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A study on Factors Affecting Mortality and Morbidity in Patients Presenting with Peritonitis Due to Duodenal Ulcer Perforation

G Kishore Babu[1], Gowthami Penumur[2]

[1]Associate Professor, Department of General Surgery, Sri Venkateswara Institute of Medical Sciences, Tirupati, Andhra Pradesh 517507, India. [2]Senior Resident, Department of General Surgery, Sri Venkateswara Medical College, Tirupati, Andhra Pradesh 517507, India.

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Abstract

Context: Perforation of the duodenal ulcer is common emergency surgical with significant morbidity and mortality rates. Operative management either open or lap is the treatment. Several factors determine the morbidity and mortality which were studied in this study.

Aims: To study clinical risk factors, socio-demographic factors, in relation to outcome of surgery for duodenal ulcer perforation and analyze the mortality and morbidity in patients with peritonitis due to duodenal ulcer perforation.

Materials and Methods: Patients of duodenal ulcer perforation admitted in SVRRGGH between August 2016 to September 2017 were studied prospectively. History, clinical examination, investigations, intraoperative findings and postoperative status, relationship of clinical and socio-demographic factors on peritonitis were documented in proforma.

Statistical analysis used: SPSS 11.

Results: The most common age group is 60–70 years. Male to female ratio of 7:1. Highest incidence occured during the months of September and October. Common precipitating factors were smoking, alcohol, NSAIDS. Among 110 patients 12 presented in shock, with mortality of 66%. Delayed presentation > 24 hours, Size of perforation > 1 cm, peritoneal contamination > litre were associated with increased mortality. Common postop complications were wound infection, Pneumonia. Mortality is more in elderly age group that is in patients more than 60 years of age.

Conclusions: Smoking, alcohol and NSAIDS usage are predisposing factors for duodenal ulcer perforation. Early presentation, prompt diagnosis, adequate resuscitation, emergency surgery and postoperative monitoring are useful for successful management and good outcome of perforated peptic ulcer.

Keywords: Duodenal perforation; Peritonitis; Cellen Jones technique.

Introduction

Peritonitis is often caused by introduction of an infection into the otherwise sterile peritoneal environment through perforation of bowel. The first clinical description of perforated peptic ulcer was made by Crisp in 1843. Smoking and use of nonsteroidal anti-inflammatory drugs are important risk factors for perforation. Diagnosis is made clinically and confirmed by the presence of pneumoperitoneum on radiographs. Perforated duodenal ulcer, the most catastrophic complication, was associated with high mortality in the past due to late presentation of the patient, delay in surgery and lack of appropriate antibiotics.[1]

Perforation is usually seen in middle and old age, with a male preponderance and the epidemiological trend is not the same worldwide. Incidence is slightly declining in western countries.[2] Stress and strain has been mentioned as a possible cause of increased incidence.

Operative management consists of omental patch closure. Laparoscopic approaches to closure of

Corresponding Author: Gowthami Penumur, Senior Resident, Department of General Surgery, Sri Venkateswara Medical College, Tirupati, Andhra Pradesh 517507, India.

E-mail: gowthami.penumur@gmail.com

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duodenal perforation are now being applied widely and may become gold standard in the future.

The mortality in perforated peptic ulcer can be reduced by early approach to hospital, diagnosis, prompt surgical treatment and appropriate and adequate antibiotics. Thorough peritoneal toilet along with adequate fluid and electrolyte replacement, improvement in critical care and ICCU facilities are some of the factors which have improved the prognosis of duodenal ulcer perforation.[3]

Materials and Methods

Study Setting: Patients with DU perforation admitted and treated in SVRRGGH.

Study Period: August 2016 to September 2017.

Study Design: Prospective study.

Inclusion Criteria: Patients above age 18 years presenting with duodenal ulcer perforation.

Exclusion Criteria: Perforation other than duodenal ulcer or secondary to trauma.

Study Method: Data is collected by taking proper history, clinical examination, investigations, intraoperative findings and postoperative status. Omental patch closure is performed for all the cases. Thorough peritoneal toilet with drainage was done in all cases. All patients were put on appropriate antibiotics. The relationship of clinical and socio-demographic factors on peritonitis were assessed.

Results

Table 1: Age distribution of duodenal perforation

Age in years	No. of cases	Percentage
19–20	4	3.6
21–29	17	15.4
30–39	15	13.7
40–49	21	19.1
50–59	21	19.1
60–70	29	26.3
> 70	3	2.8

Table 2: Sex incidence of duodenal perforation

Sex	No. of cases
Male	96
Female	14

Table 3: Seasonal Incidence of Duodenal Perforation

Month	No. of cases	Percentage
January	5	4.5
February	3	2.7
March	10	9
April	4	3.7
May	9	8.1
June	12	11
July	10	9
August	13	12
September	22	20
October	12	11
November	4	3.6
December	6	5.4
Total	110	100

Table 4: Time of presentation for duodenal perforation

Time in hours	No. of cases	Percentage
< 24	55	50
24–48	22	20
> 48	33	30

Table 5: Smoking and alcohol in duodenal perforation

	No. of cases	Percentage
Smokers	70	63
Non-smokers	40	37
Alcoholics	37	34
Non-alcoholics	73	66

Table 6: Size of duodenal perforation

Perforation diameter in mm	No. of cases	Percentage
1–5	69	63
6–10	29	26
11–15	5	4.5
16–20	6	5.5
> 20 mm	1	1

Table 7: Postoperative complications after surgery

Complications	No of cases	Percentage
Wound infection	17	47
Chest infections	10	27
Wound dehiscence	04	11
Burst abdomen	03	8
Bile leak	01	2
Deep vein thrombosis	01	2

Table 8: Mortality and age distribution

Age in years	No of cases expired	Percentage
19–20	-	-
21–29	-	-
30–39	-	-
40–49	1	8
50–59	3	25
> 60	8	67

Table 9: Relationship between perforation duration and mortality

Interval	Expired	Survived	Total
< 24 hours	3	52	55
> 24 hours	9	46	55

Table 10: Size of perforation and mortality

Size of perforation	Expired	Survived	Total
0.1–0.5 cm	5	64	69
0.6–1 cm	3	26	29
> 1 cm	4	8	12

Table 11: Peritoneal contamination relation to mortality

Peritoneal contamination	Expired	Survived	Total
< 1 litre	5	73	78
1–2 litre	3	15	18
> 2 litre	4	10	14

X^2 test value was 6.73. p - value is 0.035 (less than 0.05), hence statistically significant.

Table 12: Presence of shock and mortality

Presence of shock	Expired	Survived	Total
Yes	8	4	12
No	4	94	98

X^2 value was 36.88. p - value is < 0.0001, hence the difference is statistically significant.

Discussion

Incidence of emergency surgery for perforated peptic ulcer, a complication of peptic ulcer disease, has increased slightly as has mortality rate of patients undergoing surgery for perforated peptic ulcer despite improvements in perioperative monitoring and treatment.[4] Early presentation, prompt diagnosis and emergency surgery are pillars to successful management and good outcome of perforated peptic ulcer[5] (Table 13).

Table 13: Comparison of age and sex incidence

Author	Age group of years	Male : Female
Sankar Arveen (2009)	30–60	
Moller et al. (2013)	59–81	
Thorsen et al. (2013)	60–70	1:1
Dilipchoksi (2014)	30–65	5:1
Noola GS et al. (2016)	40–49	
Present study	60–70	7:1

Possible contributing factor is the increased use of NSAIDs in the elderly and other concomitant diseases.[6] Differences in sex incidence is due to food habits, alcohol and smoking among males and females (Table 14).

Table 14: Comparison between different studies

Author	Seasonal incidence	Smoking	Alcohol	NSAIDS
Sankararveen (2009)	November and December			
Thorsen et al. (2013)	September and October	64%		53%
Dilipchoksi (2014)		48%	15%	
Seth et al. (2016)		35%	13%	47%
Present study	September and October	63%	34%	12%

Fares, et al. in their study suggest that winter months had a higher incidence when observed globally.[7] Smoking causes vasoconstriction, mucosal ischemia and contribute to ulcer perforation.[8] Concurrent consumption of alcohol and cigarette smoking increases the risk of ulcers.[9] Drugs like asprin cause damage to upper gastrointestinal tract due to its direct irritative effect.[10] Thorsen et al. in their study found that NSAIDS usage is seen in 53% of patients presenting with perforated duodenal ulcer.[11] This risk increases to five times in patients more than age 60 years old[12] (Table 15).

Table 15: Comparison of postoperative complications

Author	Postoperative complications
B Kocer et al.	Respiratory failure-37% Wound infection-18% Renal failure-10% Sepsis-9%
Sankararveen (2009)	Wound infection-41%
Kim JM et al. (2012)	Wound infection-17% Pulmonary complications-17% Multi organ failure-10% Intraabdominal abscess-6% Leakage-4%
Dilipchoksi (2014)	Wound infection-41% Respiratory failure- 12% Leakage-6%
Unver (2015)	Respiratory infections-33% Sepsis-18% Wound infections-12% Leakage-8%
Seth et al. (2016)	Wound infection-17% Chest infections-11%
Present study	Wound infection-47% Chest infection-27% Wound dehiscence-11% Burst abdomen-8% Leak -2% Deep vein thrombosis-2%

Postoperative morbidity and mortality in perforated duodenal ulcer depend upon various factors. Age more than 60 years old, delayed treatment or increase in the duration between onset of symptoms to presentation to hospital, shock at presentation, concomitant diseases, elevated renal

parameters on presentation of patient to hospital, hypoalbuminemia are some of the risk factors influencing the outcome.[13,14]

Factors Affecting Mortality

B kocher et al. also stated that with increase in age the mortality increases with 1.4% in younger people to 37% in age > 65 year.[15] G Bas et al. stated in their study that recognition of symptoms was significantly later in elderly patients thereby therapeutic delay increasing the mortality rate from 0–20%.[16]

Duration of perforated duodenal ulcer and mortality

Buck and Moller stated that surgical delay exceeding 6 hours is a well-established negative prognostic factor in patients with perforated peptic ulcer. Seth et al. also reported that all patients were operated within four hours of diagnosis accounting for high survival rate.[17] Long standing perforation associated with peritoneal contamination, positive peritoneal culture, septic complications and development of postoperative abscess.[18]

Size of perforation and mortality

Kumar et al. stated that ulcer perforation greater than 5 mm is an independent risk factor for releak when simple closure with omental patch alone is performed.[19] A study from turkey indicated perforation of size more than 0.5 cm in diameter predictive of poor survival.[20] Calcuttawala et al. also stated that mortality has significance bearing to the size of perforation.[21]

Peritoneal contamination and mortality

Dilipchoksi in his study stated that increase in peritoneal contamination increases the mortality of patients with perforated peptic ulcer. In their study out of 34 patients with peritoneal fluid more than 1000 ml mortality was in 17.6% of patients.[22]

Presence of shock and mortality

Calcuttawala et al. in their study stated that presence of shock at admission as risk factor leading to death. Similarly a study from Turkey has indicated an age more than 60 years, shock at presentation and perforation and perforation more than 5 mm in diameter as predictive of poor survival.[20]

Several scoring systems were proposed to determine the mortality and morbidity in patients with patients with peritonitis. In 1985, Boey et al. proposed a three variable system that helps to predict mortality in peforated peptic ulcer.[23] Other systems like Mannheim Peritonitis Index (MPI),[24] ASA score (American Society of Anesthesiology Score).[24]

Noval techniques and innovations for the treatment of peptic ulcer perforation

Natural Orifice Transluminal Endoscopic Surgery (NOTES).[25] Transluminal omental patch closure:[26] Over the scope clip,[27] Self-expanding Metal Stents (SEMS):[28] Over stitch Endoscopic suturing system:[29] U Clips[30] Other techniques are plug with acellular matrix or by gluing it to perforation,[31] suturing of the gastric or duodenal perforation followed by application of patch coated with fibrinogen and thrombin covered with omental patch,[32] mesnchymal stem cell injection.

Conclusion

Various factors affecting mortality and morbidity in peritonitis due to duodenal ulcer perforation were studied. Elderly patients have increased risk of mortality and morbidity. Smoking, alcohol and NSAIDS usage are predisposing factors for duodenal ulcer perforation. Shock at presentation, delayed presentation, peritoneal contamination are important predictor for postoperative morbidity and mortality. Early presentation, prompt diagnosis, adequate resuscitation, emergency surgery and postoperative monitoring are useful for successful management and good outcome of perforated peptic ulcer.

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