenal fistula consisting of a short accessory channel between the distal stomach and the duodenal bulb, such that the gastric antrum and the duodenal bulb are connected by two openings separated by a septum or bridge of tissue[1]. This is reported to be a rare anomaly of the stomach which could be congenital or acquired [2-6]. Even though it is considered as a congenital anomaly anatomy textbooks does not state this anomaly in their text under the developmental deformities of the stomach or the duodenum and it is said to be very rare congenital anomaly of which was first reported in 1971 [1]. Mechanism of occurrence of DPO as an acquired condition is said to be secondary to chronic gastric or duodenal ulcers leading to gastro-duodenal fistula [2,4,7]. DPO is most of the time an incidental finding during routine investigation of the upper gastrointestinal tract due to the fact that this is asymptomatic unless present with symptoms related to the concurrent peptic ulcer disease [6,9]. However, some of them have presented with complications such as upper gastro intestinal bleeding and pyloric stenosis. On the other hand inadvertent injury of the abnormal band separating the pyloric cannal is possible during upper gastro intestinal endoscopies. Therefore the knowledge of presence of this anomaly is important for gastrointestinal surgeons and physicians.

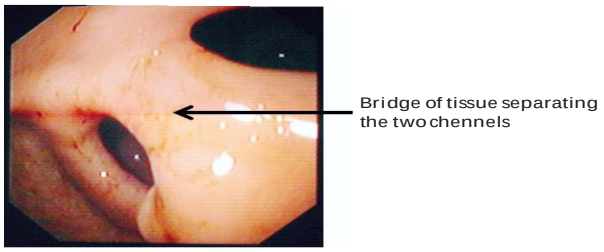
Keyword: Double Pylorus; Anomalies in Stomach.

Introduction

I have encountered a case of this nature during an upper gastrointestinal endoscopy of a 72 year old male with dyspeptic symptoms (Picture 1 and 2). During endoscopy he was found to have normal oesophageal, duodenal and stomach mucosae with evidence of oesophagitis at the gastro-eosophageal junction due to gastro-eosophageal reflux disease (GORD). There was no endoscopic evidence of chronic gastritis at the site of pylorus. Therefore this case is more likely to be a case of congenital DPO. Ideally it is necessary to confirm the absence of chronic gastritis histopathologically and to demonstrate the presence of the musculris mucosa in the bridge separating the two channels to come to the conclusions. However that was not done in this case.



Picture 1:



Picture 2:

Literature Review

History

The first case of a DPO was reported in 1969 by smith and Tuttle [8]. Since then there had been several cases reported in elsewhere in the world. In the early period it was found in adult patients those who have undergone surgery or investigations procedures for dyspeptic symptoms and or peptic ulcer disease. Therefore it was thought to be due secondary to peptic ulcer disease. But some authors debated that and said it is a developmental defect. This fact was supported by reported cases of DPO in children [9].

In the literature this topic has been discussed under various headings which include "duplication of pylorus", "double pyloric channel", "double pylorus" and "duplicated gastric outlet". However, I could not found any of the cases been reported in Sri Lankan literature. A study which consists of 102,958 endoscopic examinations conducted from 1987 to 1999, a diagnosis of double pylorus was made in only 20 patients and this highlighted the rarity of the condition. The prevalence of DPO in routine endoscopic and radiodiagnostic procedures is estimated to be 0.02% to 0.13% with a distinct over representation of males [1].

Aetiology

Duplication of the pylorus may take two forms: either a large fistulous communication resulting in the appearance of a pyloric band, or a narrow irregular channel. Most cases are acquired but some have been regarded as congenital. Evidence proposed for a congenital origin has been the presence of an intact muscularis mucosae and the coexistence of another congenital abnormality [2].

A congenital double pylorus is a rare anomaly caused by gastric and duodenal duplication. The embryogenetic background of the congenital double pylorus probably is the failure of the pyloric lumen to recanalize during the early stages of embryonic life. The congenital double pylorus may be combined with a double antrum (true antroduodenal duplication) or a single antrum, as in this reported case. Stannard et al described a case of congenital double pylorus in which one of the channels led to an intraluminal cystic duplication of the duodenal bulb [9]. Javed et al describe the morphological difference between congenital and acquired DPO. In which he described that congenital DPO showed longer accessory channel which lay on the greater curvature aspect, and had normal mucosal folds passing through it [7].

An acquired DPO is a complication of prepyloric or postpyloric ulcer, which perforates the gastric and duodenal walls and gives rise to a fistula [1]. An observation made by Javed et al supported the theory of genesis of DPO by an existing peptic ulcer. They have demonstrated the development of a DPO by followed up endoscopies in a patient with peptic ulcer disease prior to the development of the DPO [8]. However, not only those benign ulcers give rise to DPO but there are reports on gastric carcinoma infiltrating the pyloric channel and dividing it into two lumens making a DPO. Because of this one can no longer assume that an acquired DPO is only due to benign ulcer disease [10,11].

Therefore the etiology for the occurrence of DPO may be a developmental deformity, complication of benign peptic ulcer disease or sequale of gastric antral carcinoma.

Symptoms

DPO has found in males than in females [11]. This is similar to the gender prevalence of peptic ulcer disease in general. However the average age for the occurrence of DPO is 10 to 20 years older than those with duodenal or gastric ulcer without the DPO [8]. There are no classical symptoms for the disease, and most of the times it is an incidental finding during investigations of the upper gastrointestinal tract and up to 25% of the cases remain undiagnosed [12].

Symptoms related to the DPO includes epigastric pain, dyspepsia, and upper gastrointestinal bleeding and these intern reflect the symptoms of peptic ulcer diseas [3,11]. The commonest presentation of acquired DPO is bleeding. When symptomatic there is often an underlying disease such as alcoholism, diabetes or chronic renal failure. Many patients have ulcer disease of long duration. However in uncomplicated double pylorus there may be few symptoms or none.[4]

Evidence shows the disappearance of symptoms once the ulcer is healed [11]. Therefore the presence of a double pylorus is not necessarily associated with dyspeptic symptoms [2].

Diagnosis

Diagnosis of DPO is always done during investigations of the upper gastro intestinal tract either endoscopicaly or radiologicaly. However, DPO and pyloric deformity without a double channel may be difficult to differentiate for both the

endoscopist and radiologist in routine examinations. Prone, barium-filled views of the pylorus with compression applied will usually allow the distinction to be made radiographically. The endoscopist may find it necessary to distend the antrum sufficiently to separate the thickened distorted antral folds from the pyloric septum [7].

When a DPO is found the next challenge is to differentiate whether it is a congenital one or the acquired one. There are various methods which have been used to differentiate these two conditions. This includes age of onset, morphological appearance, and histological findings. Whatever the method is being used distinguishing between congenital and acquired double pylorus is not always easy [13].

However a congenital origin may be assumed if the diagnosis is made in early childhood, the histologic examination of the bridge of tissue separating two channels shows the presence of mucosa, lamina propria, and muscularis mucosae or if chronic penetrating ulcer or chronic gastritis is absent or if there is no history of using NSAIDs. Furthermore, it seems that congenital duplications usually are located in the greater curvature rather than the lesser curvature, which is the characteristic position for the development of the acquired double pylorus [1,7].

However, the congenital DPO is exceedingly rare while the acquired one is relatively more common. The first congenital double pylorus was reported in 1971. Since then congenital double pylorus has been rarely reported [1].

Complications

This may include development of progressive pyloric stenosis or upper gastrointestinal bleeding. The bleeding is due to the perforation of septum which leads to formation of a large single channel [11]. In addition to this inadvertent damage can occur to the bridge separating the two channels during endoscopic procedures.

Management

Spontaneous recovery of acquired DPO have been observed in follow up cases [11,14]. Therefore surgical intervention should only be considered for patients with refractory symptoms, recurrent ulcers and other complications [6,14,15]. Chiu et al described conservative approached to a case of acquired DPO with repeated endoscopy and medical therapy for gastric ulcer disease showing spontaneous closure of the DPO [11]. On the other hand Graham et al. reported a successful treatment of a symptomatic double pylorus with a biliary sphinterotome [16].

Evidence shows the probability of all symptomatic cases of double pylorus has associated with gastroduodenal mucosal disease. Therefore the management should be directed towards healing the mucosal disease rather than surgically correcting the anatomical abnormality [2]. Because of this, it is widely accepted that the congenital double pylorus is largely asymptomatic and requires no intervention in most cases [1].

Use of proton pump inhibitors and the standard surgical interventions when necessary is advocated by many authors. Some study shows the importance of irradication of helicobactor pylori in healing of ulcers associated with DPO [4]. However Hu TH et al doubted the benefit of eradication of Helicobacter pylori in terms of relief of symptoms and fistula closure in patients with DPO [14].

Conclusion

Congenital abnormalities are rarely found during gastrointestinal endoscopy in adults. Among them congenital DPO is very rare and most of DPO are acquired by ulcer perforation. In general, congenital double pylorus is mainly a harmless incidental finding which needs no therapy, but it should be distinguished from acquired double pylorus. Endoscopists should be aware of this abnormality to avoid complications specially during side-view endoscopy and when interpreting of their endoscopic findings. Early diagnosis and appropriate treatment of the peptic ulcer disease is necessary to prevent this rare complication of acquired DPO.

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Lower Esophageal Perforation by Drainage Tube Masquerading as Staple Line Leak after Laparoscopic Sleeve Gastrectomy

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Abstract

Laparoscopic sleeve gastrectomy is increasingly being recognised as a valid stand-alone procedure for the surgical management of morbid obesity. However, utility of drain placement in laparoscopic sleeve gastrectomy remains controversial. We report our experience of unexpected esophageal perforation caused by drainage tube in a 45 yr old female with a BMI of 49 kg/m^2 who underwent laparoscopic sleeve gastrectomy at our institute. This unusual complication, in our opinion, has not been reported anywhere in literature.

Keywords: Gastrectomy; Laparoscopic sleeve gastrectomy; Esophageal Perforation.

Introduction

Laparoscopic sleeve gastrectomy(LSG) can be a first-step procedure before gastric bypass or duodenal switch, or a single stage restrictive procedure if long-term results are good [1]. Studies report weight loss after LSG ranging from 35% to 72% of excess weight loss at 12 months [2].

Surgical complications in bariatric patients are usually difficult to interpret. Clinical signs are often silent and sometimes the only alarming sign of a possible complication is low grade fever or tachycardia. That is why many surgeons insist in the use of drains, believing that they can provide more safety in thepostoperative care of these patients, even though the utility of drain placement in general surgery and in bariatric patients in particular remains controversial [3]. We, at our institute, are routinely using drains in laparoscopic sleeve gastrectomy becausewe feel that they can be helpful in early detection of intraperitoneal bleeding.

We present an interesting case of lower esophageal perforation by drainage tube masquerading as staple line leak after laparoscopic sleeve gastrectomy.

Case Report

A 45-year-old female patient was referred to the metabolic and bariatric surgery clinic at our institute which is a large tertiary care teaching hospital in New Delhi, India. The patient was morbidly obese with estimated body mass index of 49 kg/m^2, and had comorbidities including type 2 diabetes and hypertension. Patient underwent laparoscopic cholecystectomy 8 years back. Preoperative investigations including upper GI endoscopy were within normal limits. A laparoscopic sleeve gastrectomy was scheduled after pre-operative optimization of patient's medical comorbidities.

The patient was operated under general anaesthesia and pneumoperitoneum was created using a veress needle. Access into peritoneal cavity was gained using an Optiview trocar® (Ethicon Endo-Surgery Inc., Johnson & Johnson, Ohio, USA). A total of five-trocars were used (three 12mm and two 5mm trocars), and a sleeve was fashioned over a 36Fr bougie using a 60mm Echelon Endopath®linear cutter (Ethicon Endo-Surgery Inc., Johnson & Johnson, Ohio, USA)using the standard method. An intraoperative leak test was performed at the end of

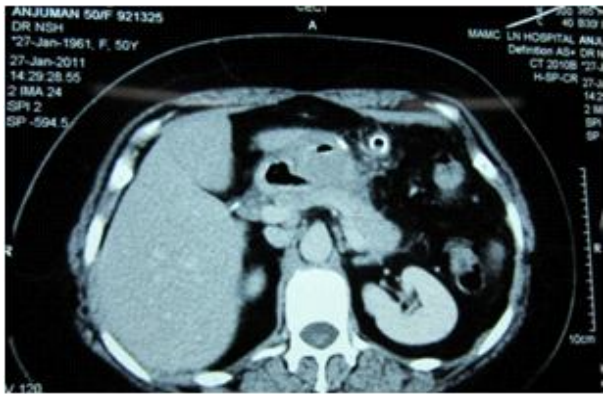
the procedure by insufflating air into the stomach and instilling saline in the peritoneal cavity. A 28 Fr abdominal drain (made of polyvinyl chloride) was placed in the perigastric region and brought out through the left lumbar port.

Post operatively, on the evening of surgery, a note was made of approximately 300 ml of blood in the abdominal drain. The vitals remained stableand the abdomen wassoft and nontender. By the next morning however, the pulse rate increased to 100 per min with a total drain output of 500ml post surgery. The blood pressure remained stablebut there was a drop in Haemoglobin of 2 gm% from the preoperative value. A decision was made to perform a CECT of abdomen which revealed a large paragastric hematoma measuring 9 x 10 cm along the greater curvature of stomach with no obvious leakage of gastric contrast Figure 1.

The patientwas transfused 3 units of packed red cells and was put on conservative management with intensive monitoring. Oral intakewith stage 1 liquid diet was started on post-operative day 3. The daily drain output gradually decreased to 100-150 ml of serosanguinous fluid by the end of 1st week. The patient remained stable and was discharged on day 8 with abdominal drain in situ.

The patient presented to the emergency 2 days later with complaints of passage of ingested liquids through the abdominal drain, and was readmitted.The patient was started on IV fluids and all oral intake was stopped. A Gastrograffin swallow revealed contrast spill near gastroesophageal junction(Figure 2). A nasojejunal tube was inserted under fluoroscopic guidance and patient was started on enteral nutrition through 1000 Kcal nasojejunal tube feeds(Figure 3). The patient was discharged after a week with both the abdominal drain and the nasojejunal tube in situ. The drain output decreased to about 10-20 ml of cloudy fluid per day. The abdominal drain was accidentally pulled out at around 12 weeks post operatively and a 16 Fr Foley's catheter was introduced through the drain tract. A repeat Gastrograffin study at 16 weeks revealed a persistent leak from the same site.

After 20 weeks of conservative management, when the leak failed to settle, an upper GI endoscopy was performed. It revealed a 10 x 6 mm chronic perforation of the lower esophagus, 1 cm proximal to gastroesophageal junction. The tip of the Foley's catheter was seen through the perforation in the esophagus(Figure 4,5). Under direct endoscopic vision, the catheter tip was withdrawn and the mucosa around the perforation was apposed using 3 endoclips (Triclip, Cook Medical Inc, USA) (Figure 6). The output through the Foley's catheter ceased within 3 days. A negative leak was confirmed by subsequent Gastrograffin study performed after a week of endoscopic intervention (Figure 7). A second look endoscopy performed after 2 weeks from the first one showed complete healing of esophageal perforation (Figure 8). The Foley's catheter was then removed. Patient was started on oral feeds after 3 weeks which were well tolerated. Patient was discharged and is in regular follow up with current BMI of 32 and remains asymptomatic.



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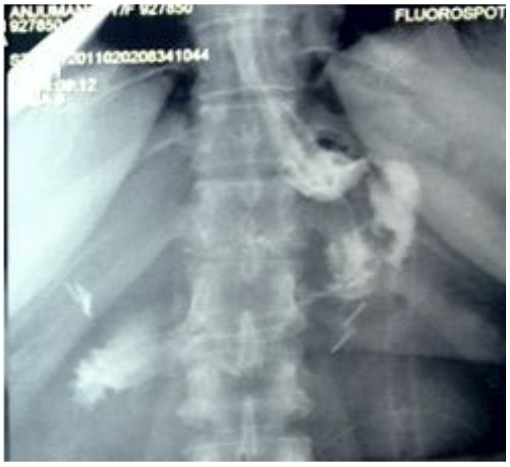

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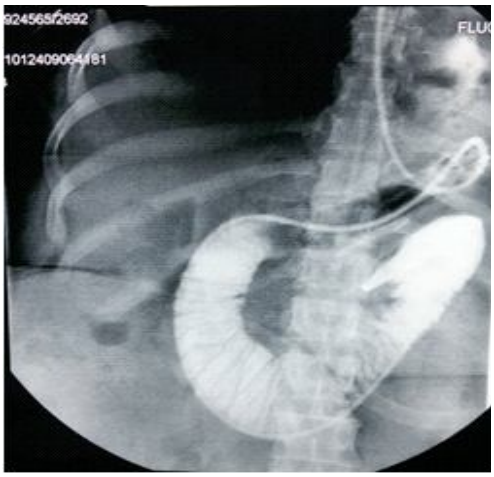

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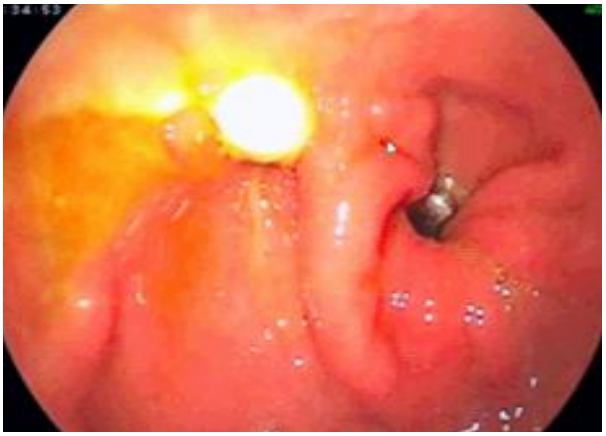

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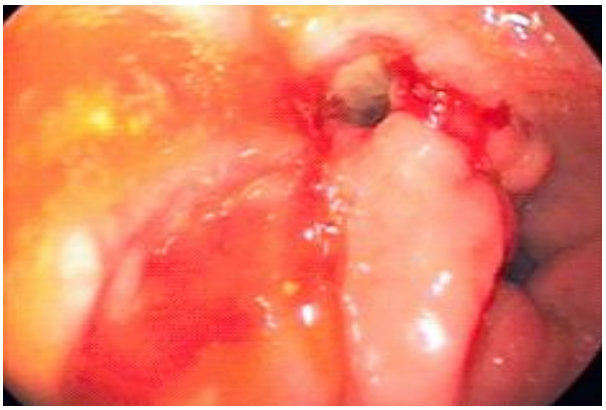

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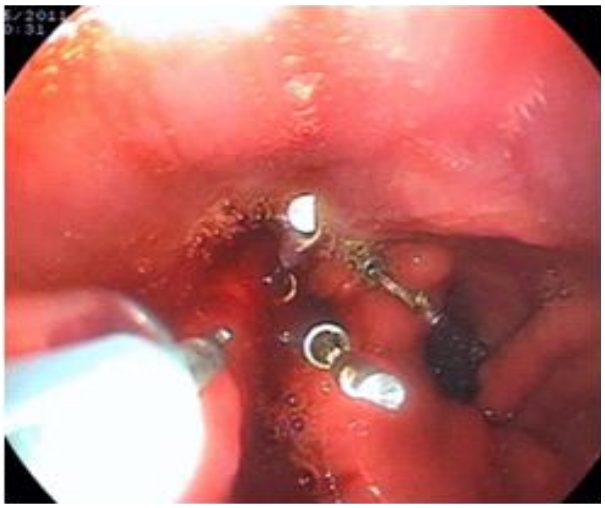

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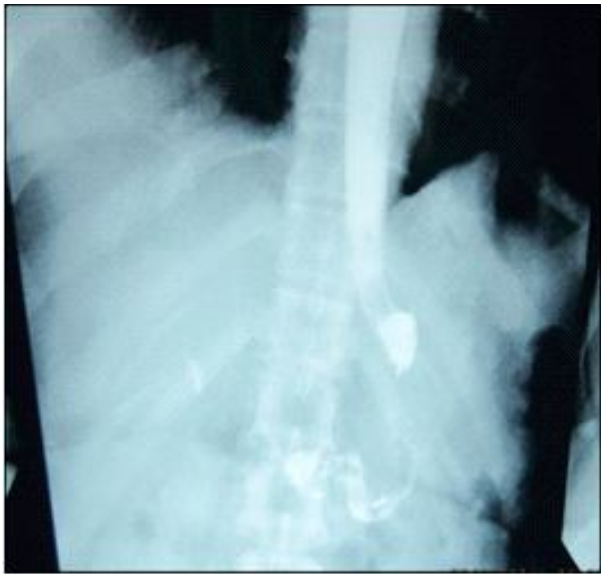

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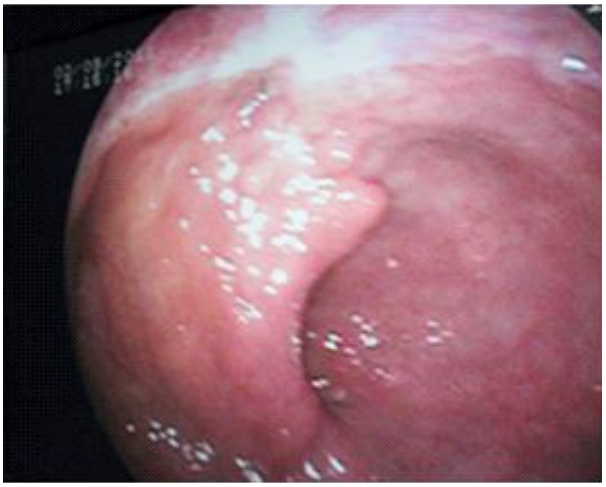

Fig. 8:

Discussion

The use of abdominal drain was first reported by Hippocrates in the case of gall bladder empyema [4] and later by Celsus in the management of ascites [5]. Abdominal drains have been classified into open and closed drain systems. Open drain includes corrugated rubber or plastic sheets and the drained fluid gets collected in stomal bag or gauze dressing. Thus, the risk of infection is increased. Close drain consists of tubes draining in a bag or bottle reducing the risk of infection. Based upon the mode of function, they are also classified as active and passive drains. Active drains are maintained under suction, which may be high or low. Passive drains have no suction and function by differential pressure between body cavity and exterior and by gravity [6,7].

Bowel erosion by abdominal drain is rare. The duration of placement of drain contributes to bowel erosion. Both open as well as closed suction drains have been reported to cause erosion. The mechanism of erosion in both the groups are postulated to be different. The open drains erode the bowel due to pressure necrosis by tip whereas closed suction drains cause drawing of bowel into side holes due to creation of high negative pressure (which can reach up to -180 mmHg) causing erosion of the wall [8].

Direct perforation of bowel due to blind placement of drains has also been reported [9]. Erosion of drain into bowel may present as either localized or generalized peritonitis. An enterocutaneous fistula with drainage of the enteric contents through the drain may lead to the diagnosis of this condition. Imaging in the form of fistulogram through the drain may show passage of the contrast medium into the bowel. Contrast-enhanced computed tomography may also help in diagnosing this erosion.

The index case had an intraperitoneal bleed with formation of peri gastric hematoma in the postoperative period. The most likely source of this was the gastric staple line. Staple line bleed after LSG is a well recognized complication, and most of the patients with small hematomas respond to conservative management. We discharged this patient with abdominal drain in situ as we expected the hematoma to get lysed and resolve on conservative management. However, the readmission of the patient with complaints of passage of ingested liquids through the abdominal drain was suggestive of staple line leak. The Gastrograffin study also confirmed the clinical diagnosis as contrast spill was seen near the gastroesophageal junction. This site has been reported to be one of the most common sites of staple line leak.

As the patient was clinically stable with no signs of peritonitis or sepsis, the patient was managed conservatively [10]. Conservative management may be indicated in cases with localized peritonitis or low output enterocutaneous fistula. Patients with general peritonitis or having high drainage output require re-exploration.

Despite conservative management for 20 weeks, the seropurulent discharge persisted. An upper GI endoscopy was therefore done to identify the site of leak. It unexpectedly revealed a lower esophageal perforation near the gastro-esophageal junction, with fibrosed margins and Foley's catheter tip projecting into the esophageal lumen. A diagnosis of esophageal perforation due to erosion by the abdominal drain was made. The complication could have been precipitated by suture line bleed with hematoma formation and possible secondary infection followed by pressure necrosis of lower esophagus wall by drain tip.

After discussion with the gastroenterologist, endoscopic clipping of the perforation was performed. The option of esophageal stenting was not considered feasible in view of distal location of perforation near the gastro-esophageal junction, as stenting would have caused significant gastro esophageal reflux.

A wide search of published literature was performed to search for such a complication after LSG. To our knowledge a similar complication after LSG has not been reported earlier. Recently, endoscopic clipping for small esophageal perforations has been reported in some case reports [11]. Evidence of the effectiveness of clips for the endoscopic closure of both acute and chronic perforations of esophagus is growing [11].

The authors believe that in order to avoid bowel erosion, soft drains like Jackson Pratt drains are preferable over the stiffer PVC drains. Moreover, the drains should be utilized only when necessary and removed as early as possible. Confirmation of the final tip position of drain by direct visualization before complete desufflation of abdominal cavity may also prove to be of help.

In the hindsight, we believe that an early upper GI endoscopy could have significantly shortened the postopeartive course and morbidity of in this patient. Direct visualization and closure through upper GI endoscopy has a significant role in management of gastroesophageal leaks. Although rare, possibility of drain erosion into lower esophagus and/or stomach should be suspected in patients presenting with features of post-operative staple line leak after LSG.

Conclusion

Early upper GI endoscopy has a significant role in management of gastroesophageal leaks along with nasojejunal tube feedings. Endoscopic treatment of mature esophageal perforation with metallic clips can be performed to promote closure. In combination with other conservative medical efforts, this method can be used safely and effectively for selected patients.

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