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A Prospective Clinical Study on Prognostic Factors in Perforative Peritonitis in a Tertiary Care Hospital

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Abstract

Background:

Peritonitis caused by gastrointestinal tract perforations, a common occurrence in this country, requires rapid surgical intervention and is associated with high rates of morbidity and mortality. The most catastrophic outcome, a perforated duodenal ulcer, is estimated to have a high mortality rate. Previously, increased risk was linked to variables such as delayed patient presentation, surgical postponement, and poor antibiotic usage.

Methods:

All patients with duodenal ulcer perforation who were hospitalised and treated at DD MCH, Keonjhar between August 2021 and November 2022 were studied after providing written informed permission. The research was approved by the institutional ethics council prior to its initiation.

Results:

110 individuals with duodenal ulcer perforation who had surgery were evaluated. 32 patients (29.09%) were older than 60 years. The male:female ratio was 6.85 to 1. Among the sociodemographic characteristics, older age (>60 years) was shown to have a significant connection with mortality after surgery. 37.27% of the study population had IHD, 40.90% utilised NSAIDs, 10.90% presented with shock, and 50% arrived at the health institution after 24 hours. Ischaemic heart disease, NSAID usage, the occurrence of shock upon admission, and late presentation were all linked with death.

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Conclusions:

Increasing age, the presence of IHD, the use of NSAIDs, patients presenting in shock, and those arriving late to the health institution all predicted a bad outcome.

Keywords: Peritonitis, Duodenal Ulcer, Ischaemic Heart Disease, NSAIDs

INTRODUCTION

Peritonitis is an inflammation of the serosal membrane that lines the abdominal cavity and its organs. Bowel perforations are a frequent route for an infection to infiltrate the typically sterile peritoneal environment and cause peritonitis. A chemically irritating material, such as stomach acid from a torn ulcer, may potentially have caused the disease. This country has a high incidence of peritonitis caused by stomach perforations, which need immediate surgical surgery and have a high mortality rate.

Crisp's first clinical report of a ruptured peptic ulcer appeared in 1843. Smoking and using nonsteroidal anti-inflammatory medications are two main risk factors for perforation. The clinical diagnosis is made, and radiographs demonstrate Pneumoperitoneum confirms the diagnosis.

The most severe outcome, a perforated duodenal ulcer, used to have a significant mortality rate due to the patient's delayed presentation, the surgical site's delay, and the lack of appropriate antibiotics. [1]

According to some authors, the incidence of peptic ulcer disease and perforation has decreased during the last three decades. The treatment of peptic ulcer disease has evolved as a consequence of advances in the use of a broad range of drugs in medical therapy, and surgery has become less prevalent in the elective setting.

Males are more prone to get perforation in middle and old age, and the epidemiological trend differs internationally. In Western countries, the frequency is relatively On the decrease. [2] Stress and strain have been identified as potential causes of the increase in occurrence.

Operative therapy involves the age-old process of closing the oral patch, which may be done laparoscopically. Laparoscopic procedures for sealing duodenal holes are now widely utilised and have the potential to become the gold standard in the future, especially for patients with perforations smaller than 10 mm and who present during the first 24 hours of pain.

The present study's goal is to investigate the most common causes of duodenal ulcer perforation, as well as the poor prognostic characteristics that influence ulcer mortality and morbidity.

Early hospital admission, early diagnosis, quick surgical treatment, and the administration of appropriate and sufficient antibiotics may all help reduce the fatality rate in perforated peptic ulcers. The prognosis for duodenal ulcer perforation has improved owing to a variety of factors, including better critical care and ICCU facilities, adequate fluid and electrolyte replacement, and complete peritoneal toiling. [3]

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This research reviews and presents relevant literature on peptic ulcer illness and developments in medical treatment, as well as peptic ulcer perforation and contemporary trends in perforation care. [4]

Aims and Objectives

1. To investigate clinical risk factors for duodenal ulcer perforation and their relationship to surgical outcome.
2. Researching sociodemographic characteristics in connection to the result of duodenal ulcer perforation surgery.
3. To examine the mortality and morbidity rates among individuals who have peritonitis as a result of a perforated duodenal ulcer.

This prospective analysis included all patients with duodenal ulcer perforation who were hospitalised and treated at DDMCH, KEONJHAR between August 2021 and November 2022. A performa was utilised to capture the patient's history, examination findings, investigation results, sociodemographic information, and related comorbid conditions. The patients received simple omental patch closure and were periodically monitored for up to two months. These individuals were evaluated for problems throughout the research period and documented in a performa. The patients' outcomes were reported as dead or alive following a two-month follow-up period. The research began with prior permission from the institutional ethics committee.

Inclusion Criteria

1. All patients above age 18 years presenting with duodenal perforation.
2. Patient giving written informed consent.

Exclusion Criteria

1. Perforation other than duodenal ulcer perfora- tion.
2. Perforation secondary to blunt trauma or pene- trating trauma.

Results

Table 1: Relationship between Sociodemographic Factors and Mortality in the Study Population

Sl. No.	Sociodemographic Factors	Dead Patients	Survived Patients	Total Patients	Chisquare Value	P Value
	Age Group					
1	18 – 39 Years	1 (2.77%)	35 (97.22%)	36 (100%)	13.840	0.0009*
2	40 – 59 Years	2 (4.76%)	40 (95.23%)	42 (100%)		
3	≥ 60 Years	9 (28.12%)	23 (71.87%)	32 (100%)		
	Gender					
1	Male	9 (9.37%)	87 (90.62%)	96 (100%)	1.8265	0.1765
2	Female	3 (21.42%)	11 (78.57%)	14 (100%)		
	Residence					

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1	Rural	7 (16.27%)	36 (83.72%)	43 (100%)	2.0946	0.1478
2	Urban	5 (7.46%)	62 (92.53%)	67 (100%)		

From Table 1 it can be seen that the frequency and proportion of mortality increased among the study population at higher ages. This was also found to be statistically significant. There was no relationship between gender or place of residence with mortality.

Table 2: Relationship Between Selected Risk Factors and Mortality in Patients who Underwent Surgery for Duodenal Ulcer Perforation

Sl. No.	Risk Factors	Dead Pa - tients	Survived Patients	Total Pa-tients	Chisquare Value	P Value
	Diabetes Mellitus					
1	Present	3 (25%)	9 (75%)	12 (100%)	2.7517	0.0971
2	Absent	9 (9.18%)	89 (90.81%)	98 (100%)		
	Hypertension					
1	Present	6 (13.04%)	40 (86.95%)	46 (100%)	0.3706	0.5426
2	Absent	6 (9.37%)	58 (90.62%)	64 (100%)		
	Ischaemic Heart Disease					
1	Present	8 (19.51%)	33 (80.48%)	41 (100%)	4.9776	0.0256*
2	Absent	4 (5.79%)	65 (94.20%)	69 (100%)		
	Copd					
1	Present	3 (15.78%)	16 (84.21%)	19 (100%)	0.5628	0.4531
2	Absent	9 (9.89%)	82(90.10%)	91 (100%)		
	Smoking					
1	Present	5 (7.14%)	65 (92.85%)	70 (100%)	2.8095	0.0937
2	Absent	7 (17.5%)	33 (82.5%)	40 (100%)		
	Alcohol					
1	Present	7 (18.91%)	30 (81.08%)	37 (100%)	3.6804	0.0550
2	Absent	5 (6.84%)	68 (93.15%)	73 (100%)		
	NSAIDS					
1	On NSAIDs	9 (20%)	36 (80%)	45 (100%)	6.4757	0.0109*

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2	Not on NSAIDs	3 (4.61%)	62 (95.38%)	65 (100%)		
	Presence of Shock					
1	Present	8 (66.66%)	4 (33.433%)	12 (100%)	43.085	<0.00001 *
2	Absent	4 (4.08%)	94 (95.91%)	98 (100%)		
	Time of Presentation					
1	< 24 Hours	2 (3.63%)	53 (96.36%)	55 (100%)	5.9864	0.0144*
2	> 24 Hours	10 (18.18%)	45 (81.81%)	55 (100%)		

From Table 2 , it is evident that presence of Ischaemic Heart disease (IHD), consumption of NSAIDs, presence of shock and late presentation of the patient had a statistically significant relationship with mortality.

The most common post operative complication among the study population was wound infection (47%) followed by chest infections (27%). Least common complications were bile leak (2%) and deep vein thrombosis (2%).

Discussion

Since the development of H2 blockers, proton pump inhibitors, and therapy to remove H.pylori, the number of people presenting with simple peptic ulcers has reduced, resulting in fewer elective surgeries. Despite a decrease in the number of uncomplicated peptic ulcer cases, the number of people hospitalised with peptic ulcer perforation has remained constant. Despite advances in perioperative monitoring and treatment, the frequency of emergency surgery for perforated peptic ulcers, a complication of peptic ulcer disease, has risen somewhat, as has the mortality rate of patients undergoing perforated peptic ulcer surgery.[4] In this research, 110 patients with perforated duodenal ulcers were evaluated at our institution's general surgery department. The goal of this research is to discover the variables determining postoperative complications and death. We discovered that age, gender, smoking, alcohol, length of perforation, and peritoneal contamination are predictive variables in the fate of these individuals. among this research, the incidence of perforated duodenal ulcers was highest among the elderly, and it increased with age. This greater occurrence in older age might be attributed to lower amounts of prostaglandins in the gastrointestinal mucosa, which increases the likelihood of ulcerogenic damage. Age Incidence In the current research, the largest incidence of perforation was in the age group of 60-70 years (26%), followed by similar incidences in the age groups of 50-60 years (21%), and 40-50 years (21%). Other investigations reported a similar incidence. among this research, the incidence of perforated duodenal ulcers was highest among the elderly, and it increased with age. This greater occurrence in older age might be attributed to lower amounts of prostaglandins in the gastrointestinal mucosa, which increases the likelihood of ulcerogenic damage. Another probable contributing factor is an

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increase in the use of nonsteroidal anti-inflammatory medicines among the elderly, as well as other concurrent conditions. [5] Sex Incidence Perforated duodenal ulcers are more frequent in males than women this century. In this research, 96 of the 110 patients were men and 14 were females, resulting in a 7:1 male to female sex ratio. The disparity in the incidence of perforated peptic ulcers between men and women might be attributed to increased smoking and alcohol use among men compared to women, both of which are risk factors for perforated duodenal ulcer. variances in sex incidence seen in various studies might be attributed to variances in male and female dietary choices, alcohol use, and smoking around the globe. Smoking is one of the most frequent risk variables not addressed in this research. Cigarette smoking may counteract the impact of H2 receptor antagonists on stomach acid output in individuals with duodenal ulcers. Smoking reduces the pancreatic production of bicarbonate. Nicotine has been proven to increase basal acid secretion. It has been observed that smoking reduces duodenal pH. The link between ulcer perforation and smoking is physiologically reasonable. Smoking produces acute vasoconstriction in the mucosa of the upper GI tract. Ischemia lowers mucosal tolerance to acid, which may lead to ulcer perforation. This mechanism might explain why we see an increase in risk among smokers. [6] In this research, smoking was prevalent in 63% of the participants. Other studies have also shown smoking as a significant risk factor. Alcohol Alcohol use and cigarette smoking are two etiological variables that are closely linked to peptic ulcer illnesses. prolonged active gastritis is supposedly linked to prolonged alcohol use. Alcohol has been demonstrated to influence the mucosal barrier and histology. Consuming alcohol and smokes at the same time increases the risk of ulcers. [7] NSAIDS produce prostaglandin deficit, which causes microvascular abnormalities in the upper gastrointestinal mucosa, resulting in reduced mucosal blood flow and injury. Asprin and other direct irritant medications affect the upper gastrointestinal system. [8] According to Thorsen et al.'s study, 53% of patients with a perforated duodenal ulcer use NSAIDS. [9] In a study of 49 patients with duodenal ulcer perforation, Seth et al found that 24 patients (47%) used NSAIDS. According to some research, the total risk of adverse gastrointestinal events is three times higher in individuals using NSAIDS. For adults over the age of 60, this risk increases fivefold. [10] In the current investigation of patients with perforated duodenal ulcers, NSAIDS were used by 12% of the patients. Postoperative Complications A variety of factors influence mortality and post-operative morbidity in patients with perforated duodenal ulcers. Some risk variables impacting the outcome include age over 60, treatment delay or increasing the time between symptom start and hospital presentation, shock at presentation, coexisting disorders, increased renal parameters at hospital presentation, and hypoalbuminemia. [11,12] Post-operative mortality in the elderly is three to five times greater. This might be owing to the existence of medical comorbidities, delayed presentation, atypical presentation, or a diagnostic delay of more than 24 hours.[13] Kumar et al. found that when an omental patch is used for simple closure, ulcer perforations more than 5 mm constitute an independent risk factor for leaking. [13] As a result, the presence of shock on admission slows postoperative recovery owing to renal and respiratory difficulties, as well as affecting wound healing due to reduced perfusion. Delay in surgery promotes increased bacterial peritonitis, which leads to septicaemia and renal failure in the postoperative phase. In the present study, the most common postoperative complications seen were wound infection in seventeen patients, chest infections in eleven patients, wound dehiscence in four patients, burst abdomen in three patients, leakage

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in one patient, and deep vein thrombosis in one patient. Duration of Perforated Duodenal Ulcer and Mortality According to current studies, every hour that passes between admission and surgery reduces the probability of survival by 2.4 percent in patients with perforated peptic ulcer disease. According to their statement, diagnostic delays between admission and diagnosis seem to be the most common cause of hospital surgical delays. [14]

In this investigation, death was increased in patients who presented after 24 hours of symptom start. In this research, out of 110 patients, presentation within 24 hours was related with enhanced survival, but death was significant in individuals presenting beyond 24 hours after symptom start. shortage of knowledge, a shortage of transportation, and symptomatic treatment by themselves or local quacks were all probable reasons for the delay. A high link between delay and unfavourable outcome might be due to an increased chance of acquiring severe sepsis. Presence of shock and mortality In this research, shock upon presentation is associated with higher mortality. In the current research, eight of the twelve individuals who presented with shock died. In this research, patient age, the delay from the beginning of symptoms (perforation to surgery), peritoneal contamination, and shock upon presentation are strong predictors of morbidity and death in patients with perforated duodenal ulcer. These variables also contribute to increased post-operative morbidity and length of hospital stay. Several studies have shown the importance of Noval procedures and developments for the treatment of peptic ulcer perforation.

Natural Orifice Transluminal Endoscopic Surgery (NOTES)

The concept of NOTES ulcer closure is identical to that of open and laparoscopic surgery: a well-vascularized pedicle of omentum falciform ligament is introduced to the site of perforation and sealed in situ. The omentum is drawn into the duodenal lumen, the abdominal cavity is irrigated, and the endoscope exits the existing perforation site by carbon dioxide insufflation. It is clipped into place, and insufflating the lumen may be utilised to detect leakage. Laparoscopic assistance was used if the ulcer was too small to enable the complete endoscope to exit. Its drawbacks include inflammation of the gut wall and significant perforations. Transluminal Omental Patch Closure In this operation, an endoscope is used to implant a vascularised omental pedicle via a hole, which is then clipped into place. It requires living tissue, not the friable wound margins. Over the Scope Clip. In this operation, wound edges are grasped endoscopically and a big clip with a transmural grab is placed across the hole. Indurated ulcer margins may be difficult to manipulate because to limited pliability and the absence of vascularized tissue (omental pedicle). [15,16]

Self-expanding Metal Stents (SEMS)

Self-expanding metal stents (SEMS) This procedure involves covering the ulcer with self-expandable metal stents. This surgery demands endoscopic expertise, and the long-term outcomes are questionable. [17]

Over Stitch Endoscopic Suturing System

The Over Stitch Endoscopic Suturing System is offered commercially and employs suturing techniques based on endoscopic caps and catheters. It uses flowing or interrupted sutures to close gaps of varying sizes. [18]

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U Clips

U Clips Some disadvantages of laparoscopic repair of perforated peptic ulcers include the duration of the operation and the laparoscopic surgeon's familiarity with intracoronary knotting. [19] U-Clips simplify the laparoscopic repair of a perforated peptic ulcer by eliminating the need for knots and making the procedure safer and simpler. It is appropriate for holes that are smaller than 10mm in diameter. Additional methods include the use of an acellular matrix plug, a biodegradable lactide-glycoside-caprolacton patch that is glued to the perforation to close it, suturing the duodenal or stomach perforation, followed by the application of a patch coated in thrombin and fibrinogen and covered in an omental patch, and the injection of mesenchymal stem cells. [20,21] The experimental model incorporates a couple of these techniques. It is critical to study innovative technologies in order to identify less invasive surgical repair choices. In a similar vein, persons with little symptoms may benefit from less invasive treatment options. Long-term follow-up studies with quality-of-life evaluations will be required to determine the safest and most effective management strategies, as well as appropriate selection criteria.

Conclusions

Increasing age at presentation, the presence of ischemic heart disease, the use of NSAIDs, patients presenting with shock at admission, and late arrival to the hospital all had a bad outcome.

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