

A STUDY OF DUODENAL ULCER PERFORATION: RISK FACTORS AND PROGNOSTIC DETERMINANTS IN BTGH, GULBARGA

Rajshekhkar Patil¹, Sangamesh Kamthane², Palla Abhishek Reddy³

¹Associate Professor, Department of General Surgery, M. R. Medical College, Attached to Basweshwar Hospital, Gulbarga.

²Post Graduate, Department of General Surgery, M. R. Medical College attached to Basweshwar Hospital, Gulbarga.

³Post Graduate, Department of General Surgery, M. R. Medical College attached to Basweshwar Hospital, Gulbarga.

ABSTRACT: BACKGROUND AND OBJECTIVES: Duodenal ulcer perforation is one of the acute abdominal emergencies in the surgical field. Duodenal ulcers are often caused due to imbalance between mucosal defences and acid /peptic injury. The cases of duodenal ulcer perforation in surgically treated patients were thoroughly studied with respect to trends in age, distribution of occurrence, risk factors, seasonal variation, outcome of operative and non-operative modalities of treatment and factors influencing the prognosis of the disease. The current study summarizes epidemiology, risk factors, Pathophysiology, pathogenesis, clinical features, investigations, modalities of treatment and prognostic determinants of duodenal ulcer perforation in BTGH, Gulbarga.

MATERIAL AND METHODS: The study was conducted in the Department of Surgery, Basaveshwara Teaching and General Hospital, Gulbarga Karnataka during the period of Nov. 2011 - Sep.2013. The diagnosis of duodenal ulcer perforation was that established by the admitting surgeon, based on clinical features and supposed by radiological evidence and confirm at operation. Surgery was defined as urgent less as 4 hours between admission and surgery, same day (4-24 hours) and delayed at a later time during the same admission. This study comprises of 60 cases of duodenal ulcer perforation admitted in the Department of Surgery, Basaveshwar Teaching & General Hospital. Operative details included the site and nature of operation performed. Mortality was defined as death following surgical procedure. Post-operative morbidity was defined in terms of duration of hospital stay and associated complications following surgery.

INCLUSION CRITERIA: All patients in whom a diagnosis of duodenal ulcer perforation was established on admission and confirmed by investigations between November 2011-September 2013 are included in this study.

EXCLUSION CRITERIA: 1. Cases of gastric antral perforation. 2. Cases of traumatic duodenal perforation.

RESULTS: out of 60 cases, the peak age incidence was between 40 and 49 years, only 3 cases of females with perforated duodenal ulcers were observed, 39 cases (65%) belonged to lower socio-economic status, 57 males were either indulged with smoking (40%) or alcohol (30%) or both (25%), 36 patients (60%) had previous history of peptic ulceration, NSAIDs intake was associated with 26.67%, study the maximum incidence of perforation was during the four month of the winter 33 (66%), 55 patients (91.67%) had pneumo-peritoneum, 13 patients had wound infection and 7 out of them were expired.

CONCLUSION: A series of sixty cases duodenal perforations were studied and analyzed at Department of Surgery, Basaveshwara Teaching and General Hospital, Gulbarga Karnataka during the period of Nov 2011-Sep. 2013. The following is the list of the conclusions drawn after the study: 1. Duodenal ulcer perforation is one of the most common acute abdominal emergencies. 2. Duodenal ulcer perforation was more common in the age group of 40-49 years. 3. In this study the male: female ratio was found to be 19:1. 4. Duodenal perforation was common in lower socioeconomic group. 5. The associated risk factors are found to be smoking, alcohol intake, NSAIDs intake and previous history of acid peptic disease. 6. Duodenal perforation cases were high during winter season. 7. Symptoms like abdominal pain and diarrhea were present in all patients with DU perforation. 8. Signs of G/R and BS were common in patients with DU perforation. 9. Wound infection was common post-operative complications. 10. Mortality rate was higher in case of geriatric patients with comorbid illness. 11. Mortality rate in the age group of above 60 years is as high as 44.44%. 12. Prognostic factors were, a. Age, b. Comorbid illness, c. Duration of symptoms, d. Delay in taking up the patient for emergency operation, e. Patient's general condition at the time of presentation.

KEYWORDS: Duodenal Ulcer Perforations, Simple Closure with Omental Patch Prognostic Factors, H. Pylori Prospective.

HOW TO CITE THIS ARTICLE: Rajshekhkar Patil, Sangamesh Kamthane, Palla Abhishek Reddy. "A Study of Duodenal Ulcer Perforation: Risk Factors and Prognostic Determinants in BTGH, Gulbarga". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 91, November 12; Page: 15657-15664, DOI: 10.14260/jemds/2015/2252.

INTRODUCTION: Duodenal ulcer perforation is one of the acute abdominal emergencies in the surgical field. Even though the incidence of peptic ulcer disease has been declining for past 20 years and the need of elective ulcer

surgery is on decline, neither the incidence nor the need for emergent complications of ulcer (Perforation, bleeding, obstruction) have changed during past 15-20 years.

Peptic ulcers are ulcers (Figure 1), occurring in any portion of the gastrointestinal tract (GIT), in which mucosa is bathed in hydrochloric acid (HCl) and gastric juice. Ulcers can develop in the esophagus, stomach or duodenum, at the margin of a gastroenterostomy, in the jejunum, and in association with a Meckel's diverticulum containing ectopic gastric mucosa.¹ In older patients, admission rates for duodenal ulcer perforation increased in the last decade. Duodenal perforation currently accounts for approximately 75% of peptic perforation. In a recent study, a postoperative

Financial or Other, Competing Interest: None.

Submission 19-09-2015, Peer Review 21-09-2015,

Acceptance 28-09-2015, Published 11-11-2015.

Corresponding Author:

Dr. Rajshekhkar Patil.

Block No.56, Swastik Nagar,

Bilgundi Layout, Sedam Road,
Gulbarga.

E-mail: drrjsp@gmail.com

DOI:10.14260/jemds/2015/2252.

mortality rate of 19% in perforated peptic ulcer patients increased to 41% among the elderly.²

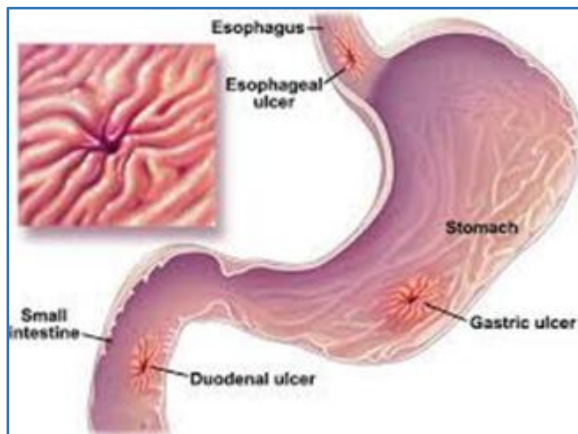


Fig. 1: Peptic Ulcers in Different Parts of Gastrointestinal Tract

With the success of medical therapy including potent gastric acid suppressing drugs and antibiotics effective against *Helicobacter pylori*, the need of surgical intervention has decreased drastically in the management of ulcer disease.³ Nonetheless, surgical operations remain the mainstay for the emergency treatment of life-threatening aggressive complications (Perforation, bleeding and obstruction) in duodenal ulcers at advanced stages.

With the success of medical therapy including potent gastric acid suppressing drugs and antibiotics effective against *Helicobacter pylori*, the need of surgical intervention has decreased drastically in the management of ulcer disease.³ Nonetheless, surgical operations remain the mainstay for the emergency treatment of life-threatening aggressive complications (Perforation, bleeding and obstruction) in duodenal ulcers at advanced stages.

Following are the surgical options for duodenal ulcer perforations.⁴

- Operations for duodenal ulceration reduce acid production by the stomach.
- Cephalic phase reduced by vagotomy.
- Antral phase reduced by antrectomy.
- May require gastric drainage procedure to overcome effects of vagotomy.

Duodenal ulcers are often caused due to imbalance between mucosal defenses and acid/peptic injury.⁵ Following are the causes for duodenal ulcer perforations (Figure 2):

- Increased gastric acid secretion.
- *Helicobacter pylori* infection.
- Smoking.
- Alcohol consumption.
- Psychological stress.
- Drugs such as NSAIDs, Aspirin, cocaine.
- Genetic factors.
- Impaired defensive properties of the mucosa and barrier mechanism.

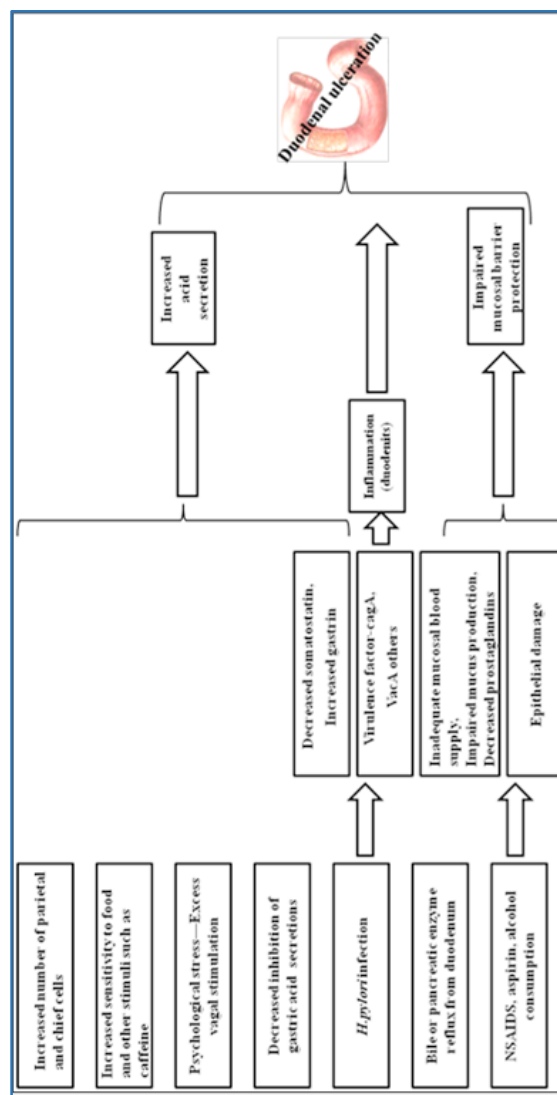


Fig. 2: Pathogenesis of Duodenal Ulceration

The present study deals with duodenal ulcer perforation in patients treated surgically. The cases of duodenal ulcer perforation in surgically treated patients were thoroughly studied with respect to trends in age, distribution of occurrence, risk factors, seasonal variations, outcome of operative and non-operative modalities of treatment and factors influencing the prognosis of the disease.

The current study summarizes epidemiology, risk factors, pathophysiology, pathogenesis, clinical features, investigations, modalities of treatment and prognostic determinants of duodenal ulcer perforation in BTGH, Gulbarga. There are multiple factors influencing the progress of the disease and its prognosis which would be discussed in detail in this study.

AIMS AND OBJECTIVES:

The aims of the study are:

1. To study the prevalence of duodenal ulcer perforation with respect to age.
2. To study the risk factors and seasonal trends.
3. To study the prognostic factors influencing the disease process.
4. To study the outcome of operative and non-operative treatment – mortality and morbidity.

MATERIALS AND METHODS: The study was conducted in the Department of Surgery, Basaveshwara Teaching and General Hospital, Gulbarga Karnataka during the period of Nov. 2011 - Sep. 2013. The diagnosis of duodenal ulcer perforation was that established by the admitting surgeon, based on clinical features and supposed by radiological evidence and confirm at operation.

Surgery was defined as urgent less as 4 hours between admission and surgery, same day (4-24 hours) and delayed at a later time during the same admission. This study comprises of 60 cases of duodenal ulcer perforation admitted in the Department of Surgery, Basaveshwar Teaching & General Hospital. Operative details included the site and nature of operation performed. Mortality was defined as death following surgical procedure.

Post-operative morbidity was defined in terms of duration of hospital stay and associated complications following surgery.

Inclusion Criteria: All patients in whom a diagnosis of duodenal ulcer perforation was established on admission and confirmed by investigations between November 2011-September 2013 are included in this study.

Exclusion Criteria:

1. Cases of gastric antral perforation.
2. Cases of traumatic duodenal perforation.

RESULTS: Sixty cases of duodenal ulcer perforation were studied. In all 55 cases underwent simple closure and omnetal Patch (SC & OP) and the perforation were found in the anterior aspect of first part the duodenum. All cases were advised to continue anti-H.pylori treatment for 4 weeks post-operatively. The following observations were made out.

Gender:

Gender	No. of cases	Percentage (%)
Male	57	95
Female	3	5
Total	60	100

Table 1: Table showing gender distribution

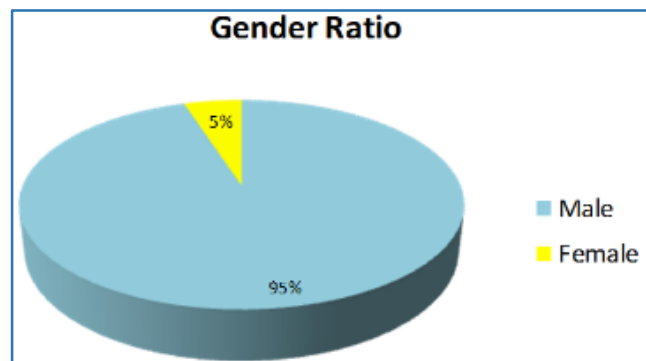


Chart 1: Pie diagram showing gender distribution

Socioeconomic Status:

	No. of Cases	Percentage%
Lower	39	65
Upper	21	35
Total	60	100

Table 2: Socioeconomic Status

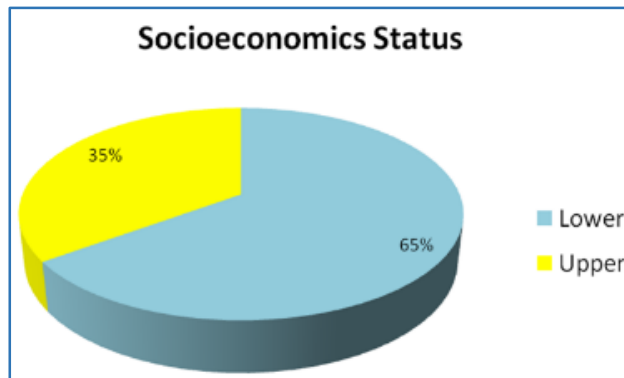


Chart 2: Pie diagram showing distribution of socioeconomic status

Personal Habits:

Habits	No. of Cases	Percentage (%)
Smoking	24	40
Alcohol	18	30
Both	15	25
None	3	5
Total	60	100

Table 3: Personal habits of patients with perforated duodenal ulcers



Chart 3: Pie diagram showing personal habits of Patients with perforated duodenal ulcers

History of Acid Peptic Disease:

History	No. of Cases	Percentage (%)
Present	36	60
Absent	24	40
Total	60	100

Table 4: History of acid peptic disease of patients with perforated duodenal ulcers

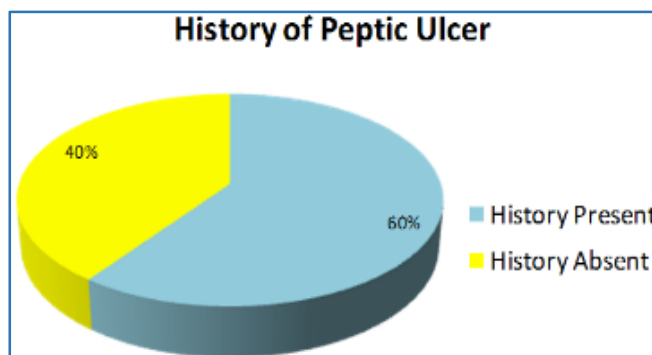


Chart 4: Pie diagram showing History of acid peptic ulcer

History of Drug Intake:

	No. of Cases	Percentage (%)
History of NSAIDs Intake	16	26.67
No History of NSAIDs Intake	44	73.33
Total	60	100

Table 5: History of NSAIDs intake in patients with perforated duodenal ulcer

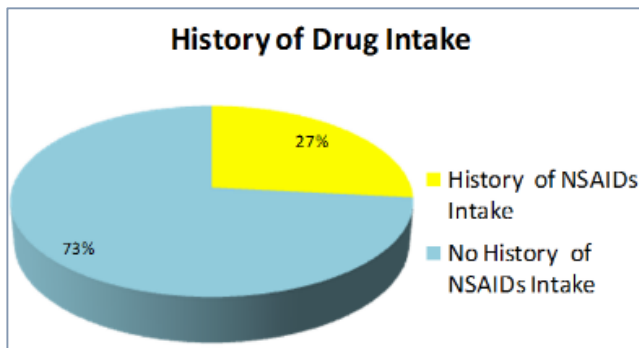


Chart 5: Pie diagram showing History of NSAIDs intake by Patients

Age (yrs.)	Cases without NSAIDs intake	Cases with NSAIDs intake	Percentage (%)
<30	15	2	12.5
30-39	12	1	6.25
40-49	15	3	18.75
50-59	9	4	25
>60	9	6	37.5
Total	60	16	100

Table 6: Age distribution of patients with and without history of NSAIDs intake ($\chi^2=5.73, p<0.05(p=0.043)$)

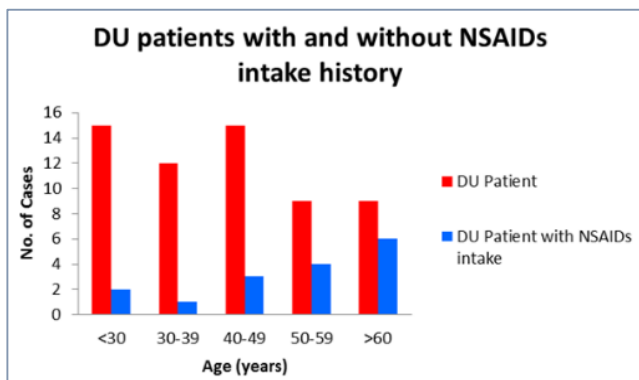


Chart 6: Age distribution of patients with and without history of NSAIDs intake

Seasonal Trends:

Months	Seasons	No. of Cases	Percentage (%)
Feb.-May	Summer	9	15
June-Sept.	Monsoon	18	30
Oct.-Jan.	Winter	33	55
	Total	60	100

Table 7: Seasonal trends ($\chi^2=14.7, p<0.001(p=0.00089)$)

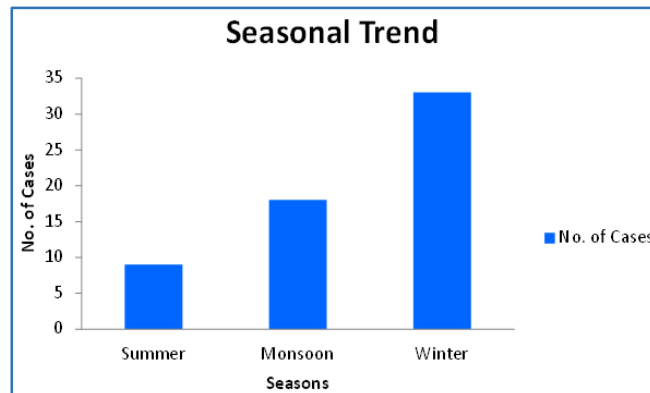


Chart 7: Graph showing seasonal trend observed in perforated duodenal ulcers

Investigations:

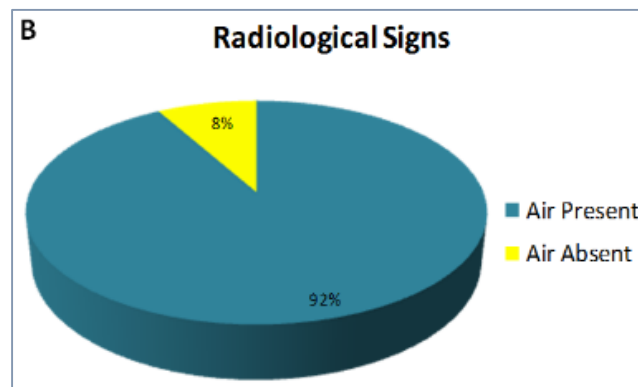
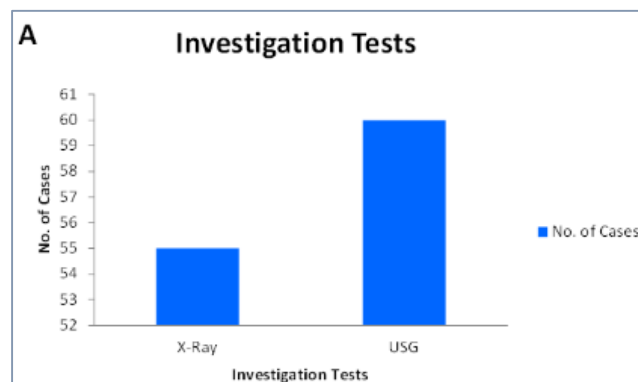
Investigations	No. of Cases(+)	No. of Cases (-)	Total	Sensitivity to test
X-Ray	55	5	60	91.7
USG	60	0	60	100.0

Table 8: Investigations test for duodenal ulcer perforation

	No. of Cases	Percentage (%)
Air Present	55	91.67
Air Absent	5	8.33
Total	60	100.00

Table 9: Presence of air under diaphragm in patients with perforated duodenal ulcers

Chart 8. A. Graph showing investigation tests for perforated duodenal ulcer and 8. B. Pie diagram showing the presence and absence of radiological signs



Symptoms	No. of Cases	Percentage (%)
AP	60	100.0
V	13	21.7
F	6	10.0
D	60	100.0

Table 10: Symptoms observed in duodenal ulcer perforation patient (AP-abdominal pain, V-vomiting, F-fever, and D-distension)

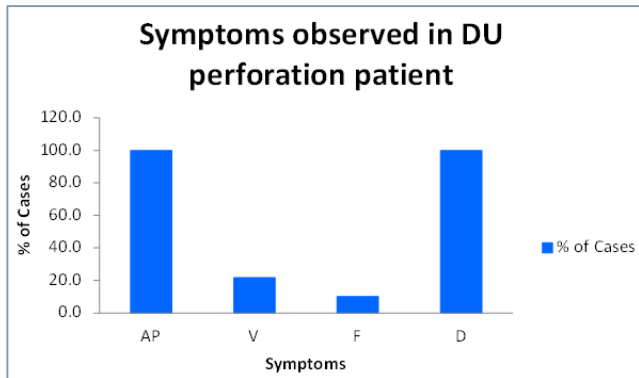


Chart 9: Symptoms observed in DU perforation patient

Signs	No. of Cases	Percentage (%)
G/R	60	100.0
BS	60	100.0
DM	6	10.0
HTN	9	15.0
Shock	8	13.3

Table 11: Signs observed in DU perforated patient (G/R-Guarding and Rigidity, BS-Bowel sound, DM-Diabetes mellitus, HTN-Hypertension)

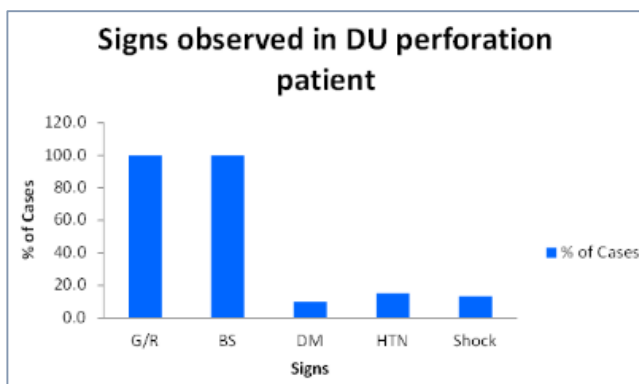


Chart 10: Signs observed in DU perforation patient

Management:

Surgery	No. of Cases	Percentage (%)
SC & OP	55	91.67
TVGJ	2	3.33
B/L Flank Drain	2	3.33
Conservative	1	1.67
Total	60	100.00

Table 12: Surgical and conservative treatment of perforated duodenal ulcer

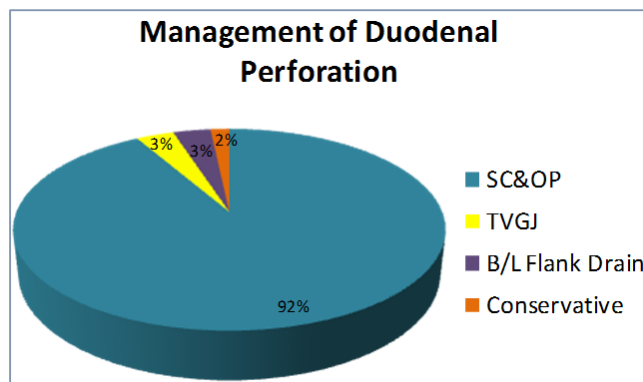


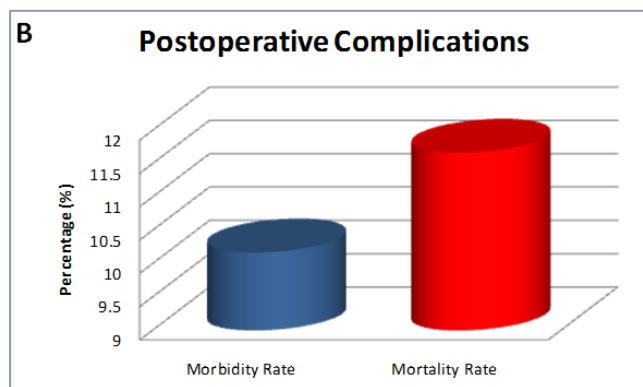
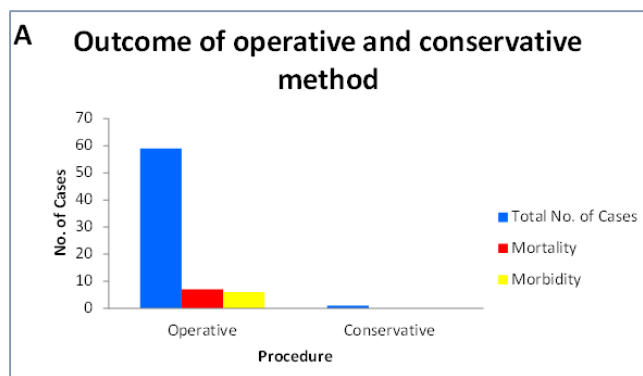
Chart 11: Pie diagram showing management of duodenal

Postoperative Complications:

Procedure	No. of Cases	Mortality	Morbidity
Operative	59	7	6
Conservative	1	0	0
Total	60	7	6

Table 13: Post-operative complications (X2-0.21, p>0.05 (p=0.578))

Chart 12: A. Outcome of operative and conservative method and B. Post-operative complications.



Duration of Stay:

DOS (days)	No. of Cases	Percentage (%)
<5	8	13.3
6 to 10	49	81.7
>10	3	5.0
Total	60	100.0

Table 14: Duration of stay (DOS) in hospital after the treatment of DU perforation

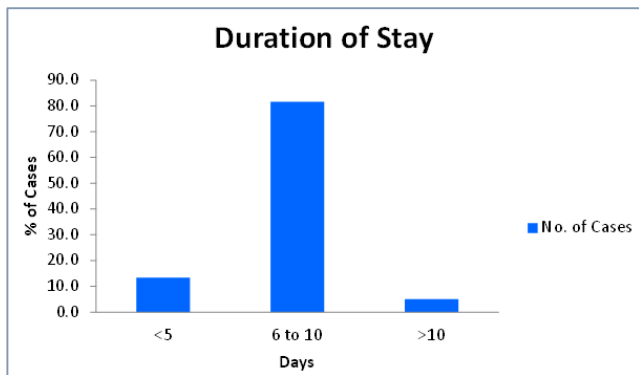


Chart 13: Duration of stay in hospital after treatment of DU perforation

DISCUSSION: Duodenal ulcer is a type of peptic ulcer disease that destroys the lining of the duodenum. Duodenal perforation, complication of duodenal ulcer, is one of the commonest surgical emergencies requiring hospitalization and early management. Perforated duodenal ulcer remains a surgical emergency but nowadays it rarely results in death. The discussion is based on the analysis of data pertaining to 60 cases of perforated duodenal ulcers.

AGE: The age of patients in this study is ranging from 18 to more than 60 years. The peak age incidence was between 40 and 49 years.

Author	Year	Peak age incidence (years)
Samuel J et al.	1953	30-60
Debaley et al.	1990	>50
M.C.Dandpat et al.	1991	20-40
Ramesh C et al.	1995	30-50
Hannah et al.	2005	31-40
Kalpesh Jani et al.	2006	30-50
Taylor.		>50
Present study	2013	40-49

Table 15: Age Incidence

Gender: In the current study out of 60 cases, only 3 cases of females with perforated duodenal ulcers were observed. Our study found male predominance for perforated duodenal ulcers which correlates to the reported observation. The very low incidence of female patients with duodenal ulcer perforation in comparison to male incidence may be due to great difference in habits, social, economical, cultural activities and stress.

Author	Year	Male : Female ratio
Paul. H. Jordan.	1995	26:1
Primrose N. John.	2004	2:1
Rodney Maingot.	1990	5:1
Present study	2013	19:1

Table 16: General Incidence

Socioeconomic Status: Perforation due to duodenal ulcer was common in lower socioeconomic group. Out of 60 cases of perforated duodenal ulcers, 39 cases (65%) belonged to lower socioeconomic status.

Personal Habits: In the present study, all 57 males were either indulged with smoking (40%) or alcohol (30%) or both (25%). The present study clearly reflects an increasing incidence of the duodenal ulcer perforations among alcoholics and smokers.

History of Acid Peptic Disease: In the present study, out of 60 cases 36 patients (60%) had previous history of peptic ulceration. In the study conducted by George Stain et al, 75% patients had past history of peptic ulceration.

History of Drug Intake: The analysis of 60 cases of perforation in the current study revealed that the intake of NSAIDs increases the incidence of the duodenal ulcer perforation. From the present study, NSAIDs intake was associated with 26.67% of patients with duodenal ulcer perforation. Moreover it was observed that the geriatric patients (>60 years) with history of NSAIDs intake were at increased risk of duodenal ulcer perforation. 37.5% of geriatric patients had the history of NSAIDs intake. NSAIDs intake significantly increased with the age.

Seasonal Trends: In the current study the maximum incidence of perforation was during February to September (54%). But the rate of occurrence of duodenal ulcer perforations was significantly high during winter (October to January). During the four months of the winter 33 (66%) cases of duodenal ulcer perforation were observed.

Author	Year	Season of Perforation
Bloom et al.	1974	Winter
Present study	2013	Winter

Table : 17 Seasonal Trend

Radiological Signs: All patients in the present study were subjected to plain X-ray abdomen in erect position. Out of 60 cases studied, 55 patients (91.67%) were found with pneumo-peritoneum.

Study	Year	Pneumoperitoneum
Shaffer study.	1992	70%
Present study	2013	91.67%

Table 18: Presence of pneumoperitoneum

Duration of Symptoms: In the present study the duration of symptoms (Pain/vomiting /distension/constipation or diarrhea/injury/fever) before presentation to the hospital was found to be 1.49 days (1-4 days). This was mainly because most of the patients were initially treated at nursing clinics, primary care centers and then referred to our hospital. If they arrived straight to our hospital, they would have been operated earlier and the time lag would have been decreased. Abdominal pain and diarrhea were present in all patients.

Delay: The delay in taking up the patient for emergency operation was 3.67 hours (2-7 hours). Patients who presented with shock needed intense resuscitation and after improving their general condition, they were shifted to emergency operation.

Management: 59 patients were subjected to surgical treatment (SC+OP, B/L Flank Drainage and GJ+TV). One patient was maintained conservatively because field of perforation was suspected and he maintained his vitals. His response to drug therapy was positive and he recovered.

Hospital Stay: Patient who lapsed a longer time after operation contributed to increase in hospital stay by wound infection and increased time for improvement in general condition. Increase in age and conservative management also contributed to prolonged hospital stay. Average duration of the hospital stay was found to be 8.05 days (2-16 days).

Postoperative Complications: In the present study, 47 patients with duodenal ulcer perforation had smooth recovery. Out of 60 cases, 13 patients had suffered from various complications such as wound infection. Seven of thirteen patients with post-operative complications expired. Patients who presented late (2 days or more) to emergency surgical ward and who had comorbid illness had increased rate of wound infection.

Mortality: From the present study following prognostic factors in duodenal ulcer perforation can be concluded:

1. Age.
2. Associated comorbid illness.
3. Time delay between onset of symptoms and admission to hospital.
4. Patient general condition at the time of presentation.

Nine patients belonging to age group of more than 60 years were associated with comorbid illness (Diabetes Mellitus, Hypertension). Seven patients of this age group where presented with septicemia shock. Mortality rate in the age group of above 60 years is as high as 44.44%.

There were three patients in the age group of 40 to 49 years which were associated with comorbid illness and presented with shock. The mortality rate in this age group was 20%. A detailed study on outcome of non-operative management was not carried out because patients were lost for follow-up. The observations in this group were incidentally made out.

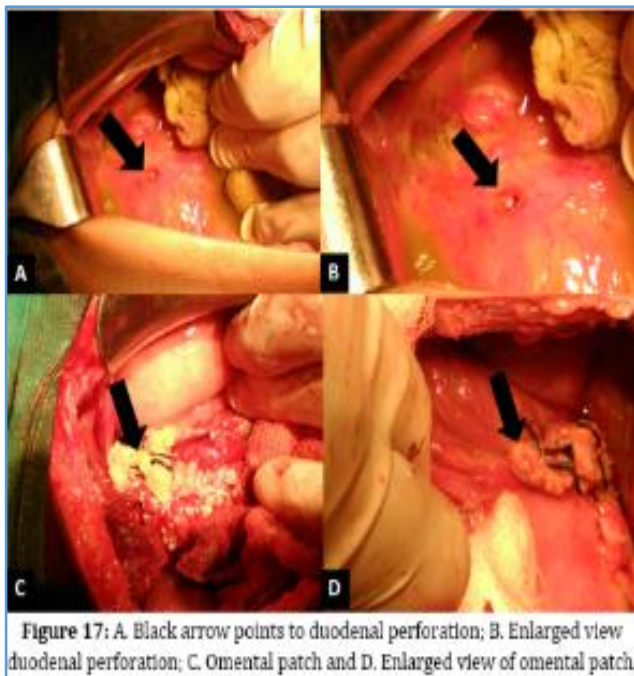


Figure 18: Postoperative complication-Wound infection

CONCLUSION: A series of sixty cases duodenal perforations were studied and analyzed at Department of Surgery, Basaveshwara Teaching and General Hospital, Gulbarga Karnataka during the period of Nov 2011-Sep. 2013.

The following is the list of the conclusions drawn after the study:

1. Duodenal ulcer perforation is one of the most common acute abdominal emergencies.
2. Duodenal ulcer perforation was more common in the age group of 40-49 years.
3. In this study the male: female ratio was found to be 19:1.
4. Duodenal perforation was common in lower socioeconomic group.
5. The associated risk factors are found to be smoking, alcohol intake, NSAIDs intake and previous history of acid peptic disease.
6. Duodenal perforation cases were high during winter season.
7. Symptoms like abdominal pain and diarrhea were present in all patients with DU perforation.
8. Signs of G/R and BS were common in patients with DU perforation
9. Wound infection was common post-operative complications.
10. Mortality rate was higher in case of geriatric patients with comorbid illness.
11. Mortality rate in the age group of above 60 years is as high as 44.44%.
12. Prognostic factors were
 - a) Age.
 - b) Comorbid illness.
 - c) Duration of symptoms.
 - d) Delay in taking up the patient for emergency operation.
 - e) Patient's general condition at the time of presentation.

BIBLIOGRAPHY:

1. Bertleff MJ, Lange JF. Perforated peptic ulcer disease: a review of history and treatment. *Dig Surg.* 2010 Aug; 27(3):161-169.
2. Maingot's abdominal operations-10th editin. Haile T. Debas, Sean J. Molvitill, Appleton & Lange Vol. I: p 983-984.

3. Wormsley KG. The pathophysiology of duodenal ulceration. *Gut*. 1974 January; 15(1): 59-81.
4. Madiba TE, Nair R, Mulaudzi TV, Thomson SR. Perforated gastric ulcer - reappraisal of surgical options. *South African Journal of Surgery*. 2005; 43(3): 58-60.
5. Tadataka Y, David AH, Neil K, Loren L, Chung O, Don PW. *Textbook of Gastroenterology*. 2003; 4th Edition. Lippincott Williams & Wilkins.