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Risk Factors Predicting Morbidity and Mortality in Peptic Ulcer Perforation at Maharaj Nakorn Chiangmai Hospital

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Abstract

Background: **Peptic ulcer perforation (PUP) is one of the important problems in Maharaj Nakorn Chiangmai Hospital due to high morbidity and mortality. If the risk factors of these outcomes are identified, modification of these risk factors may improve the outcomes. This study was conducted to identify these risk factors.**

Methods: **Data of 203 patients with PUP admitted to Maharaj Nakorn Chiangmai Hospital from January 2001 to October 2004 were studied retrospectively. General health data and data of twelve relevant risk factors were collected. The risk factors were analyzed by chi-squared test.**

Results: **The overall morbidity rate was 21.2% and mortality rate was 12.8%. Risk factors significantly associated with high mortality were age over 60 years, patient with underlying diseases (hypertension, diabetes mellitus, COPD, renal insufficiency, CHF, IHD, CA lung), duration from abdominal pain to operation more than 12 hours , hypotension before surgery, perforated size larger than 0.5 cm. and severe degre of contamination. The mean hospital stay was 8.64 days and number of patients who stayed more than 8 days was 50 (24.6%). Risk factors significantly associated with increasing hospital stay of more than 8 days were similar to those predicting mortality.**

Conclusion: **This study showed clearly that the duration before operation and hypotension were associated with high mortality and morbidity. Surgeons should modify these risk factors before surgery or referral.**

Introduction

After the introduction of medical therapies of peptic ulcer disease including H2 receptor antagonist, proton pump inhibitor and *H. pylori* eradication, there has been a decrease in peptic ulcer disease and elective surgery for this disease.[1-3] By contrast, the numbers of peptic ulcer perforation or upper gastrointestinal hemorrhage have remained quantitatively constant.[4,5]

Smoking and history of NSAIDs were clearly the risks for perforated ulcer, but steroids and *Helicobactor pylori* were not clearly the risk for the perforation.[8-12]

Morbidity and mortality of peptic ulcer perforation were major problems.[1,6,7] There were many studies trying to find out the risk factors to predict these events. The risk factors in previous studies were age over 60 years, hypotension at admission, delayed of surgery more than 24 hours and patient with underlying diseases.[13-24]

Peptic ulcer perforation was one of important

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problems at Maharaj Nakorn Chiangmai Hospital due to high morbidity and mortality. If the risk factors of this problem are identified and managed properly, the disaster may be decreased. Therefore it was essential to carry out a study to identify the risk factors.

Methods

Retrospective reviews of patient records admitted with the diagnosis of peptic ulcer perforation from January 2001 to October 2004 were collected and analyzed. Collected data included age, sex, hospital stay, history of smoking, recent use of NSAIDs or steroid, underlying diseases (hypertension, DM, COPD, CRF, IHD, CHF, others), duration from onset of abdominal pain to admission and from admission to surgery, blood pressure before surgery, site and size of perforation, operative time, degree of contamination (mild, moderate, severe), operative procedure, morbidities (wound infection, prolonged ileus, intraabdominal abscess and leakage), mortality and causes of death.

Method of data analysis

Some part of data were presented as demographic data; others were calculated by using SPSS ver.10 statistical software. The chi-square test was used to compare proportion and two tailed probability (P) value less than 0.05 was considered statistically significant.

Results

General data

From January 2001 to October 2004, 203 patients were admitted at Maharaj Nakorn Chiangmai Hospital with the diagnosis of peptic ulcer perforation. There were 145 male patients (71.4%) and 58 female patients (28.6%) with mean age of 59.39 years (ranged from 19-97 years).

One hundred and twenty-seven patients (62.6%) had history of smoking, 70 patients (34.5%) had history of recent use of NSAIDs and 21 patients (10.3%) had history of recent use of steroid.

Sixty-one patients (30%) had underlying diseases (Table 1).

Mean duration from onset of abdominal pain to admission was 17.4 hours and median duration was 7 hours. Duration from admission to operation ranged from 50 minutes to 18 hours with the mean length of 6.2 hours. Ninety-four patients (46.3%) required duration from admission to operation more than 6 hours. In conclusion, the mean duration from onset of pain to operation was 23.6 hours with the median time of 14.2 hours.

Table 1 Underlying diseases

Underlying diseases	Frequency (%)
Hypertension	34 (16.75)
Diabetes mellitus	12 (5.91)
COPD	17 (8.37)
CA lung	6 (2.96)
Chronic renal failure	5 (2.46)
Ischemic heart disease	4 (1.97)
Heart failure	3 (1.48)

Table 2 Sites of perforation

Sites of perforation	Frequency (%)
First part of duodenum	126 (62.1)
Prepyloric	61 (30.0)
Body	13 (6.4)
Antrum	2 (1)
Third part of duodenum	1 (0.5)
Total	**203 (100)**

Table 3 Degree of contamination

Degree of contamination	Frequency (%)
Mild	51 (25.1)
Moderate	103 (50.7)
Severe	49 (24.1)
Total	**203 (100)**

Twenty-four patients (11.8%) presented with hypotension before operation with blood pressure less than 90/60 mmHg. Perforated sizes ranged from 0.1 to 5 cm with mean of 0.691 cm and median of 0.5 cm. Sites of perforation and degrees of contamination are shown in Table 2 and 3.

Operative time ranged from 30 minutes to 375 minutes, mean 107 minutes, median 95 minutes. Operative procedures are shown in Table 4.

Mortality

Twenty-six patients (12.8%) died from complications of peptic ulcer perforation such as sepsis, heart

disease, respiratory problem, renal disease, liver failure and thyroid storm. The analysis of factors associated with mortality showed that factors that significantly associated with mortality included age over 60 years, female gender, patients with underlying diseases (hypertension, diabetes mellitus, COPD, renal insufficiency, CHF, IHD, CA lung), duration from abdominal pain to operation of more than 12 hours , hypotension before surgery, perforated size larger than 0.5 cm. and severe degree of contamination. History of smoking, recent use of NSAIDs and steroid and operative time were not associated with increased mortality (Table 5).

Table 4 Operative procedures

Procedures	Frequency (%)
Simple closure with omental patch	140 (69)
Truncal vagotomy with pyloroplasty	42 (20.7)
Pyloroplasty with omental patch	8 (3.9)
Others (antrectomy, subtotal gastrectomy, etc)	13 (6.5)
Total	**203 (100)**

Hospital Stay

The mean hospital stay in this study was 8.64 days and ranged from 1 to 53 days. Fifty patients (24.6%) stayed in the hospital more than 8 days. Results of the analysis showed that factors that significantly associated with increased hospital stay (longer than 8 days) included age over 60 years, patients with underlying diseases (hypertension, diabetes mellitus, COPD, renal insufficiency, CHF, IHD, CA lung), time duration from abdominal pain to operation more than 12 hours, hypotension before surgery, perforated size larger than 0.5 cm. and severe degree of contamination.

History of smoking, recent use of NSAIDs and

Table 5 Factors associated with mortality

	Number	Mortality (n)	P value
Age (<60:>60 yrs)	92:111	4:22	0.002
Male:Female	145:58	13:13	0.018
History of smoking (no:yes)	76:127	11:15	0.740
History of recent use of NSAIDs (no:yes)	133:70	20:6	0.276
History of recent use of steroids (no:yes)	182:21	23:3	1.000
Underlying diseases (no:yes)	142:61	12:14	0.009
Time from pain to operation (<12:>12 hrs)	78:125	4:22	0.018
Operative time (<100:>100 mins)	115:88	19:7	0.110
Blood pressure (>90/60:<90/60 mmHg)	179:24	7:19	0.000
Perforated size (<0.5:>0.5 cm)	144:59	12:14	0.006
Degree of contamination (mild:mod:severe)	51:103:49	1:6:19	0.000
Time from admit to operation (<6:>6 hr)	109:94	8:18	0.021

Table 6 Factors associated with increased hospital stay

Factors	Number	Hosp stay >8 days	P value
Age (<60:>60 yrs)	92:111	10:40	0.000
Male:Female	145:58	34:16	0.661
History of smoking (no:yes)	76:127	13:37	0.079
History of recent use of NSAIDs (no:yes)	133:70	31:19	0.666
History of recent use of steroids (no:yes)	182:21	42:8	0.213
Underlying diseases (no:yes)	142:61	28:22	0.021
Time from pain to operation (<12:>12 hrs)	78:125	10:40	0.004
Operative time (<100:>100 mins)	115:88	26:24	0.549
Blood pressure (>90/60:<90/60 mmHg)	179:24	37:13	0.001
Perforated size (<0.5:>0.5 cm)	144:59	23:27	0.000
Degree of contamination (mild:mod:severe)	51:103:49	10:15:25	0.000
Morbidity	160:43	15:35	0.000
Mortality	177:26	39:11	0.046

steroid, gender and operative time were not associated with increased hospital stay (Table 6).

Morbidity

Forty-three patients (21.2%) suffered from morbidity (Table 7).

Factors that significantly increased morbidity included age over 60 years, history of smoking, recent use of NSAIDs and steroid, patients with underlying diseases (hypertension, diabetes mellitus, COPD, renal insufficiency, CHF, IHD, CA lung), duration from abdominal pain to operation more than 12 hours, hypotension before surgery, perforated size larger than 0.5 cm. and severe degree of contamination.

Gender, history of alcoholic usage and operative time were not associated with increased morbidity (Table 8).

Table 7 Morbidity in 43 patients

Morbidity	Frequency (%)
Wound infection	19 (44)
Postoperative bowel ileus	17 (39.5)
Anastomotic leakage	2 (4.65)
Pneumonia	11 (25.6)
Re-operation	5 (11.6)
Atrial fibrillation	4 (9.3)
Atelectasis	2 (4.65)
Pleural effusion	3 (7)
COPD with exacerbation	4 (9.3)

Complications

Eighteen patients (8.9%) suffered from pulmonary complications which included pneumonia, atelectasis, COPD with acute exacerbation and pleural effusion,

Factors associated with increased pulmonary complications were age over 60 years, history of smoking and patient with underlying diseases, ie. hypertension, diabetes mellitus, COPD, renal insufficiency, CHF, IHD, CA lung (Table 9).

Table 8 Factors associated with morbidity

	Number	Morbidity (n)	P value
Age (<60:>60 yrs)	92:111	8:35	0.000
Male:Female	145:58	32:11	0.765
History of smoking (no:yes)	76:127	7:36	0.002
History of recent use of NSAIDs (no:yes)	133:70	22:21	0.040
History of recent use of steroids (no:yes)	182:21	34:9	0.022
History of recent use of alcohol (no:yes)	101:102	20:23	0.759
Underlying diseases (no:yes)	142:61	24:19	0.037
Time from pain to operation (<12:>12 hrs)	78:125	10:33	0.033
Operative time (<100:>100 mins)	115:88	24:19	1.000
Blood pressure (>90/60:<90/60 mmHg)	179:24	32:11	0.004
Perforated size (<0.5:>0.5 cm)144:59	16:27	0.000	
Degree of contamination (mild:mod:severe)	51:103:49	5:15:23	0.000

Table 9 Factors associated with pulmonary complications

Factors	Number	Pulmonary Complications	P value
Age (<60:>60 yrs)	92:111	3:15	0.021
Male:Female	145:58	13:5	1.000
History of smoking (no:yes)	76:127	2:16	0.031
History of recent use of NSAIDs (no:yes)	133:70	10:8	0.502
Underlying disease (no:yes)	142:61	7:11	0.006
Time from pain to operation (<12:>12 hrs)	78:125	4:14	0.220
Operative time (<100:>100 mins)	115:88	11:7	0.880
Blood pressure (>90/60:<90/60 mmHg)	179:24	13:5	0.070
Degree of contamination (mild:mod:severe)	51:103:49	2:9:7	0.190

Discussions

Factors that predicted mortality in patients with peptic ulcer perforation included age over 60 years, female gender, patient with underlying diseases (hypertension, diabetes mellitus, COPD, renal insufficiency, CHF, IHD and CA lung), time duration from abdominal pain to operation more than 12 hours, hypotension before surgery, perforated size larger than 0.5 cm. and severe degree of contamination.

Some of these risk factors could be modified. Time duration from onset of abdominal pain to operation may be decreased by early diagnosis, effective referral system, effective resuscitation before operation and good coordination between surgical teams (anesthetists, surgeons and operative room personnel). Hypotension before surgery may be managed by proper and effective resuscitation. Patients with underlying diseases (hypertension, diabetes mellitus, COPD, renal insufficiency, CHF, IHD and CA lung) may be managed by proper preoperative, peri-operative, and post-operative care. Better control of these diseases may prevent the complications.

Surgeons should keep in mind that other risk factors that could not be modified are associated with increased mortality.

When compared to other studies, the results were not different. Factors associated with increased mortality include age over 60 years, time duration from pain to surgery more than 12 hours, patients with underlying diseases, hypotension before surgery and severe degree of contamination. However, size of perforation is also included as another risk in this study.

Most previous studies did not mention about the details of post operative complications. This study includes pulmonary complications and prolonged hospital stay as morbidity from peptic ulcer perforation. Factors associated with increased hospital stay are similar to those associated with mortality and factors associated with increased pulmonary complications included age over 60 years, patients with underlying diseases and previous history of smoking.

Conclusion

We may reduce the morbidity and mortality of peptic ulcer perforation by decreasing the time duration from onset of abdominal pain to operation, proper resuscitation to stabilize the patients before surgery, controlling the underlying disease and preventing complications that may occur.

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