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CLINICOPATHOLOGICAL CORELATION IN SURGICAL MANAGEMENT OF DUODENAL PERFORATION

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ABSTRACT:

Introduction: The stomach is a crucial part of the digestive system, followed by the duodenum, which is 25 cm long and divided into four segments. Duodenal diseases include ulcers, inflammation, diverticula, tumors, polyps, and hookworm infections. Duodenal perforations are life-threatening, with mortality rates of 8-25%. Surgery remains the primary treatment for this common emergency.

Methodology: This prospective cross-sectional study was conducted at Navodaya Medical College and Hospital, Raichur. Forty patients with clinical and radiological signs of hollow viscus perforation, diagnosed with duodenal perforation during exploratory laparotomy, were randomly selected. Thorough clinical and radiological examinations were performed.

Results: The mean age of participants was 41.70 ± 11.82 years, with 80% being male. Chief complaints included abdominal pain (47.50%), vomiting (37.50%), and fever (15%). Risk factors identified were smoking (42.50%), alcohol consumption (37.50%), family history (17.50%), NSAID use (22.50%), and peptic ulcer disease (7.50%). The mean surgery duration was 43.30 ± 11.53 minutes. Hospital stay was less than 5 days for 52.50% of participants. Post-operative complications occurred in 15% of cases, with 7.50% experiencing anastomotic leaks.

Conclusion: The study found that duodenal perforation predominantly affects males, with abdominal pain and vomiting as common symptoms. Identified risk factors included smoking, alcohol consumption, NSAID use, peptic ulcer disease history, and family history.

Approximately half of the patients required hospital stays longer than 5 days. Post-operative complications, including anastomotic leaks, were observed in a small percentage of cases.
Key words: Duodenal Ulcer, Duodenal perforation, Risk factors.

INTRODUCTION

Stomach is an important organ and most dilated portion of the digestive system with Oesophagus preceding it and followed by small intestine. It comprises four main regions being the cardia, fundus, body and pylorus.[1] The continuation of pylorus is the duodenum which is a C-shaped segment of the small intestine and distally is continued by jejunum and ileum and is positioned inferiorly to the stomach.[2]

The duodenum is a unique peritoneal inter-positional organ occupying the peritoneal cavity and extraperitoneal cavity adjacent to many organs which includes pancreas, stomach, abdominal aorta and liver. It measures about 25 cm in length, 2.5 cm width with about 2 mm thickness and is divided into four segments, the duodenal bulb, descending segment, horizontal segment and ascending segment. Duodenal diseases are complex which includes duodenal ulcer, inflammation, diverticulum, tumour, polyp and hookworm diseases.[3]

Duodenal ulcers occur when there is a disruption in the surface of the mucosa of the duodenum and these ulcers are a part of peptic ulcer disease which involves stomach and first part of duodenum. Helicobacter pylori and NSAIDs (Non-Steroidal Anti-Inflammatory Drugs) are two important underlying etiology in occurrence of duodenal ulcers. Three main complications of duodenal ulcers include bleeding, perforation and obstruction.[4] Duodenal perforation is a rare, but lethal condition with mortality ranging from 8% to 25% and these duodenal perforations can be either free or contaminat

Duodenal ulcer patients experience nocturnal abdominal pain or feel hungry and when perforation occurs they experience a sudden onset of severe pain in upper abdomen. 1 Peptic ulcer disease, habits of smoking and alcohol consumption, duodenal diverticulitis, infections, few autoimmune conditions, duodenal ischaemia, impacted gallstones, tumours are few etiological factors of duodenal perforation.[5]

Duodenal perforation is a common surgical emergency which can be secondary to an ulcer, endoscopic procedures, trauma or surgery. Advanced age, pre-operative shock, co-existing medical illness and delay in treatment are common risk factors that are associated with poor outcomes among patients with duodenal perforation.[6] Over the last two decades

there has been a number of advances in management of perforated duodenal ulcers which includes risk stratification, expanded role of non-operative treatment and developing role for laparoscopic surgery.[7]

Surgery is still the mainstay of treatment for duodenal perforation and many perforations are repaired using an omental patch and if patient needs surgery, there is still ongoing debate regarding type of repair whether open or laparoscopic technique and role of gastric deviation surgeries such as pyloric exclusion.8 Our study was conducted with an intention to understand the clinic pathological correlation with surgical management of duodenal perforation.

MATERIALS AND METHODS

This prospective cross-sectional study was conducted at Navodaya Medical College and Hospital in Raichur over an 18-month period from January 2022 to June 2023. The study included 40 patients who were admitted with clinical and radiological signs of hollow viscus perforation and diagnosed with duodenal perforation during exploratory laparotomy. Patients were selected using simple random sampling.

Inclusion criteria were patients with diagnosed duodenal perforation on exploratory laparotomy who were willing to participate. Exclusion criteria included pregnant women, immunocompromised patients, those with pre-diagnosed malignancies, and patients who had undergone previous abdominal surgeries.

All participants underwent thorough clinical examination, abdominal examination, and supportive radiological exams. Detailed history was collected regarding the illness, symptoms, associated conditions, and comorbidities. Investigations performed included complete blood count, random blood sugar, abdominal X-ray, and CT scan if needed.

Post-operatively, wound dressing was done and the wound was inspected on the day of surgery and post-operative days 3, 5, 7 and 9. Parameters recorded included post-operative pain, hospital stay duration, time to early feeding, anastomotic leak, antibiotic usage duration, and complications on follow-up. Data was analyzed using descriptive statistics, t-tests, chi-square tests, and ANOVA. The study received ethical clearance from the institutional ethics committee.

RESULTS

This prospective cross-sectional study was conducted at Navodaya Medical College and Hospital, Raichur, over 18 months. Forty patients diagnosed with duodenal perforation during exploratory laparotomy were included using simple random sampling.

Table 1 presents the demographic and clinical characteristics of the study population. The mean age of participants was 41.70 ± 11.82 years, with a significant male predominance (80%). The most common presenting complaint was abdominal pain (47.50%), followed by vomiting (37.50%) and fever (15%). Hypertension was the most prevalent comorbidity, affecting 25% of the patients.

Table 1: Demographic and Clinical Characteristics

Characteristic	**Result**
Mean age	41.70 ± 11.82 years
Gender	80% male, 20% female
Chief complaints	Pain abdomen (47.50%)
	Vomiting (37.50%)
	Fever (15%)
Most common comorbidity	Hypertension (25%)

Table 2 highlights the risk factors associated with duodenal perforation in the study population. Smoking history was the most common risk factor (42.50%), followed by alcohol consumption (37.50%). Use of NSAIDs was reported in 22.50% of cases, while 17.50% had a family history of duodenal perforation. A history of peptic ulcer was present in 7.50% of patients.

Table 2: Risk Factors

Risk Factor	**Percentage**
History of smoking	42.50%
Alcohol consumption	37.50%
Use of NSAIDs	22.50%
Family history	17.50%
History of peptic ulcer	7.50%

Table 3 summarizes the surgical and post-operative outcomes. The mean duration of surgery was 43.30 ± 11.53 minutes, with an average hospital stay of 5.53 ± 1.78 days. Patients received their first post-operative feed at a mean time of 5.38 ± 1.33 hours. Anastomotic leak occurred in 7.50% of cases, while overall post-operative complications were observed in 15% of patients.

Table 3: Surgical and Post-operative Outcomes

Outcome	Result
Mean surgery duration	43.30 ± 11.53 minutes
Mean hospital stay	5.53 ± 1.78 days
Mean time to first feed	5.38 ± 1.33 hours
Anastomotic leak incidence	7.50%
Post-operative complications	15%

Table 4 illustrates the progression of post-operative pain scores over time. Pain scores showed a consistent decrease from day 0 (5.08 ± 1.75) to day 7 (0.10 ± 0.63), indicating effective pain management and recovery.

Table 4: Post-operative Pain Score (Mean ± SD)

Time Point	Pain Score
Day 0	5.08 ± 1.75
Day 1	3.50 ± 2.00
Day 3	0.73 ± 1.75
Day 7	0.10 ± 0.63

DISCUSSION

The study's demographic findings align with several previous studies. The mean age of participants was 41.70 ± 11.82 years, with 80% being male. This is consistent with findings from Ranjan A, et al.[5], Jamal MH, et al.[6], and Sarkar R, et al.[7], who reported similar age ranges and male predominance. However, Buck DL, et al.[8] reported a higher proportion of elderly patients and females, indicating potential demographic variations across different populations.

Regarding clinical presentation, 47.50% of patients presented with abdominal pain as the chief complaint, followed by vomiting (37.50%) and fever (15%). These findings are partially consistent with Jamal MH, et al.[6] and Seth S, et al.[9], who reported higher percentages of abdominal pain and vomiting. The study identified several risk factors, including smoking (42.50%), alcohol consumption (37.50%), and NSAID use (22.50%). These align with findings from Ranjan A, et al.[5], Buck DL, et al.[8], and Seth S, et al.[9], underscoring the importance of these factors in duodenal perforation etiology.

The mean duration of surgery was 43.30 ± 11.53 minutes, with 52.50% of patients requiring hospital stays of less than 5 days. Post-operative complications were observed in 15% of cases, with anastomotic leak occurring in 7.50%. These outcomes differ somewhat from Bojanapu S, et al.[10], who reported longer hospital stays and higher complication rates. The study's post-operative pain scores showed a gradual decrease from day 0 to day 7, indicating effective pain management. Overall, these findings contribute to the understanding of duodenal perforation management and outcomes, while highlighting areas for further research and potential improvements in patient care.

CONCLUSION

The findings from our study concluded that males were affected more, pain abdomen and vomiting were the commonest presenting complaints and the risk factors identified were history of smoking, alcohol consumption, use of NSAIDs, previous history of peptic ulcer disease and family history of duodenal perforations. Almost half of them required hospital stay duration for more than 5 days and post- operatively anastomoses leak was witnessed among three of them and 15% experienced post-operative complications.

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