## Original Research Article

# Relationship of qSOFA values to gastric perforation patients in A. W. Sjahranie General Hospital, Samarinda, Indonesia

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### ABSTRACT

**Background:** Authors hypothesized the qSOFA score would be useful in sepsis patients caused by gastric perforation. The present study investigated the relationship of qSOFA value to outcome of patients with gastric perforation in Samarinda.
**Methods:** This research was analytical, descriptive research method using cross-sectional study design 70 patients. Data analysis was obtained to see the relationship between age, gender, vital sign qSOFA and survival in gastric perforation patients.
**Results:** Mean systolic blood pressure was significantly higher in subjects who lived than those who died, i.e. 105.5 vs 92.5 (p <0.001). Mean diastolic blood pressure was significantly higher in subjects who lived than those who died, ie 80.0 vs 66.8 (p <0.001). The respiration rate was significantly lower in subjects who lived than those who died, namely 22.9 vs 24.6 (p <0.001). The mean GCS score was significantly higher in subjects who lived than those who died, ie 14.2 vs 12.2 (p <0.001).
**Conclusions:** The higher the qSOFA score in the study subjects with gastric perforation, the higher the mortality rate. There was a relationship between the qSOFA value and the outcome of patients with gastric perforation where the mean qSOFA score was significantly lower in subjects who lived than those who died.

**Keywords:** Gastric perforation, Peptic ulcer, qSOFA, Sepsis

## INTRODUCTION

Peptic ulcer affects 4 million people annually worldwide. The main etiological factors include the use of non-steroidal anti-inflammatory drugs (NSAIDs), smoking, Helicobacter pylori and high-salt diets. 10%-20% of cases are with complications and 2%-14% of these cases experience ulcer complications until perforation. Perforation of peptic ulcer is relatively rare, but when happens it's life-threatening and the mortality rate varying from 10% to 40%.[1]

Gastrointestinal perforation is a form of complex penetration of the stomach wall, small intestine, large intestine due to leaking of the contents of the intestine into the abdominal cavity. Perforation of the intestine has the potential for bacterial contamination in the abdominal cavity (this condition is known as peritonitis). Gastric perforation develops into a chemical peritonitis caused by a leak of stomach acid into the abdominal cavity. This kind of infection can cause sepsis. Sepsis is a complex state of the body that is stimulated by infection and then triggers an excess body immune response. Three

important signs of sepsis are inflammation, excessive coagulation and suppression of fibrinolysis. This inflammatory cascade and coagulation mainly mediates the progression of sepsis, causing hypoxia and tissue ischemia which continues to organ dysfunction. Sepsis that has failed organ function can be categorized as severe sepsis. Some are said to be septic shock if the conditions mentioned above are accompanied by refractory hypotension.[2,3] There are many scoring systems to predict the outcome of patients with sepsis such as SOFA, SAPS, APACHE, MPM and a number of other scoring systems. One of the most widely used scoring systems in the world is the qSOFA score.

In a study in Korea it was concluded that the prognostic utility of the qSOFA score at ICU entry for patients with bacteremia was very useful as a screening tool to predict clinical severity and use of medical resources within 72 hours after admission. In addition, the comparison of the qSOFA score with other scoring system parameters shows that the qSOFA score is simpler and useful in the Korean ICU. In a study in Argentina it was found that qSOFA showed better accuracy for predicting sepsis and death in hospitals.

The criteria for organ dysfunction in other scoring systems require parameters that may be difficult and require time while simple scoring such as qSOFA, with 3 clinical variables and no laboratory tests, is statistically greater predictive validity. In a prospective study the sensitivity of qSOFA was 0.32 and the specificity was 0.98 for the identification of severe sepsis.[4,5] Authors hypothesized the qSOFA score would be useful in Indonesian patients. The present study investigated the relationship of qSOFA value to outcome of patients with gastric perforation in Samarinda.

## METHODS

The design of this study was observational analytic using cross-sectional study design. Data were obtained from A.W. Sjahranie Hospital. The data collection was conducted in one-year period, from March 2016 to February 2017. The sampling method used was total sampling. The study population of this research was all patients were diagnosed with gastric perforations who were hospitalized through the Emergency Department of the A.W Sjahranie Hospital, Samarinda and performed surgery in the emergency operating room during the study period. The inclusion criteria for this study were patient age ≥40 years old, diagnosed clinically or radiologically as pre-operative gaster perforation, and went through repair laparotomy for perforated gaster.

The exclusion criteria were traumatic perforated gaster and malignancy. The collected data is processed using Statistical Package for the Social Sciences (SPSS). In this study diagnostic tests will be carried out according to the variables studied. Analysis using Chi-Square test for associative test and unpaired T test for correlation significance test. Significance of statistics is obtained if p <0.05. This research has been approved by Research Ethics Committee, 'Mulawarman University, Samarinda, Indonesia. Number; 183/KEPK-FK/III/2016.

## RESULTS

The analysis was carried out on the research subjects who were 70 patients diagnosed with gastric perforations who were hospitalized through the Emergency Department of the Sjahranie Hospital Samarinda and performed surgery in the emergency operating room during March 2016- February 2017.

### Table 1: Age, vital sign, and qSOFA (n=70).

| Variable | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|
| Age | 47 | 68 | 56.9 | 5.4 |
| Systolic | 80 | 110 | 94.5 | 7.7 |
| Diastolic | 52 | 90 | 68.9 | 7.5 |
| Respiration rate | 21 | 28 | 24.3 | 1.4 |
| GCS | 10 | 15 | 12.5 | 1.3 |
| qSOFA | 0 | 3 | 2.5 | 0.9 |

Data analysis was performed on 70 subjects aged between 47-68 years with a mean of 56.9±5.4 years. Age, vital sign, and qSOFA of the subjects were presented in Table 1. Categorical variables of this study were presented in Table 2. In this study the qSOFA score was between 0-3 with a mean of 2.5±0.9. Most of the subjects studied were women (51.4%), aged 51-60 years (65.7%). The radiological picture shows all positive free air

(100%), while the calculation of the qSOFA score shows most of the score 3 (68.6%). The percentage of subjects whose survival was only found in 11 subjects (15.7%).

Survival according to gender was presented in Table 3 the distribution of the percentage of survival was found not to differ significantly between men and women

(p>0.05). Survival according to age was presented in Table 4.

**Table 2: Demographic categorical variables (n=70).**

| Variable | | n | % |
|---|---|---|---|
| Gender | Male | 34 | 48.6 |
| | Female | 36 | 51.4 |
| Age | <=50 | 7 | 10.0 |
| | 51-60 | 46 | 65.7 |
| | >60 | 17 | 24.3 |
| Radiology | Free air (-) | 0 | 0.0 |
| | Free air (+) | 70 | 100.0 |
| qSOFA | 0 | 4 | 5.7 |
| | 1 | 5 | 7.1 |
| | 2 | 13 | 18.6 |
| | 3 | 48 | 68.6 |
| Survival | Alive | 11 | 15.7 |
| | Deceased | 59 | 84.3 |

No significant differences in the percentage of subjects living according to age were found (p>0.05). Comparison of vital signs between subjects living with those who died was obtained and presented in table 5. The mean systolic blood pressure was significantly higher in subjects who lived than those who died, i.e. 105.5 vs 92.5 (p<0.001).

The mean diastolic blood pressure was significantly higher in subjects who lived than those who died, ie 80.0 vs 66.8 (p<0.001). The respiration rate was significantly lower in subjects who lived than those who died, namely 22.9 vs 24.6 (p<0.001).

The mean GCS score was significantly higher in subjects who lived than those who died, i.e. 14.2 vs 12.2 (p<0.001).

In this study, it was found that the mean qSOFA score was significantly lower in subjects who lived than those who died, i.e. 1.0 vs 2.8 (p <0.001). These results as stated in table 6 indicate a significant correlation between low qSOFA scores and survival.

**Table 3: Survival according to gender.**

| Gender | | Survival | | Total | p* |
|---|---|---|---|---|---|
| | | Alive | Deceased | | |
| Male | n | 6 | 28 | 34 | |
| | % | 17.6% | 82.4% | 100.0% | 0.666 |
| Female | n | 5 | 31 | 36 | |
| | % | 13.9% | 86.1% | 100.0% | |
| Total | n | 11 | 59 | 70 | |
| | % | 15.7% | 84.3% | 100.0% | |

**Table 4: Survival according to age.**

| Age category | | Survival | | Total | p* |
|---|---|---|---|---|---|
| | | Alive | Deceased | | |
| <=50 | N | 2 | 5 | 7 | |
| | % | 28.6% | 71.4% | 100.0% | |
| 51-60 | N | 6 | 40 | 46 | |
| | % | 13.0% | 87.0% | 100.0% | 0.557 |
| >60 | N | 3 | 14 | 17 | |
| | % | 17.6% | 82.4% | 100.0% | |
| Total | N | 11 | 59 | 70 | |
| | % | 15.7% | 84.3% | 100.0% | |

**Table 5: Vital sign comparative analysis.**

| Variable | Survival | N | Mean | SD | p* |
|---|---|---|---|---|---|
| Systolic | Alive | 11 | 105.5 | 6.9 | 0.000 |
| | Deceased | 59 | 92.5 | 6.0 | |
| Diastolic | Alive | 11 | 80.0 | 6.3 | 0.000 |
| | Deceased | 59 | 66.8 | 5.6 | |
| Respiration rate | Alive | 11 | 22.9 | 0.9 | 0.000 |
| | Deceased | 59 | 24.6 | 1.3 | |
| GCS | Alive | 11 | 14.2 | 0.8 | 0.000 |
| | Deceased | 59 | 12.2 | 1.1 | |

Independent t test.

Survival based on qSOFA score was presented in Table 7.

Based on the distribution of the percentage of living subjects, there was a significant correlation between low qSOFA scores and survival (p <0.001), where the percentage of living subjects was found to be highest in the 0-1 qSOFA score (88.9%) and the lowest score 3 (0.0%).

**Table 6: Comparison qSOFA based on Survival.**

| Survival | n | Mean | SD | p* |
|----------|-----|------|-----|-------|
| Alive | 11 | 1.0 | 0.8 | 0.000 |
| Deceased | 59 | 2.8 | 0.5 | |

Mann Whitney Test

**Table 7: Survival based on qSOFA.**

| qSOFA | | Survival | | Total | p* |
|-------|-----|------|----------|-------|-----|
| | | Alive | Deceased | | |
| 0-1 | n | 8 | 1 | 9 | |
| | % | 88.9% | 11.1% | 100.0% | |
| 2 | n | 3 | 10 | 13 | |
| | % | 23.1% | 76.9% | 100.0% | 0.000 |
| 3 | n | 0 | 48 | 48 | |
| | % | 0.0% | 100.0% | 100.0% | |
| Total | n | 11 | 59 | 70 | |
| | % | 15.7% | 84.3% | 100.0% | |

Chi Square.

## DISCUSSION

From the research data, it was found that most of the subjects studied were women (51.4%) and men (48.6%), aged 51-60 years (65.7%). This is in accordance with the literature that in the United States, peptic ulcer disease (PUP) is found in approximately 4.5 million people each year with a ratio of incidence in men to around 40% and women 60%. In Indonesia stomach ulcers are found between 6-15% at the age of 20-50 years. Comparison of incidence in men was 36.8% and women were 63.2%.[6,7] The radiological picture shows all positive free air (100%), according to the literature that Photo X Ray is upright chest position or lateral abdominal decubitus radiograph shows evidence of free air (pneumoperitoneum).[8] The qSOFA score shows most of the scores of 3 (68.6%). The percentage of subjects whose survival was only found in 11 subjects (15.7%). The distribution of the percentage of living subjects was found not to differ significantly between men and women (p> 0.05). There was no significant difference in the percentage of subjects living according to age (p> 0.05).

In other study, increasing age of the patient, longer duration of symptoms, advanced disease process, generalised peritonitis with purulent or feculent exudate, shock at presentation and development of multiorgan failure are all associated with mortality and contribute to dismal outcome of the patient significantly. But, on that study, gender of the patient has no bearing on the outcome of the patient in the similar risk group.[9]

Comparison of vital signs between subjects living with those who died was the mean systolic blood pressure was significantly higher in subjects who lived than those who died, ie 105.5 vs 92.5 (p <0.001), the mean diastolic blood pressure was significantly higher in subjects who lived than those who died, ie 80.0 vs 66.8 (p <0.001), the

respiration rate was significantly lower in subjects who lived than those who died, namely 22.9 vs 24.6 (p <0.001). The mean GCS score was significantly higher in subjects who lived than those who died, ie 14.2 vs 12.2 (p <0.001)

From the above data in accordance with the literature using the qSOFA score, patients with suspected infection predicted to undergo ICU treatment for a long time or predicted to die in the hospital can be quickly identified by Quick SOFA (qSOFA), which consists of decreased level of consciousness, systolic blood pressure <100 mmHg, and respiratory rate >22x/minute; qSOFA score> 2 is associated with more or less risk of death 10% in the population in public hospitals with suspected infection. With these criteria, the mortality rate in hospitals can exceed 40%.[3]

In this study, it was found that the mean qSOFA score was significantly lower in subjects who lived than those who died, ie 1.0 vs 2.8 (p <0.001). Similar result is found in a research that comparing outcome between qSOFA score and Rockall preendoscopy score, which results indicate a significant correlation between low qSOFA scores and survival.

An increase in the qSOFA score is associated with adverse outcomes in patients with non-variceal upper gastrointestinal bleeding. The simple-to-use qSOFA score can be used for the prediction of mortality in patients with non-variceal upper gastrointestinal bleeding as an alternative when Rockall preendoscopy score is incomplete for which the comorbidity is unknown.[10]

## CONCLUSION

The incidence of gastric perforation based on sex is more common in women than men. Simple investigations that can be performed on patients with suspected gastric perforation are plain abdominal photographs where the images assessed are free air or not, which in this study showed that radiological images showed all positive free air. The higher the qSOFA score in the study subjects with gastric perforation, the higher the mortality rate There was a relationship between the qSOFA value and the outcome of patients with gastric perforation where the mean qSOFA score was significantly lower in subjects who lived than those who died.

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