

Original Article

Study on the nursing effect on complications of severe acute pancreatitis

Zhanxia Yu¹, Suyan Wu², Guangzhen Wan³

¹Department of Traumatology, Linyi People's Hospital, Linyi 276003, Shandong, China; ²Department of Femoral Head, Linyi People's Hospital, Linyi 276003, Shandong, China; ³Department of Spinal Surgery, Linyi People's Hospital, Linyi 276003, Shandong, China

Received September 21, 2015; Accepted January 9, 2016; Epub February 15, 2016; Published February 29, 2016

Abstract: Objective: To the complications of severe acute pancreatitis (SAP) and to explore the effect of nursing intervention on the complications and SAP prognosis. Methods: The clinical data of 115 SAP patients in our hospital from 2011.1 to 2014.6 were retrospectively analyzed. All patients received the complication nursing. Mortality and morbidity of the complications were observed, and the complications were evaluated by Binder scoring system. The risk factors of prognosis were evaluated by Logistic regression analysis. Results: Among the 115 patients, 86 cases were cured (74.78%), 29 cases died (25.22%), 53 cases (46.09%) were combined complications. A total of 89 cases were surgical treated, 21 cases (23.60%) died, 42 cases (47.19%) with complications. For the 26 cases with non-surgical treatment, 8 cases (30.77%) died, and 11 cases (42.31%) with complications. There was no significant difference in the cure rate, mortality and complication morbidity between the surgical and the non-surgical treatment ($P>0.05$). There were significant differences in mortality between patients with the shock or ARDS or combined >1 complications and those without complication ($P<0.05$). Among the 83 cases with Binder score <7 , mortality was in 14 cases (16.87%). In the 32 cases with Binder score ≥ 7 , 15 cases (46.87%) died. The difference of mortality between two groups has statistical significance ($P<0.05$). The complication morbidity and mortality in the groups with score of nursing quality >90 and ≤ 90 were 40.48% (34/84) and 16.67% (14/84), respectively, which were much higher than those ≤ 90 (61.29% (19/31) and 48.39% (15/31). The difference has statistical significance ($P<0.05$). The results of Logistic regression model indicate that Shock (OR=1.927, 95% CI 1.649-2.252), ARDS (OR=1.911, 95% CI 1.726-2.116), combined >1 complications (OR=2.127, 95% CI 1.692-2.674), Binder score (OR=1.793, 95% CI 1.520-2.115), as well as score for nursing quality (OR=-0.380, 95% CI 0.528-0.886) are the independent risk factors for death ($P<0.05$). Conclusions: Binder score was closely related to the mortality of SAP. Shock, ARDS, and combined >1 complications are independent risk factors for death. Improving the nursing quality can reduce the incidence of SAP complications as well as the mortality.

Keywords: Severe acute pancreatitis, complication, nursing, acute respiratory distress syndrome

Introduction

Severe acute pancreatitis (SAP) is a very common clinical acute abdomen disease, with the characteristic of acute onset, rapid progress, and poor prognosis. Despite the significantly improvement in the understanding of the SAP pathogenesis and the level of treatment in recent years, the mortality rate is still as high as 20%~30%. Clinical studies [1, 2] showed that complications were the leading cause of death in SAP, such as secondary infection, shock, multiple organ dysfunction syndrome, respiratory distress syndrome acute (ARDS), etc. In order to effectively reduce the incidence

of complications and improve prognosis, it is important to fully understand these complications and to develop reasonable nursing intervention methods. In this paper, the cases of SAP were retrospective analyzed to explore the impact of nursing intervention on the complications of SAP and their prognosis.

Materials and methods

General data

A total of 115 patients in our hospital from 2011.1 to 2014.6 were diagnosed as SAP according to "Standard for clinical diagnosis

and classification of acute pancreatitis” [3] formulated by Pancreatic surgery group of Chinese Medical Association in 1997. The patients were accompanied with different degrees of abdominal pain, vomiting, fever, etc. The pancreatic enlargement could be investigated under B-mode ultrasonography or CT, and the results of amylase testing from abdominal puncture fluid showed positive. There were 82 male patients and 33 females in this group, aged 24~68 years, median age of 35 years. The causes of the disease: 46 cases of binge drinking, 26 cases of alcohol abuse, 33 cases of biliary tract system diseases, 4 cases of abdominal injury, 3 cases of infection, 3 cases of other diseases.

Nursing methods

All patients were treated according to “Guidelines for diagnosis and treatment of acute pancreatitis in China (Draft)” [4] formulated by the group of pancreatic diseases in digestive diseases, Chinese Medical Association in 2007. Among them, 89 cases were surgical treated and 26 cases were non-surgical treated. All patients were given comprehensive nursing interventions, and the contents as follows:

Nursing of ARDS: ① Closely observe the respiratory patterns of the patients, especially the phenomenon of respiratory rate accelerate, chest tightness, nares flaring, three concave sign, etc.; ② Detect and analyze the blood gas, monitor oxygen partial pressure (PaO₂) and carbon dioxide partial pressure (PaCO₂). If the PaO₂ is low, give the oxygen with low flow rate of 2~3 L/min. Oxygen mask serious could be applied in serious case; ③ Uniform and reasonable arrangement of infusion, avoid rapid fluid without any sign, which may accelerate ARDS; ④ Maintain airway patency, regularly buckle back, turn over, clear the respiratory tract secretion; ⑤ If ARDS symptoms were found in patients, the clinicians should be informed and mechanical ventilation maintenance therapy is feasible.

Nursing of hypovolemic shock: ① ECG monitor, observe the variation of patients’ breathing, heart rate and blood pressure, notice the phenomenon of blood pressure reducing and heart rate speeding up; ② Observe the clinical symptoms, such as cold sweat, oliguria, cold extremi-

ties, etc. Once occurred, it is necessary to carefully find out the reasons, whether related to low blood volume, shock, or heart failure; ③ Once revealed the presence of hypovolemia and shock, it should be immediate fluid resuscitation, adding potassium, calcium, correcting water and electrolyte disorders.

Nursing of acute renal failure: ① Strengthen the inspection to ensure the timely infusion with appropriate quantity, and record the 24 h intake and output of fluid; ② Continuous observe the change of urine, record urine volume per hour. If the continuous 6 h urine volume <20 mL/h, and simultaneous detection of serum creatinine increased, it is necessary to consider the possibility of renal failure and contact the doctor.

Nursing of pancreatic encephalopathy: ① Observe the patients whether there is irritability, lethargy, irritability and restlessness, talkative, and even coma symptoms, if yes, the doctor should be conducted; ② Diagnosed pancreatic encephalopathy patients should be admitted to the ICU treatment, and the manic patients not self-restraint was feasible for constraint; ③ Ensure the rest of patients, control the number of visits, intravenous drip of “hibernation”.

Nursing of abdominal hemorrhage: The abdominal wound and drainage of the patients were observed, as well as the observation of the color and shape of the drainage liquid. If the drainage liquid was in color of red or brown, it is necessary to consider the possibility of bleeding and contact the doctor.

Nursing of gastrointestinal function: ① In the acute period, absolute fasting and drinking, gastrointestinal decompression, fluid infusion for correction of electrolyte disorders; ② Performing total parenteral nutrition with sugar, fat milk, amino acids, vitamins, insulin, trace elements, etc., venous catheter input with drip rate of 40~60/min; ③ After 2 weeks of total parenteral nutrition for recovery of gastrointestinal function, oral diet was feasible.

Evaluating indicator

The mortality and the incidence of complications were observed. The patients were divided into survival group and death group according

Nursing for SAP complications

Table 1. Analysis of treatment and nursing results [case (%)]

Group	Cases	Cured	Dead	Complications
Surgical treatment	89	68 (76.40)	21 (23.60)	42 (47.19)
Non-surgical treatment	26	18 (69.23)	8 (30.77)	11 (42.31)
Total	115	86 (74.78)	29 (25.22)	53 (46.09)

Table 2. A comparison of the complications between cured patients dead ones [case (%)]

Complications	Cases	Dead
No complication	62	58 (93.55)
Single complication	47	20 (42.55)*
Shock	11	6 (54.55)*
ARDS	12	7 (58.33)*
Renal inadequacy	4	1 (25.00)
Hemorrhage of digestive tract	3	1 (33.33)
Pancreatic encephalopathy	5	2 (40.00)
Hypocalcemia	2	0 (0.00)
Metabolic acidosis	3	0 (0.00)
General infection	4	2 (50.00)
Others	3	1 (33.33)
Combined >1 complications	6	5 (83.33)*
Total	115	29 (25.22)

Note: *P>0.05, statistically significant comparing to the cases without complication.

Table 3. Effect of nursing quality on the complications and mortality [case (%)]

Score for nursing quality	Cases	Complications	Dead
>90	84	34 (40.48)	14 (16.67)
≤90	31	19 (61.29)	15 (48.39)

to the prognosis, and the difference of complication motilities was compared. Binder score system was applied to evaluate the organ and metabolism complications, and accordingly the patients were divided into two groups with binder score <7 and ≥7. The mortalities of these groups were compared.

Evaluation of nursing quality

The nursing quality for each patient was evaluated. The questionnaire includes nursing measures (15 points), critical management (25 points), treatment nursing (25 points), emergency capability (15 points), and patients (or their families) satisfaction (20 points). Total 100 points and 90 points for pass. The occur-

rence of complications and prognosis for the patients with scores >90 and ≤90 were evaluated, respectively.

Statistical method

The results were statistical analyzed by using software SPSS 12.0 package and the categorical data are presented as percentage. The chi square test used to compare categorical variables. Logistic regression model was built to determine associated factors. A *p* value less than 0.05 was considered statistically significant.

Results

Analysis of the treatment and nursing results

Among the 115 patients, 86 cases were cured (74.78%) after treatment and nursing, 29 cases died (25.22%), 53 cases (46.09%) were combined complications. A total of 89 cases were surgical treated, 68 cases cured while 21 cases died, 42 cases with complications. For the 26 cases with non-surgical treatment, 18 cases cured, 8 cases died, 11 cases with complications. There was no significant difference in the cure rate, mortality and complication morbidity between the surgical and the non-surgical treatment (*P*>0.05, **Table 1**).

Comparison of complications between the cured and died patients

In the 62 cases without complication, 58 cases (93.55%) were cured, while 4 cases (6.45%) died. The complications occurred in 53 cases. Among the 47 cases with single complication, 27 cases (57.45%) were cured, while 20 cases (42.55%) died. The difference was statistically significant (*P*<0.05) comparing to those without complication. There were significant differences in mortality between patients with the shock or ARDS complications and those without complication (*P*<0.05). A total of 6 cases were combined >1 complication, one case (16.67%) cured, while 5 cases (83.33%) died. The difference was statistically significant (*P*<0.05) com-

Table 4. Prognostic factors analysis for SAP

Factor	β	S.E.	OR	95% CI for OR	Wald χ^2 value	P value
Shock	0.656	0.237	1.927	1.649-2.252	11.679	0.000
ARDS	0.648	0.216	1.911	1.726-2.116	13.889	0.000
Combined >1 complications	0.755	0.196	2.127	1.692-2.674	19.653	0.000
Binder score	0.584	0.206	1.793	1.520-2.115	13.762	0.000
Score for nursing quality	-0.380	0.172	0.684	0.528-0.886	12.845	0.000

paring to those without complication. The results were shown in **Table 2**.

Relationship between the binder score and mortality

Among the 83 cases with Binder score <7, 69 cases (83.13%) were cured and mortality in 14 cases (16.87%). In the 32 cases with Binder score ≥ 7 , 17 cases (53.13%) were cured, while 15 cases (46.87%) died. The difference of mortality between two groups has statistical significance ($P < 0.05$).

Effect of nursing quality on the complications and mortality

The nursing quality of total 115 cases was evaluated, with the score ranging from 79 to 100, and average in (94.31 \pm 3.18). 84 cases >90 while 31 cases ≤ 90 . The complication morbidity and mortality in the group with score >90 were much higher than those ≤ 90 , and the difference has statistical significance ($P < 0.05$), as shown in **Table 3**.

Prognostic factors analysis

Logistic regression model were established by using prognosis as dependent variable Y, and previous described factors as independent variable X. The results indicate that Shock, ARDS, combined >1 complications, Binder score, as well as nursing quality are the independent risk factors for death ($P < 0.05$), as shown in **Table 4**.

Discussions

The complication of SAP, including local lesions and systemic diseases, are generally divided into organ and metabolic complications, which becomes the major factor for death during SAP treatment. Binder integrated score system includes various organ lesions (shock, systemic infection, and bleeding) and metabolic compli-

cations (hypocalcemia, metabolic acidosis, and pancreatic encephalopathy), which were assigned with different scores. The complications are closely related to the binder scores, which could not only determine the severity of SAP, but also applied on the prognosis. In clinical, a Binder score of 7 was usually considered line of demarcation for prognosis [5], and it was also applied in this research work. The results showed that the mortality was 16.87% in 83 cases of patients with Binder score <7, while mortality was 46.87% in those with Binder score ≥ 7 , indicating significant difference. Hence, the results showed that the Binder score and prognosis are closely related, as well as the complications are related to the mortality.

At present, there are two main treatment methods for SAP: operation treatment and non-surgical treatment. The results showed that there is no significant difference between these two treatment methods, indicating that the treatment method is not the risk factor of mortality for SAP patients. Among the 53 patients with complications, 47 cases were with single complication, while 6 cases with two kinds of complications, including 2 cases with shock and ARDS, one case with shock and pancreatic encephalopathy, one case with ARDS and renal insufficiency, one case with hemorrhagic shock and hemorrhagic shock, and one case with ARDS and pancreatic encephalopathy. The mortality in 62 patients without complications was 6.45%, while mortalities were 42.55% in patients with one complication, and 83.33% in those with two complications. It could facilely conclude that the complications are major factor for death. As the survival rate in the patients without complication is greatly improved, it is of great importance for prophylactic nursing of complications in SAP patients, which could be further confirmed by Logistic regression analysis: Shock, ARDS, combined >1 complications, and Binder score are independent risk factors

for mortality. For the patients with SAP incidence, large amounts of toxins and intrinsic factors would be released into the body, resulting in the activity decreasing of active substances on alveolar surface, and further leading to the compliance decreasing of lung and surface tension increasing of alveolar, which increases the risk of ARDS [6-8]. Meanwhile, pancreatic tissue release large amounts of inflammatory factors and cytokines, increasing the leading to vasodilation and enhancement of vascular permeability. As a result, the plasma in the blood vessels mass exudates, resulting in a serious shortage of blood for circulation and then hypovolemic shock [9]. The results also indicate that score of nursing quality is also an independent risk factor for death, whose OR is -0.380. Hence, the higher nursing quality received, the lower the risk of death was. To improve the nursing quality becomes a main method for reduction of SAP mortality.

Early observation and preventive nursing of SAP complications can effectively reduce the incidence of complications. Even in the occurrence of complications, timely and effective nursing and treatment could also reduce the severity of complications and improve the prognosis. As SAP has many complex and dangerous complications, it is necessary to formulate reasonable nursing procedures in the process of clinical nursing for patients with SAP, screen for complications according to the nursing program, and improve the corresponding nursing quality. Considering that the complications for different patients are not similar, and often more than one type of complication is onset, it is very important to explore the cause of complications for each patient and take individual nursing procedure.

Disclosure of conflict of interest

None.

Address correspondence to: Guangzhen Wan, Department of Spinal Surgery, Linyi People's Hospital, No. 27 Jiefang Road, Linyi 276003, Shandong, China. Tel: 0539-8075919; E-mail: wanguangzhen@sina.cn

References

- [1] Gou S, Yang Z, Liu T, Wu H, Wang C. Use of probiotics in the treatment of severe acute pancreatitis: a systematic review and meta-analysis of randomized controlled trials. *Crit Care* 2014; 18: R57.
- [2] Zerem E. Treatment of severe acute pancreatitis and its complications. *World J Gastroenterol* 2014; 20: 13879-13892.
- [3] Pancreatic surgery group of Chinese Medical Association. Chinese standard for clinical diagnosis and classification of acute pancreatitis (Second plan in 1996). *Chinese Journal of Surgery* 1997; 35: 773.
- [4] Group of pancreatic diseases in digestive diseases, Chinese Medical Association. Guidelines for diagnosis and treatment of acute pancreatitis in China (Draft). *Modern Digestion & Intervention* 2007; 12: 206-208.
- [5] Qu Y, Lu H, Sui W, et al. The relationship of evaluation of severe acute pancreatitis by using Binder points and prognosis. *Prec J Med Pharm* 2006; 23: 641-643.
- [6] Luan ZG, Zhang J, Yin XH, Ma XC, Guo RX. Ethyl pyruvate significantly inhibits tumour necrosis factor- α , interleukin-1 β and high mobility group box 1 releasing and attenuates sodium taurocholate-induced severe acute pancreatitis associated with acute lung injury. *Clin Exp Immunol* 2013; 172: 417-426.
- [7] Liu G, Zhang J, Chen H, Wang C, Qiu Y, Liu Y, Wan J, Guo H. Effects and mechanisms of alveolar type II epithelial cell apoptosis in severe pancreatitis-induced acute lung injury. *Exp Ther Med* 2014; 7: 565-572.
- [8] Qu Z, Jiang Y, Wu BQ, Duan YF, Sun ZD, Luo GH. Cystathionine-gamma-lyase inhibitor attenuates acute lung injury induced by acute pancreatitis in rats. *Arch Med Sci* 2014; 10: 825-829.
- [9] Shen L, Tan L, Huang Y, et al. Clinical nursing for 23 cases of hemorrhagic necrotic type acute pancreatitis. *Journal of Qilu Nursing* 2011; 17: 32-33.