

patients who underwent surgery after 24 hours developed morbidity and 7 (30.43%) patients expired.

At the time of admission, shock (systolic BP less than 100) was present in 6 (17.14%) patients. 1 (16.66%) patient developed morbidity and 2(33.33%) patients expired in postoperative period.

In study by Kocer et al. in 2007, patients older than 65 years had a higher morbidity rate (56.6% vs 16.2%) and mortality rate (37.7% vs 1.4%) when compared to younger patients.

In study by J. C. Dakubo et al. in 2009, patients older than 65 years had a higher mortality rate (19.81% vs 6.8%) when compared to younger patients. Factors like age above 60 years, excessive alcohol intake were statistically significant in predicting postoperative complications and/or mortality in their study.

In our study, patients older than 65 years had a higher mortality (100 % vs 20.58 %). Hence age 65 years is significant in predicting postoperative mortality in our study.

3.5 Pre-operative hemoglobin predicting the morbidity and mortality in patients with peptic perforation

| Pre operative Hb | Total no. of patients | Morbidity | Mortality |
|------------------|-----------------------|-----------|-----------|
| <11 | 14 | 1 | 5 |
| >11 | 21 | 5 | 3 |
| Total | 35 | 6 | 8 |

Hb<11 was present in 14(40%) patients, 1(7.14%) patient developed morbidity and 5 (35.71%) patients expired in postoperative period. Hb>11 was present in 21(60%) patients, 5(23.8%) patients developed morbidity and 3 (14.28%) patients expired in postoperative period.

3.5 Site of Perforation predicting the morbidity and mortality in patients with peptic perforation

| Site | Total | Morbidity | Mortality |
|----------|-------|-----------|-----------|
| Gastric | 25 | 3 | 5 |
| Duodenal | 10 | 3 | 3 |
| Total | 35 | 6 | 8 |

10(28.57%) patients had duodenal perforation. 3(30%) developed morbidity and 3 (30%) expired. 25 (71.42%) patients had gastric perforation out of which 3(12%) developed morbidity and 5(20%) expired. In our study morbidity is 30% in case of duodenal perforation and 12% in case of gastric perforation. Morbidity in case of patients with gastric and duodenal perforations are compared with study conducted by Noguiera et al and Eduardo et al59.

Study conducted by Noguiera et al shows morbidity is 60% in case of duodenal perforation and 42% in case of gastric perforation. Study conducted by (Eduardo et al59) shows morbidity is 24.6% in case of duodenal perforation and 38% in case of gastric perforation. Comparable to Noguiera et al our study has more morbidity in patients with duodenal perforation than gastric perforation.

In our study mortality is 30% in case of duodenal perforation and 20% ingastric perforation.

Study conducted by to Eduardo et al 59 shows mortality 19% in patients with duodenal perforation and 17.6% in gastric perforation. Study conducted by Noguiera et al(34) shows mortality 13.2% in patients with duodenal perforation and 10.6% in gastric perforation. Similarly our study shows that duodenal perforation has higher mortality compared to gastric perforation.

3.6 Size of perforation predicting mortality and morbidity

| Size of perforation | Total | Morbidity | Mortality |
|---------------------|-------|-----------|-----------|
| <0.5 cm | 18 | 2 | 3 |
| 0.6-1 cm | 10 | 2 | 3 |
| >1 cm | 7 | 2 | 2 |

In 18 (51.42%) patients the size of perforation was < 0.5 cm in which 2 (11.11%) patients developed post operative complications and 3(16.66) died. In 10 (28.57%) patients the size of perforation was 0.6-1 cm in which 2 (20%) patients developed post operative complications and 3 (30%) died. In 7 (20%) patients the size of perforation was >1 cm in which 2(28.57%) patients developed morbidity and 2 (28.57%) died.

Morbidity is increased as the size of perforation increases. In our study patients with size of perforation is <0.5 cm morbidity was 11.11%, in the size of perforation between 0.5-1 cm morbidity was 20% and if the > 1cm it was 28.57% In the study conducted by Kocer et al morbidity was 71% in patients with size of perforation <0.5 cm, 21.9% in patient with size of perforation 0.5-1 cm and 7.1% size is more than 1 cm. Our study shows increased morbidity directly proportional to increase in size of perforation.

3.7 Type of peritoneal contamination predicting the morbidity and mortality in patients with peptic perforation

| | Grade | Total no. of patients | Morbidity | Mortality |
|------------------------------------|-------|-----------------------|-----------|-----------|
| Grades of Peritoneal Contamination | 0 | 3 | 0 | 0 |
| | 1 | 16 | 2 | 0 |
| | 2 | 3 | 3 | 0 |
| | 3 | 3 | 0 | 2 |
| | 4 | 9 | 1 | 6 |
| Total | | 35 | 6 | 8 |

On exploration, 3 (8.57%) of the patients had grade 0 peritoneal contamination, 16 (45.71%) had grade 1 peritoneal contamination, 4 (11.42%) had grade 2 peritoneal contamination, 3 (8.57%) had grade 3 peritoneal contamination and 9 (25.71%) had grade 4 peritoneal contamination.

On exploration, 16 (45.71%) of the patients had grade 1 peritoneal contamination, 4 (11.42%) had grade 2 peritoneal contamination, 3(8.57%) had grade 3 peritoneal contamination 9 (25.71%) had grade 4 peritoneal

contamination. All patients were treated surgically by simple mental patch closure of the perforation and good peritoneal wash was given.

The morbidity percentages are compared with other studies (Goudar et al)⁵⁸ in which grade 3 and 4 shows 26% morbidity due to purulent peritoneal contamination. In our study grade 3 and grade 4 peritoneal contamination shows 0% and 11.11% morbidity and 66.66% and 66.66% mortality respectively. This concludes patient with purulent peritoneal contamination mortality will be increased.

3.8 Postoperative complications:

| Complications | No. | % |
|---------------------|-----|-------|
| Paralytic ileus | 4 | 11.42 |
| Pleural effusion | 5 | 14.28 |
| Wound infection | 3 | 8.57 |
| Wound dehiscence | 2 | 5.71 |
| Renal failure | 1 | 2.85 |
| Multi organ failure | 1 | 2.85 |
| Septicemia | 1 | 2.85 |
| Leak | 1 | 2.85 |
| Death | 8 | 22.85 |

14(40%) patients had postoperative complications. Among 35 patients, most common postoperative complication was death in about 8(22.85%) patients followed by pleural effusion in 5 patients (14.28%), 4(11.42%) patients had prolonged paralytic ileus, 3 (8.57%) patients had septicemia, 2 (5.71%) patients had wound dehiscence, 1(2.85%) had renal failure, 1(2.85%) developed multi organ failure.

3.9 Various factors predicting the morbidity in patients with peptic perforation

| Parameter | | NO. | Morbidity | % | p-Value |
|---------------------|----------|-----|-----------|-------|---------|
| Age | <65 | 34 | 6 | 17.64 | 0.64 |
| | >65 | 1 | 0 | 0 | |
| Sex | Males | 33 | 6 | 18.18 | 0.51 |
| | Females | 2 | 0 | 0 | |
| NSAID use | Present | 9 | 1 | 11.11 | 0.58 |
| | Absent | 26 | 5 | 19.23 | |
| Corticosteroid use | Present | 1 | 0 | 0 | 0.65 |
| | Absent | 34 | 6 | 17.64 | |
| H/O smoking | Present | 17 | 3 | 17.64 | 0.94 |
| | Absent | 18 | 3 | 16.66 | |
| H/O alcohol | Present | 13 | 3 | 23.07 | 0.47 |
| | Absent | 22 | 3 | 13.63 | |
| Associated illness | Present | 8 | 2 | 25 | 0.5 |
| | Absent | 27 | 4 | 14.81 | |
| Pre-operative shock | Present | 3 | 1 | 33.33 | 0.43 |
| | Absent | 32 | 5 | 15.62 | |
| H/O PUD | Present | 6 | 1 | 16.6 | 0.97 |
| | Absent | 29 | 5 | 17.24 | |
| Hb | <11 | 14 | 1 | 7.14 | 0.19 |
| | >11 | 21 | 5 | 23.8 | |
| Time of surgery | <24 hrs | 12 | 1 | 8.33 | 0.31 |
| | >24hrs | 23 | 5 | 21.73 | |
| Site | Duodenal | 10 | 3 | 30 | 0.2 |
| | Gastric | 25 | 3 | 12 | |

In the analysis of 35 patients, there is no statistically significant predictor of morbidity.

3.10 Various factors predicting the mortality in patients with peptic perforation

| Parameter | | NO. | Mortality | % | p-Value |
|---------------------|----------|-----|-----------|-------|---------|
| Age | <65 | 34 | 7 | 20.58 | 0.06 |
| | >65 | 1 | 1 | 100 | |
| Sex | Males | 33 | 8 | 24.24 | 0.42 |
| | Females | 2 | 0 | 0 | |
| NSAID use | Present | 9 | 5 | 55.55 | 0.006 |
| | Absent | 26 | 3 | 11.53 | |
| Corticosteroid Use | Present | 1 | 1 | 100 | 0.06 |
| | Absent | 34 | 7 | 20.58 | |
| H/O smoking | Present | 17 | 4 | 23.52 | 0.92 |
| | Absent | 18 | 4 | 22.22 | |
| H/O alcohol | Present | 13 | 4 | 30.76 | 0.39 |
| | Absent | 22 | 4 | 18.18 | |
| Associated Illness | Present | 8 | 3 | 37.5 | 0.26 |
| | Absent | 27 | 5 | 18.51 | |
| Pre-operative Shock | Present | 3 | 2 | 66.66 | 0.06 |
| | Absent | 32 | 6 | 18.75 | |
| H/O PUD | Present | 6 | 1 | 16.66 | 0.82 |
| | Absent | 29 | 7 | 24.13 | |
| Hb | <11 | 14 | 5 | 35.71 | 0.13 |
| | >11 | 21 | 3 | 14.28 | |
| Time of surgery | <24 hrs | 12 | 1 | 8.33 | 0.13 |
| | >24hrs | 23 | 7 | 30.43 | |
| Site | Duodenal | 10 | 3 | 30 | 0.52 |
| | Gastric | 25 | 5 | 20 | |

In the analysis of 35 patients, NSAID's use (p-value <0.05) was statistically significant predictor of mortality.

According to study by Kocer et al. in 2007, a total 108 postoperative complications were seen in 65 (24.2%) patients. Respiratory failure (37.04%) was commonest complication followed by wound infections (18.52%), renal failure (9.25%) and sepsis (8.34%). A total of 23 patients died (8.5%). The most frequent causes of death were myocardial failure and sepsis.⁵⁵

According to study by J. C. Dakubo et al. in 2009, seventy three (27.7%) patients developed postoperative complications. Chest infection, septicaemia, and abdominal wound infection were the most common complications followed by leakage of the closed perforation and intra abdominal sepsis. There were 36 (11%) deaths.⁵⁶

In our study, morbidity was seen in 14(40%) patients. Most common complication was pleural effusion in 5 patients (14.28%). 4(11.42%) patients had prolonged paralytic ileus, 3 (8.57%) patients had septicemia, 2 (5.71%) patients had wound dehiscence, 1(2.85%) had renal failure, 1(2.85%) developed multi organ failure. Death occurred in 8(22.85%) patients.

4. Summary

1. Morbidity rate in our study is 17.14% and mortality rate 22.85%.
2. Peptic ulcer perforation was common in the age group of 30-50 years with mean age 44.2 years. Elderly patients (≥ 65 years) had increased mortality. Peptic ulcer perforation was common in males than females in ratio of 17.5:1.

3. Smoking (48.57%) had less significant effect in postoperative morbidity and mortality whereas alcohol consumption (37.14%) slightly increased morbidity as well as mortality. Regular ingestion of NSAID's was an important risk factor in causation of peptic ulcer perforation. Use of NSAID's (pvalue= 0.006) was also a significant risk factor in postoperative mortality.
 4. Previous history of peptic ulcer disease was not an important risk factor in causation peptic ulcer perforation, as sizeable number of patients did not give positive history of dyspepsia or peptic ulcer symptoms. It was also not a significant risk factor in postoperative mortality and morbidity.
 5. Out of 35 patients, 8 (22.85%) patients had associated co-morbid conditions and these conditions increased postoperative mortality and morbidity.
 6. Shock on admission was a determinant of morbidity and mortality in peptic ulcer perforation. In this study shock on admission was a risk factor for morbidity in peptic ulcer perforation. 66% of 77 patients with pre-operative shock died. Shock is a correctable variable that must be treated before surgery to minimize morbidity and mortality rate.
 7. Among 23 patients who underwent surgery, 24 hours after the onset of symptoms, 5 (21.73%) developed morbidity and 7 (30.43%) died. So delayed surgery (> 24 hours) is associated with increased morbidity and mortality in postoperative period.
 8. There were 14 patients with Hb < 11. Out of them 1 (7.14 %) developed morbidity and 5 (35.71 %) died.
 9. Duodenal perforation was associated with increased mortality (30%) as compared to gastric perforation (20%). Size of perforation > 1cm was associated with increased morbidity(28.57 %) as well as mortality (28.57 %).
 10. Purulent peritoneal contamination (Grade 3 & 4) was another risk factor for morbidity in peptic perforation. Postoperative morbidity was seen in 11.11% of patients and grade 3 and 4 accounted for 100% of mortality.
 11. Among 35 patients, most common postoperative complication was death in about 8(22.85%) patients followed by pleural effusion in 5 patients (14.28%), 4(11.42%) patients had prolonged paralytic ileus, 3 (8.57%) patients had septicemia, 2 (5.71%) patients had wound dehiscence, 1(2.85%) had renal failure, 1(2.85%) developed multi organ failure.
 12. Risk factors for morbidity and mortality in perforated peptic ulcer were age 65 years, associated medical illness, alcohol consumption, NSAID's use , duration of perforation more than 24 hours before surgery, presence of shock on admission and purulent peritoneal collection (Grade 3 & 4). No evidence of malignancy or presence of H. pylori was noted on histopathology report.
3. Age more than 65 years and associated medical illness increase morbidity and mortality in patients with peptic perforation.
 4. Prolonged use of drug like NSAID's is a statistically significant predictor of outcome in terms of mortality. Similarly use of corticosteroids also causes increase in mortality.
 5. The duration of perforation more than 24 hours and presence of shock on admission are associated with an increased rate of post-operative complications.
 6. Site and size of perforation and presence of purulent peritoneal contamination (grade III or grade IV) also have an adverse effect on outcome causing increased morbidity and mortality in patients with peptic perforation.
 7. Early diagnosis, prompt management of shock and septicemia, decreasing delay in surgery and definitive surgical treatment is needed to improve overall results.

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5. Conclusions

1. From present study following conclusions can be drawn based on various observations and its analysis.
2. Peptic perforation is common in the age group of 30-50 years. It is more common in males.

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Acknowledgment

With deep sense of gratitude, I take this opportunity to express respect and gratitude to my guide and mentor, my P.G. teacher **Dr. Rakesh A. Makwana** (Assistant Professor) and **Dr. Gunavant H. Rathod** (Professor, Head of the Unit and Head of the Department of General Surgery) to whom I am indebted in many ways, for their continuous guidance and constant motivation throughout the preparation of this dissertation. Their constructive suggestions were not only to improve this study but were also to improve my entire approach to the subject and its practice. ion.

I also take the opportunity to thank **Dr. R. P. Gadani** (Assistant Professor) and **Dr. R. K. Patel** (Assistant Professor) for their suggestions and immense support during the entire course of preparation.

I would like to thank **Dr. M. M. Prabhakar**, the Medical Superintendent of Civil Hospital, Ahmedabad to allow me to use the resources of the hospital to conduct the study.

Lastly I would like to thank all the patients pertaining to my study and otherwise and our institute without which this work would not have been completed and without him I would not have seen and learnt so much.