ORIGINAL ARTICLE

Early post-operative morbidity and mortality predictors in peptic ulcer perforation

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ABSTRACT

BACKGROUND: Peptic ulcer perforation (PUP) is one of the cause of acute abdomen, incidence of this entity is 5% of all abdominal emergencies. Numerous prognostic factors have been reported for morbidity and mortality after PUP, this study attempts to analyze the factors affecting mortality and morbidity in patients with PUP.

METHODS: The medical record of patients who were operated for PUP in our clinic was retrospectively evaluated between January 2008 to January 2018. A total of 318 patients were included in this study. Patients were retrospectively analyzed in terms of age, gender, comorbidity, ASA score, biochemical, hematological parameters, complications, and mortality. The risk factors affected to morbidity and mortality were also evaluated.

RESULTS: The study population consisted of 318 patients and the mean age of the patients was 41.30±19.37 (min-max: 16–89). In the study, 271 (85.22%) patients were male and 47 (14.78%) were female and male to female ratio was 5.76. In the analysis of the predictors of morbidity, age ≥60 years, (p<0.001); perforation-surgery interval >24 h (p<0.001); purulent intraperitoneal contamination (p<0.001); pre-operative renal failure (p<0.001); duodenal perforation (p<0.001); pre-operative shock (p<0.001); and ASA score > III (p<0.0001) were found statistically significant. Gender was not found statistically significant (p=0.672). Mortality developed in 15 (4.71%) of 318 patients in the post-operative period. In the multivariate analysis, age ≥60 years, (p<0.001); perforation-surgery interval >24 h (p<0.001); purulent intraperitoneal contamination (p<0.001); pre-operative renal failure (p<0.001); duodenal perforation (p<0.001); and pre-operative shock (p<0.001) were found to be independent predictors of post-operative mortality.

CONCLUSION: In our study, age ≥60 years, perforation-surgery interval >24 h, purulent intraperitoneal contamination, pre-operative renal failure, duodenal perforation, pre-operative shock, and intensive care unit in the post-operative period were found to be independent predictors of post-operative morbidity and mortality. A comprehensive clinical evaluation, adequate fluid resuscitation, initiation of appropriate antibiotic therapy, and early access to surgery can minimize the risk of morbidity and mortality in PUP.

Keywords: Morbidity; mortality; peptic ulcer perforation; predictor factors.

INTRODUCTION

Peptic ulcer disease (PUD) is one of the most common benign diseases of the stomach and gastrointestinal tract, affecting approximately 4 million people annually worldwide.[1] Mortal complications such as perforation or bleeding are seen as a complication of PUD.[2] Peptic ulcer perforation (PUP) is one of the cause of acute abdomen, incidence of this entity is 5% of all abdominal emergencies.[3]

The predisposing factors for PUP are helicobacter pylori infection, use of non-steroidal anti-inflammatory, smoking, alcohol, chronic stress, and elderly (≥60 years).[4]

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The treatment of PUP is surgical repair and it has a highest risk of mortality between all complications of PUD.[5,6] Early intervention for PUP reduces the risk of morbidity and mortality. Mortality of the PUP rates of up to 25–30% has been reported in the previous studies.[7]

Numerous prognostic factors have been reported for morbidity and mortality after PUP, this study attempts to analyze the factors affecting mortality and morbidity in patients with PUP.

MATERIALS AND METHODS

After getting local ethical committees approval, the medical record of patients who were operated for PUP in our clinic was retrospectively evaluated between January 2008 to January 2018. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. The study was approved by the Bioethics Committee of the Medical Faculty of University (Date: 21/06/2021; Decision No: HRU/21.12.22).

A total of 318 patients were included in this study. Patients were retrospectively analyzed in terms of age, gender, comorbidity, ASA score, biochemical, hematological parameters, complications, and mortality. The risk factors affected to morbidity and mortality were also evaluated. The patients were followed up in order at the 1st week, 1st month, and 6-month intervals.

Inclusion Criteria

- All patients whose age more than 16 years with PUP in the stoma and underwent surgical primary repair for the management for it were included in the study.

Exclusion Criteria

The following criteria were excluded from the study:

- PUP of atypical origin such as jejunum, ileum
- Conservatively treated patients
- Patients undergoing laparoscopic surgery
- Patients underwent surgical procedures other than primary surgical repair
- Patients under 16 years of age
- Patients presenting with recurrent perforation.

Statistical Analysis

IBM Statistical Package for the Social Sciences version 20.0 (IBM Corporation, Armonk, NY, USA) was used. For determining normality of independent samples, Shapiro–Wilk test and variance homogeneity test were used. According to the distribution of normality, Student's t-test and Mann–Whitney U test were used to evaluate numerical data. Chi-square test was used for the categorical data. Numerical data were given as mean±standard deviation (SD) and median (minimum–maximum values) according to the normality test; categorical values were given as count (n) and percentage (%). P>0.05 value was statistically significant. Determining the predictors which has effects early post-operative serious complications and mortality in PUP was evaluated by Multiple Logistic Regression Analyses. Variables with p<0.05 in the univariate analyses were included in multivariate analyses. Variable whose univariable test had p<0.05 was accepted as a candidate for the multivariable test along with all variables of known clinical importance. P<0.05 was considered statistically significant.

RESULTS

The study population consisted of 318 patients and the mean age of the patients was 41.30±19.37 (min-max: 16–89). In the study, 271 (85.22%) patients were male and 47 (14.78%) were female and male to female ratio was 5.76. Renal failure was seen in 28 (8.80%) patients before surgery. Hypertension was found to be the most common comorbid disease and was seen in 72 (22.64%) patients. Of the patients, 287 (90.25%) were admitted to the hospital in the first 24 h after the onset of symptoms. Thirty-one (9.74%) patients were operated >24 h after perforation. At the time of admission, shock (systolic BP <90) was present in 24 (7.54%) patients. Thirty-eight (11.95%) patients had duodenal perforation and 280 (88.05%) patients had pre-pyloric perforation. In this study, 170 (53.45%) patients had a history of regular smoking, history of alcohol use in 35 (11%), 148 (46.54%) had history of regular NSAID use, and history of chewing tobacco in 11 (3.45%) patients. Two hundred and ten (66.03%) patients had a history of symptoms of peptic ulcer and using PPI. In admission to the hospital, pre-operative ASA (American Association of Anesthesiologists) score was assessed for all patients. Ninety-five (29.87%) Grade was I, 145 (45.59%) Grade was II; 62 (19.49%) were Grade III, and 16 (5.03%) were Grade IV (Table 1). Morbidity was seen in 68 (21.38%) patients at the post-operative hospital period. Fourteen of 68 patients had more than one post-operative complications. Purulent intraperitoneal collection developed in 19 patients and 5 were exitus in the post-operative period because of the sepsis. In the post-operative period, ventilator support was needed to be use in 17 (5.34%) patients and 28 (8.80%) patients had to be followed up in the intensive care unit in the postoperative period. Surgical site infection was seen in 38 (11.94%) patients and wound dehiscence was seen in 6 (1.88%) patients. Post-operative pneumonia was seen in 12 (3.77%) patients and pleural effusion was developed in 24 (7.54%) patients.

In the analysis of the predictors of morbidity, age ≥60 years, (p<0.001); perforation-surgery interval >24 h (p<0.001); purulent intraperitoneal contamination (p<0.001); pre-operative renal failure (p<0.001); duodenal perforation (p<0.001); pre-operative shock (p<0.001); and ASA score > III (p<0.0001) were found statistically significant. Gender was not found statistically significant (p=0.672) (Table 1).

Table 1. Clinico pathological characteristics, preoperative and operative findings of patients with PUP and univariate analysis results

Variables	Number of patients n (%)	Morbidity p-value	Mortality p-value
Age			
Age ≥60 years		<0.0001	<0.0001
Yes	66 (21.75)		
No	252 (79.25)		
Gender		=0.672	=0.872
Male	271 (85.22)		
Female	47 (14.78)		
ASA score		<0.0001	<0.0001
I-II	240 (75.47)		
III-IV	78 (24.53)		
Perforation-surgery interval		<0.0001	<0.0001
≤24 h	287 (90.25)		
>24 h	31 (9.74)		
Preoperative renal failure		<0.0001	<0.0001
Yes	28 (8.80)		
No	290 (91.20)		
Preoperative shock		<0.0001	<0.0001
Yes	24 (7.54)		
No	294 (92.45)		
Site of perforation		<0.0001	<0.0001
Prepyloric	280 (88.05)		
Duodenal	38 (11.95)		
Purulent intraperitoneal fluid		<0.0001	<0.0001
Yes	19 (5.97)		
No	289 (94.03)		

ASA: American Society of Anesthesiologist; PUP: Peptic ulcer perforation.

Mortality developed in 15 (4.71%) of 318 patients in the post-operative period. In the univariate analysis, age ≥60 years (p<0.001); ASA score > III (p<0.0001); perforation-surgery interval >24 h (p<0.001); purulent intraperitoneal contamination (p<0.001); pre-operative renal failure (p<0.001); duodenal perforation (p<0.001); and pre-operative shock (p<0.001) were found to be risk factors affecting mortality.

In the multivariate analysis, age ≥60 years (p<0.001); perforation-surgery interval >24 h (p<0.001); purulent intraperitoneal contamination (p<0.001); pre-operative renal failure (p<0.001); duodenal perforation (p<0.001) and pre-operative shock (p<0.001) were found to be independent predictors of post-operative mortality (Table 2).

Table 2. Multivariate analysis of the factors associated with post-operative morbidity

Variables	Number of patients n (%)	p-value	OR (95% CI)
Age ≥60 years		<0.0001	0.26 (0.19–0.35)
Yes	66 (21.75)		
No	252 (79.25)		
ASA score		<0.0001	0.32 (0.24–0.43)
I-II	240 (75.47)		
III-IV	78 (24.53)		
Perforation-surgery interval		<0.0001	0.10 (0.07–0.16)
≤24 h	287 (90.25)		
>24 h	31 (9.74)		
Preoperative renal failure		<0.0001	0.09 (0.06–0.14)
Yes	28 (8.80)		
No	290 (91.20)		
Preoperative shock		<0.0001	0.08 (0.05–0.13)
Yes	24 (7.54)		
No	294 (92.45)		
Site of perforation		<0.0001	0.13 (0.09–0.19)
Duodenal	38 (11.95)		
Prepyloric	280 (88.05)		
Purulent intraperitoneal fluid		<0.0001	0.06 (0.04–0.10)
Yes	19 (5.97)		
No	289 (94.03)		

ASA: American Society of Anesthesiologist; CI: Confidence interval; OR: Odds ratio.

DISCUSSION

Although PUD is a benign disorder, the risk of morbidity and mortality increases when ulcer-related perforation develops. In our study, the risk of morbidity and mortality depends on PUP was 68 (21.38%) and 15 (4.71%), respectively. There is not enough studies about identifying independent prognostic risk factors which affect to morbidity and mortality in PUP. In our study; age ≥60 years, perforation-surgery interval >24 h, purulent intraperitoneal contamination, pre-operative renal failure, duodenal perforation, pre-operative shock, and intensive care unit in the post-operative period were found to be independent predictors of post-operative morbidity and mortality.

PUP is usually seen between the ages of 40 and 50 years. In the present study, similar to the literature, the mean age of the patients was 41.30±19.37 years.[8,9] However, some literatures which had a high mortality results were reported higher mean age than our study.[10,11] As similar to our study, the previous literatures were revealed that patients ≥60 years of age had a statistically significantly higher morbidity and mortality rate than younger patients.[7,10,12–14]

In recent studies, male dominance was detected. In our study, 271 (85.22%) patients were male and 47 (14.78%) were female and male to female ratio was 5.76 and male dominance was found as similar to these literatures.[4,9,10,15]

In a previous study; gender was not found statistically significant for mortality. In our study similar to that results, gender was not found as a prognostic factor for mortality.[14]

The location of the perforation was reported to be pre-pyloric in 68.2% to 76.3% and in duodenum in 31.8% to 23.7% of patients and the location of the perforation was not associated with mortality.[9,10] Contrary to these studies, in our study, 38 (8.80%) patients had duodenal perforation and 280 (88.05%) patients had pre-pyloric perforation and in the analysis of our results, duodenum perforation was found to be the risk factor affecting to morbidity and mortality.

Perforation-surgery interval is defined as the time between the onset of pain and performing the surgery. In the previous studies revealed that prolonged perforation-surgery interval >24 h is a prognostic risk factor for mortality.[16] Furthermore, in the literature, perforation-surgery interval >24 h was seen in 10% and 18% of cases, respectively.[12,14] In our study; 287 (90.25%) patients were admitted to the hospital in the first 24 h after the onset of symptoms and 31 (9.74%) patients were operated 24–48 h after perforation. It has reported that it is very important to reduce this interval.[17] In our study, we also found that perforation-surgery interval >24 h was a prognostic factor affecting morbidity and mortality.[17,18] Majority of patients (82.1%) in our study presented before 24 h of onset of symptoms.

Serum creatinine levels are an indicator of renal failure. In a previous study, high serum creatinine level was found as a risk factor for mortality.[12] In the analysis of our results, morbidity and mortality were found to be higher in patients who has pre-operative renal failure and had a high level of serum creatinine.

In addition, as similar to our study, pre-operative shock was reported an important risk factor affecting to morbidity and mortality.[7,11,12]

Morbidity (50%) and morbidity (4–30%) rates have been reported to be high in many studies.[19,20] In our study, morbidity (21.38%) and mortality 15 (4.71%) rates were lower than the previous studies.[6,19,20] We believe that this may be due to short perforation-surgery interval, younger average age and lower ASA scores in our study.

The limitations of our study were retrospective nature, small sample size and lack of the previous medical records of the patients.

Conclusion

In our study, age ≥60 years, perforation-surgery interval >24 h, purulent intraperitoneal contamination, pre-operative renal failure, duodenal perforation, pre-operative shock, and intensive care unit in the post-operative period were found to be independent predictors of post-operative morbidity and mortality. A comprehensive clinical evaluation, adequate fluid resuscitation, initiation of appropriate antibiotic therapy, and early access to surgery can minimize the risk of morbidity and mortality in PUP.

Ethics Committee Approval: This study was approved by the Harran University Clinical Research Ethics Committee (Date: 21.06.2021, Decision No: HRU/21.12.22).

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ORİJİNAL ÇALIŞMA - *ÖZ*

Peptik ülser perforasyonunda erken ameliyat sonrası morbidite ve mortalite belirleyicileri

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AMAÇ: Peptik ülser perforasyonu (PUP), akut karın nedenlerinden biridir, bu durumun insidansı tüm abdominal acillerin %5'idir. PUP sonrası morbidite ve mortalite için çok sayıda prognostik faktör bildirilmiştir, bu çalışma PUP'lu hastalarda mortalite ve morbiditeyi etkileyen faktörleri analiz etmeye çalışmaktadır.

GEREÇ VE YÖNTEM: Ocak 2008–Ocak 2018 tarihleri arasında kliniğimizde PUP nedeniyle opere edilen hastaların tıbbi kayıtları geriye dönük olarak incelendi. Bu çalışmaya toplam 318 hasta dahil edildi. Hastalar geriye dönük olarak yaş, cinsiyet, komorbidite, ASA skoru, biyokimyasal, hematolojik parametreler, komplikasyonlar ve mortalite açısından incelendi. Morbidite ve mortaliteyi etkileyen risk faktörleri de değerlendirildi.

BULGULAR: Çalışma popülasyonu 318 hastadan oluşmaktaydı ve hastaların yaş ortalaması 41.30±19.37 (min-maks: 16–89) idi. Çalışmada 271 (%85.22) hasta erkek, 47 (%14.78) kadın ve erkek/kadın oranı 5.76 idi. Morbidite belirteçlerinin analizinde, yaş ≥60, ($p<0.001$); perforasyon-cerrahi aralığı >24 saat ($p<0.001$); pürülan intraperitoneal kontaminasyon ($p<0.001$); ameliyat öncesi böbrek yetersizliği ($p<0.001$); duodenal perforasyon ($p<0.001$); ameliyat öncesi şok ($p<0.001$) ve ASA skoru >III ($p<0.0001$) istatistiksel olarak anlamlı bulundu. Cinsiyet istatistiksel olarak anlamlı bulunmadı ($p=0.672$). Ameliyat sonrası dönemde 318 hastanın 15'inde (%4.71) mortalite gelişti. Çok değişkenli analizde yaş ≥60, ($p<0.001$); perforasyon-cerrahi aralığı >24 saat ($p<0.001$); pürülan intraperitoneal kontaminasyon ($p<0.001$); ameliyat öncesi böbrek yetersizliği ($p<0.001$); duodenal perforasyon ($p<0.001$) ve ameliyat öncesi şok ($p<0.001$) ameliyat sonrası mortalitenin bağımsız öngörücüleri olarak bulundu.

TARTIŞMA: Çalışmamızda; yaş ≥60, perforasyon-ameliyat aralığı >24 saat, pürülan intraperitoneal kontaminasyon, ameliyat öncesi böbrek yetersizliği, duodenal perforasyon, ameliyat sonrası dönemde ameliyat öncesi şok ve yoğun bakım ünitesi ameliyat sonrası morbidite ve mortalitenin bağımsız öngördürücüleri olarak bulundu. Kapsamlı bir klinik değerlendirme, yeterli sıvı resüsitasyonu, uygun antibiyotik tedavisinin başlatılması ve cerrahiye erken erişim, PUP'ta morbidite ve mortalite riskini en aza indirebilir.

Anahtar sözcükler: Morbidite; mortalite; peptik ülser perforasyonu; prediktör faktörler.

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