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# Spectrum of Presentation and Management of External Duodenal Fistula Following Surgery- A Hospital Based Study

Authors
**Dr G. D. Yadav (MS, F.A.I.S., F.A.M.S.)[1], Dr Anju Yadav (MD) [2], Dr Shraddha Verma (MS, M.Ch)[3], Dr Pradeep Kumar[4], Dr Siddhant Singh[5], Dr Navendu Mohan[6], Dr Anand Yadav[7]**

[1]Associate Professor, Department of General Surgery, G.S.V.M Medical College, Kanpur (U.P) India
Email: *yadavgd71@gmail.com*
[2]Sr. DMO, NCR Kanpur
Email: *anjuyadavk1@gmail.com*
[3]Lecturer, Department of General Surgery, G.S.V.M Medical College, Kanpur (U.P), India
Email: *shraddhavermauttam@gmail.com*
[4]Senior Resident, Department of General Surgery, G.S.V.M Medical College, Kanpur (U.P), India
Email: *itsmedrpradeep@gmail.com*
[5]Junior Resident, Department of General Surgery, G.S.V.M Medical College, Kanpur (U.P), India
[6]Junior Resident, Department Of General Surgery, G.S.V.M Medical College, Kanpur (U.P), India
Email: *mbbsnavendu@gmail.com*
[7]Junior Resident, Department Of General Surgery, G.S.V.M Medical College, Kanpur (U.P), India
Email: *yaduvansianand@gmail.com*
Corresponding Author
**Dr Siddhant Singh**
Junior Resident, Department of General Surgery, G.S.V.M Medical College, Kanpur (U.P), India
Email: *sidsharp@gmail.com*

**Abstract**

**Background:** *Duodenal perforation is one of the commonest causes of peptic ulcer perforation. These perforations are primarily repaired but some time they may leak post operatively and form an external duodenal fistula.*

**Material and Method:** *A total of 108 cases of external duodenal fistula were studied. The management options varied with the patient condition. Patients were either managed conservatively or underwent surgical intervention which included pyloric exclusion with gastrojejunostomy, jejunal serosal patch or Three tube methods and then the final outcome of the patients was analyzed.*

**Results:** *Out of the 108 cases of duodenal leak 82 were managed conservatively out of which 32 (39%) patients expired. The remaining 26 patients were managed by surgical intervention out of which 13 (50%) patients expired due to complications.*

**Conclusion:** *Duodenal fistula patients have an overall high mortality and poor prognosis whether managed conservatively or surgically. We found that most of the patients were managed conservatively and had positive outcome and survival. In surgical methods performed in patients requiring intervention, the*

*pyloric exclusion with gastrojejunostomy was found to have relatively less mortality and better outcome than the other procedures used, i.e., jejunal serosal patch and Three tube method.*

**Keywords:** *Duodenal leak, pyloric exclusion with gastrojejunostomy, three tube method, jejunal serosal patch, duodenal perforation, external duodenal fistula (EDF).*

**Background**

Duodenal perforation is one of the commonest causes of peptic ulcer perforation. These perforations are primarily repaired but some time they may leak post operatively and form an external duodenal fistula. A leak from the duodenal suture line after repair is unusual, but if occurs, can be devastating. A patient who was previously recovering satisfactorily may suddenly present with severe abdominal pain, fever and shock-like state. Jaundice may develop within 48 hours owing to the absorption of bile from peritoneal cavity [1]. If the abdomen is drained, bile-stained fluid may be seen emerging at the drain site. Intravenous fluids should be started and adequate surgical drainage should be provided. Surgery is indicated when there is peritonitis, unresponsive fistula, high output fistula, sepsis or distal obstruction. Once the life-threatening phase is over, the priority should be to give adequate nutrition. In the last decade the management of duodenal leaks has shifted towards a more selective approach [4]. The approach to duodenal leaks ranges from nonsurgical to sophisticated surgical procedures. Duodenal leaks are technically difficult to manage and are associated with high morbidity and mortality [1,2]. Duodenal leak may be followed by external duodenal fistula (EDF). This condition is associated with electrolyte imbalance, malnutrition and exposure of tissues to copious amount of enzyme rich secretion resulting in skin excoriation and sepsis. Surgery in such patients, who are often malnourished and hypercatabolic, is associated with high morbidity and mortality rate [1,2,3]. We prospectively review our experiences with management of external duodenal fistula and their outcome.

**Aims and Objectives**

1. To evaluate the outcome of conservative and operative management of external duodenal fistula.
2. To evaluate the outcome of various surgical techniques for management of external duodenal fistula.
3. To evaluate the complications and mortality in follow up on 60 days after management.

**Material and Method**

This prospective study was conducted from July 2011 to December 2016 in the department of general surgery, LLR hospital, Kanpur, Uttar Pradesh.

**Inclusion criteria**

All patients admitted in surgery Department, L.L.R. Hospital, Kanpur developing external duodenal fistula after surgery for peptic ulcer perforation.

**Exclusion criteria**

Elsewhere operated cases with duodenal fistula after surgery for peptic ulcer perforation.

**Management of duodenal fistula**

Initially all the patients developing a duodenal leak were managed by a conservative approach for atleast 72 hours during which they were assessed for the need of a surgical intervention, given proper hydration, managed for dyselectrolytemia and prepared for surgery if required. Conservative approach meant keeping the patient nil per orally, allowing enteral nutrition with feeding jejunostomy or nasojejunal tube, parenteral nutrition, administering injection octreotide in selective patients with high output duodenal fistula , vitamin K supplementation and feeding the bile after double filtration, potassium supplementation, high protein diet and multivit-amin supplementation. Surgical intervention had

to be taken in those patients who developed signs of peritonitis, intra-abdominal sepsis or a high output duodenal fistula (>500 mL/24 hours) not responding to conservative management.

**The surgical procedures followed were:**

**Pyloric exclusion with gastrojejunostomy:** The pylorus is suture closed through a gastrostomy using non absorbable suture and a side to side gastrojejunostomy performed.

**Jejunal serosal patch:** A jejunal loop is mobilized and patched over the duodenal leak site using non absorbable sutures.

**Three tube method**: 3 tubes are placed, one ryle's tube for gastric decompression, one for feeding jejunostomy and a Foleys catheter in the duodenum for external bile drainage.

## Results

**Table 1:** Showing age and gender distribution of patients with duodenal leak/fistula

| Age Interval (in years) | Male | Female | Total |
|---|---|---|---|
| 21-30 | 12 | 00 | 12 |
| 31-40 | 22 | 02 | 24 |
| 41-50 | 32 | 02 | 34 |
| 51-60 | 24 | 00 | 24 |
| 61-70 | 10 | 02 | 12 |
| > 70 | 02 | 00 | 02 |
| Total Patients: | 102 | 06 | 108 |

In this study most patients (88.9%) developed external duodenal fistula within the first week after surgery. Mostly presented between post op days 4 to 7 (48.14%) followed by post op day < 3. Duodenal leak in post op day 4 – 7 is mostly due to risk factors like hypoalbuminemia, anemia and septicemia and other co-morbid condition. Leak within 3 days is usually due to the faulty technique used in surgery/old perforation with edematous duodenum.

**Table 2:** Showing the time of development of external duodenal fistula from the initial surgery.

| Post op day | No. of Patients (n = 108 ) | Percentage |
|---|---|---|
| < 3days | 44 | 40.74 |
| 4-7days | 52 | 48.14 |
| >7days | 12 | 11.1 |

( n = total no. of patients )

**Table 3:** Showing different approaches used for the management of external duodenal fistula.

| Treatment plan | No. of Patients ( n = 108 ) | Percentage |
|---|---|---|
| Conservative | 82 | 75.92 |
| Surgical | 26 | 24.08 |
| Pyloric exclusion with gastrojejunostomy | 12 | 11.11 |
| Three tube method(triple tube method) | 10 | 9.26 |
| Jejunal serosal patch | 04 | 3.71 |

**Table 4:** Showing duration of post operative stay in the hospital.

| Days | No. of Patients | | | | |
|---|---|---|---|---|---|
| | Conservative | Pyloric exclusion with gastrojejunostomy | Three tube method | Jejunal serosal patch | Total |
| <10 | 10 | 3 | 1 | 1 | 16 |
| 10-19 | 23 | 6 | 2 | 2 | 33 |
| 20-29 | 44 | 3 | 4 | 1 | 51 |
| ≥30 | 5 | 0 | 3 | 0 | 8 |

In our study, overall the usual duration of hospital stay was 20-29 days. This included patients who were discharged after removal of drains, discharged with drains in situ which were subsequently removed during follow up and patients who expired during the hospital stay. None of the patients expired after discharge. It was seen that the patients who were managed conservatively had a relatively longer duration of stay in the hospital (mean duration of stay = 20.36 days) as compared to those managed operatively (mean duration of stay = 17.69 days).

**Table 5:** Showing post operative complications in patients developing duodenal fistula.

| Postoperative Complication | No. of Patients | Percentage |
|---|---|---|
| Surgical site infection | 60 | 55.55 |
| Dyselectrolytemia | 76 | 70.37 |
| Burst abdomen | 42 | 38.8 |
| Respiratory infection | 20 | 18.5 |
| Extensive skin excoriation | 08 | 7.4 |
| Septicemia | 48 | 44.44 |
| Mortality | 45 | 41.6 |

**Table 5:** Showing mortality seen after using different methods to manage duodenal fistula

| Method Used | No. of Patients Expired/ Total patients | Percentage |
|---|---|---|
| Conservative | 32/82 | 39.02 % |
| Surgical | 13/26 | 50.00 % |
| Pyloric exclusion with gastrojejunostomy | 04/12 | 33 % |
| Three Tube Method | 06/10 | 60 % |
| Jejunal Serosal Patch | 03/04 | 75 % |

Mortality was higher (50%) in those patients who underwent surgical re-exploration in our study. Mortality in jejunal serosal patch was highest (75%) followed by Three tube method (60%). Pyloric exclusion with gastrojejunostomy used had least mortality (33%) among surgical methods in our study. Mortality was about 1/3rd in those patients who were managed conservatively.

By logistic regression and analysis Pyloric exclusion with gastrojejunostomy was compared with jejunal serosal patch and Three tube method. On the basis of statistical analysis Pyloric exclusion with gastrojejunostomy had better outcomes (p value <0.05).

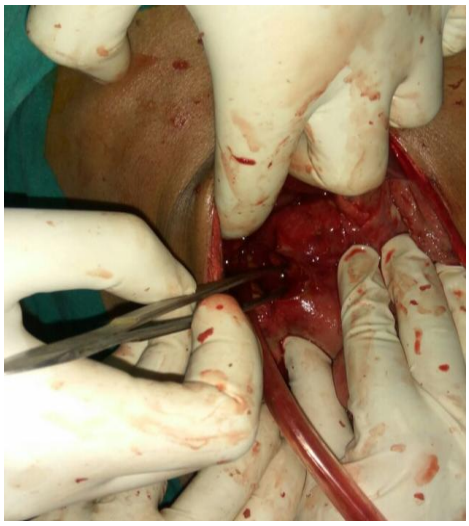

**Fig 1:** re-exploration of external duodenal fistula.

**Fig 2:** performing pyloric exclusion with gastrojejunostomy.

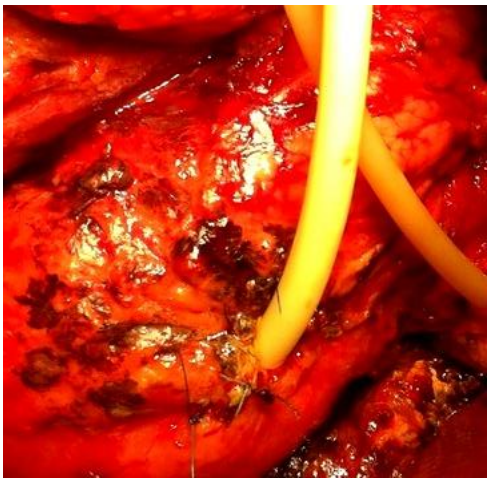

**Fig 3:** Three Tube Method.

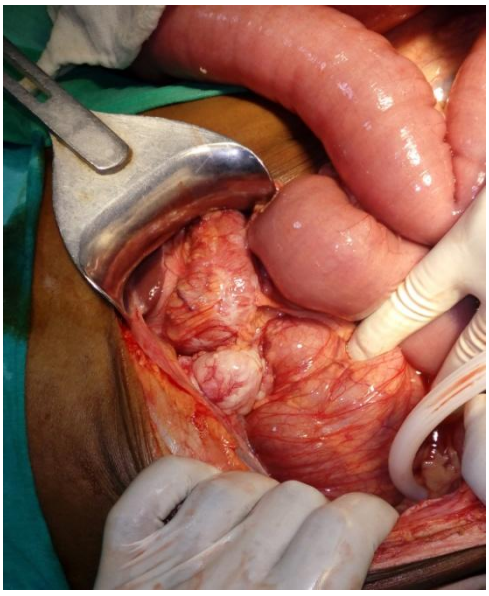

**Fig 4:** Jejunal Serosal patch.

## Discussion

Peptic ulcer perforation is a common surgical emergency in our part of the world showing a male preponderance[10]. Duodenal leak after surgery for duodenal perforation is due to multiple factors[9]. Chronic ulcers, old age, hypoalbuminemia and prolonged peritonitis have been incriminated. The size of perforation may also contribute to the development of fistula. In our study, about 1136 patients with duodenal ulcer perforation of different size, underwent repair and 108 of them developed postoperative leak. Out of the 108 patients in whom ulcer dimensions were known prior to the development of duodenal leak, 32 patient had size <1cm, 56 patients had 1-3cm , and in 20 patients the perforation size exceeded 3cm . This size has been labeled as giant duodenal perforation by some authors [11].

A total of 108 patients of external duodenal fistula were identified which were mostly diagnosed clinically and very few patients required radiological investigations in the form of Ultrasound or CT scan. Most of the duodenal leak confirmation was done clinically with the help of bilious nature coming out of drainage tube/ main wound and persistent bilious content in the drainage tube. Additionally there was evidence of sepsis, tachycardia, signs of peritonitis and presence of Entero - Cutaneous Fistula. Most commonly (75.92%) these patients were managed conservatively.

In our study 26 (24.08%) patients required surgical management. These were those having signs of peritonitis, intra-abdominal sepsis/ collection of bile or a high output fistula (>500 mL/24 hours) not responding to conservative measures.

Pyloric exclusion with gastrojejunostomy was the most commonly performed surgical procedure followed by Three tube method and then jejunal serosal patch method. Similarly success rate was also higher with Pyloric exclusion with gastrojejunostomy followed by Three tube method, and then jejunal serosal patch.

Re-leaks following closure of ulcer perforation is a noted complication. The incidence of re-leak ranges between 4 and 16 % in various studies. Rose et al recommended conservative measures which involve administration of total parenteral nutrition with drainage of leaking site [5].

In our study it was found that the conservative approach was associated with less mortality and mostly complete resolution after period of 4-6 weeks follow up. Hamby et al described a simple apposition procedure for arresting the re-leak but inflammation and induration of the ulcer surroundings precludes this intervention [6]. Poor level of success of surgical intervention was found in our study which is in contrast with the results of Maghsoudi et al where the authors obtained a success of arresting the re-leak in 13/17 (76.5%) patients[7].

Mortality seen was higher in those patients requiring surgical re-exploration in our study. This is similar to the results obtained by Sanjanwala SS et al who reported 78% mortality in patients undergoing surgery for re-leak [8]. In our study Pyloric exclusion with gastrojejunostomy had least mortality among the surgical procedures used. Mortality was about 1/3rd in those patients who were managed conservatively.

Sub-group analysis shows an overall greater survival with a conservative approach in comparison to surgical interventions.

It is recommended to delay surgery for a few weeks to control sepsis and improve nutritional status. If the fistula does not heal after 4-6 weeks of optimum medical management, it is unlikely to close without surgical intervention. Nutritional support is an essential part of the treatment of external duodenal fistula.

## Conclusion

To conclude, the present study has given a spectrum of presentation (more common in males M:F = 17:1) and management of external duodenal fistula developing after surgery for peptic ulcer perforation from a tertiary care hospital in a developing country. Duodenal fistula

patients have an overall high mortality and poor prognosis whether managed conservatively or surgically. We found that most of the patients were managed conservatively and had positive outcome and survival. In surgical methods performed in patients requiring intervention, the pyloric exclusion with gastrojejunostomy was found to have relatively less mortality and better outcome than the other procedures used, i.e., jejunal serosal patch and Three tube method.

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