Risk Factors for Death of Elderly Patients with Acute Obstructive Suppurative Cholangitis

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ABSTRACT

Objective: *To identify the risk factors for death of elderly patients with acute obstructive suppurative cholangitis (AOSC).*

Methods: *Three hundred and forty-eight AOSC patients > 60 years of age were retrospectively analysed in the First People's Hospital of Jining from June 2005 to June 2013. The patients were treated with endoscopic retrograde cholangiopancreatography (ERCP) immediately after AOSC was diagnosed to clear the stones and drain, and surgical procedures were then performed in the patients in whom ERCP failed. The risk factors were identified with univariate and multivariate analysis.*

Results: *Among the 348 AOSC patients, 27 patients died after treatment. Two hundred and forty-nine patients were treated with ERCP, and 11 patients died; 99 patients were treated with ERCP plus surgery, and 16 patients died. Two hundred and thirty-two patients were treated within 24 hours after they were admitted to the hospital, and 10 patients died; 116 patients were treated beyond 24 hours, and 17 patients died. According to the results of the univariate and multivariate analysis, shock, ERCP plus surgery, advanced age, low platelet count, the presence of co-morbidities, door to treatment time > 24 hours, hypoproteinaemia, and hyperbilirubinaemia were the independent risk factors for death of elderly patients with AOSC.*

Conclusion: *The strategies of dealing with these risk factors should be researched to reduce mortality of elderly patients with AOSC.*

Keywords: Acute obstructive suppurative cholangitis, death, elderly patients, risk factors

Factores de riesgo de muerte en pacientes ancianos con colangitis supurada obstructiva aguda

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RESUMEN

Objetivos: *Identificar los factores de riesgo de muerte en pacientes ancianos con colangitis supurada obstructiva aguda (CSOA).*

Sujetos y métodos*: Trecientos cuarenta y ocho pacientes de CSOA > 60 años de edad se analizaron retrospectivamente en el First People's Hospital de Jining de junio de 2005 a junio de 2013. Los pacientes fueron tratados con colangiopancreatografía retrógrada endoscópica (CPRE) inmediatamente luego que la CSOA fuera diagnosticada, con el propósito de limpiar las piedras y drenar, y luego se realizaron procedimientos quirúrgicos en los pacientes en que la CPRE falló. Se identificaron los factores de riesgo con análisis univariantes y multivariantes.*

Resultados: *De los 348 pacientes con CSOA, 27 pacientes murieron después del tratamiento. Doscientos cuarenta y nueve pacientes fueron tratados con CPRE, y 11 pacientes murieron; 99 pacientes fueron tratados con CPRE más cirugía, y 16 pacientes murieron. Ciento treinta y dos pacientes fueron tratados dentro de las 24 horas tras su ingreso al hospital, y 10 pacientes fallecieron; 116 pacientes fueron tratados más allá de 24 horas, y 17 pacientes murieron. Según los resultados de los análisis univariantes y multivariantes, los factores de riesgo de muerte para los pacientes con CSOA fueron: shock, CPRE más cirugía, edad avanzada, bajo conteo de plaquetas, presencia de comorb-*

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ilidades, tiempo de acceso al tratamiento > 24 horas, hipoproteinemia, e hiperbilirrubinemia.
Conclusión: *Las estrategias para tratar con estos factores de riesgo deben ser investigadas a fin de reducir la mortalidad de los pacientes ancianos con CSOA.*

Palabras claves: colangitis supurada obstructiva aguda, muerte, pacientes de edad avanzada, factores de riesgo

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INTRODUCTION

Acute obstructive suppurative cholangitis (AOSC), the severe form of acute cholangitis, is a fatal condition requiring urgent decompression of the biliary tract, especially for AOSC elderly patients. Pus is accumulated in the bile duct in the patients with AOSC, which may cause intrabiliary pressure to increase and lead to biliary sepsis. The mortality of elderly patients with AOSC is very high, and the patients should be timely treated to decrease the mortality. Many studies show that endoscopic treatment is safe and effective for acute cholangitis (1−8). Endoscopic retrograde cholangiopancreatography (ERCP) should be performed within 24 hours in the patients with acute cholangitis according to the Tokyo guidelines (9). In our experience, elderly patients with AOSC should be treated with ERCP early, and the patients with failed ERCP should be treated with surgical procedures.

Moreover, a recent study indicates that delayed (> 72 hours) or failed ERCP is correlated with worse clinical outcomes in patients with acute cholangitis (10). The objective of this retrospective study was to identify the risk factors that were associated with death of elderly patients with AOSC, and the aim was to provide useful information for decreasing the mortality of elderly patients with AOSC.

SUBJECTS AND METHODS

Diagnostic criteria

Acute obstructive suppurative cholangitis was diagnosed with the following criteria:

(a) the disease was of abrupt onset and severe; (b) urgent decompression was required in the great majority of cases; (c) obstruction appeared in the extra-hepatic bile ducts, left hepatic duct or right hepatic duct; (d) the patient had shock, and the systolic arterial pressure was smaller than 9.3 kPa. Otherwise, the patient had more than two symptoms, listed as follows: (a) the patient had mental symptoms; (b) the pulse was greater than 120/min; (c) the body temperature was greater than 39 ^{o}C or lower than 36 ^{o}C; (d) white blood cell count was greater than 20×10^{9}/L; (e) the bile was purulent and the pressure increased markedly in the bile duct and (f) the result of hecemoculture was positive.

Patients and data collection

A total of 348 consecutive patients with AOSC, including 145 male and 203 female patients, were retrospectively analysed at the First People's Hospital of Jining from June 2005 to June 2013. The average age of these patients was 67.4 (range 60–91) years. Acute obstructive suppurative cholangitis was caused by stones in the bile duct in all cases. All patients were treated with ERCP immediately after the diagnosis of AOSC was determined to clear the stones and drain, and surgical procedures were then performed in the patients with failed ERCP. Ethical issues were completely observed.

The characteristics were compared between dead and surviving AOSC patients to identify the risk factors which were associated with death of elderly patients with AOSC. The factors that were included in the paper were as follows: gender, age, presence of upper quadrant pain, systolic blood pressure, heart rate, body temperature, serum bilirubin, alanine transaminase (ALT), albumin (ALB), serum urea nitrogen, platelet count, blood glucose, percentage of neutrophils (NEUT%), impaired consciousness, shock, presence of decreased urine output, presence of co-morbidities,
therapeutic methods (including ERCP and ERCP plus surgery), and door to treatment time (including < 24 hours and > 24 hours). The information about these factors was collected from medical records.

Statistical analysis

All the statistical analyses were carried out with SPSS version 17.0 for Windows (SPSS Inc, USA). Quantitative variables were expressed as mean ± SD, and qualitative variables were expressed as percentage. Quantitative variables were analysed with Student's *t*-test, while qualitative variables were analysed with Chi-squared test or Fisher exact test. The variables with a *p*-value less than 0.10 in univariate analysis were included in the multivariate analysis with a backward stepwise logistic regression model. Multivariate logistic regression analyses were then performed to determine the risk factors correlated with the death of the elderly patients with AOSC. Significance was set at $p < 0.05$.

RESULTS

Among the 348 AOSC patients with an age greater than 60 years, 27 patients died after treatment, including 11 males and 16 females. Two hundred and forty-nine patients were treated with ERCP, and 11 patients died; 99 patients were treated with ERCP plus surgery, and 16 patients died. Two hundred and thirty-two patients were treated within 24 hours after they were admitted to our hospital, and 10 patients died; 116 patients were treated beyond 24 hours after they were admitted to our hospital, and 17 patients died.

The means of the variables and the results of univariate analysis were shown in Table 1.

Table 1: Means of the variables and the results of univariate analysis

Variables	Death (n = 27)	Survival (n = 321)	$\chi 2/t$	*p*
Male/Female	11/16	134/187	0.010	0.919
Age (year)	79.7 ± 18.42	65.6 ± 12.35	4.362	0.002
Upper quadrant pain(%)	66.67	67.29	0.004	0.947
Hypotension(%)	77.78	49.84	7.786	0.010
Tachycardia(%)	81.48	57.01	6.162	0.013
Fever(%)	88.89	83.49	0.538	0.463
Serum bilirubin (μmol/L)	112.47 ± 47.84	77.15 ± 12.23	2.784	0.009
ALT (IU/L)	108.12 ± 46.27	70.25 ± 10.13	1.983	0.039
ALB(g/L)	17.36 ± 17.13	41.47 ± 9.65	(3.048)	0.004
Serum urea nitrogen(mmol/L)	16.28 ± 12.15	5.83 ± 4.04	1.907	0.032
WBC($\times 10^9$/L)	28.54 ± 18.12	17.12 ± 6.27	1.852	0.023
Platelet count ($\times 10^9$/L)	41.31 ± 30.72	92.75 ± 56.84	2.895	0.006
Blood glucose(mmol/L)	4.23 ± 8.95	4.51 ± 6.04	0.254	0.573
NEUT%	91.63 ± 27.75	89.58 ± 18.37	0.592	0.207
Impaired consciousness(%)	51.85	41.12	1.178	0.278
Shock (%)	48.15	8.72	37.246	0.000
Decreased urine output (%)	44.44	42.06	0.058	0.809
Co-morbidities (%)	85.18	61.68	5.936	0.015
ERCP plus surgery (%)	59.26	25.85	13.993	0.001
Door to treatment time >24 h	62.96	30.84	11.564	0.003

Variables were expressed as number or percentage (%). ALT: alanine transaminase; ALB: albumin; WBC: white blood cell count; NEUT%: percentage of neutrophils; ERCP: endoscopic retrograde cholangiopancreatography.

According to the results of univariate analysis, the variables associated with death of elderly patients with AOSC were as follows: advanced age, hypotension, tachycardia, hyperbilirubinaemia, high ALT, hypoproteinaemia, high serum urea nitrogen, high WBC, low platelet count, shock, presence of co-morbidities, ERCP plus surgery, and door to treatment time > 24 hours. According to the results of multivariate analysis, the independent riskfactors for death of elderly patients with AOSC were as follows: shock, ERCP plus surgery, advanced age, low platelet count, presence of co-morbidities, door to treatment time > 24 hours, hypoproteinaemia and hyperbilirubinaemia (Table 2).

Table 2: Results of multivariate analysis of the risk factors for the death of the elderly patients with AOSC

Risk factors	Wald	*p*-value	OR	95%CI
Shock	22.863	0.000	9.72	2.137, 14.258
ERCP plus surgery	5.927	0.031	4.24	2.012, 9.154
Advanced age	7.725	0.016	3.89	1.715, 8.260
Low platelet count	8.634	0.009	3.65	1.764, 8.345
Co-morbidities	6.109	0.027	3.57	1.698, 8.059
Door to treatment time >24 hours	5.454	0.039	3.40	1.521, 7.813
Hypoproteinaemia	4.011	0.040	3.08	1.472, 7.263
Hyperbilirubinaemia	3.926	0.042	2.84	1.204, 6.347

AOSC: acute obstructive suppurative cholangitis; ERCP: endoscopic retrograde cholangiopancreatography

DISCUSSION

As a severe infection of the biliary tract, AOSC has a high mortality, especially for the elderly patients. In our hospital, we firstly performed ERCP in elderly patients with AOSC immediately after AOSC was diagnosed and then performed surgery in the patients failing ERCP. The mortality was 7.76% (27/348). It was useful to identify the risk factors for death of elderly patients with AOSC in order to reduce the mortality.

In AOSC, bacteria and endotoxin in the bile may enter into the blood through the cholangioles and cause septic shock. Shock can reduce effective circulating blood volume and then affect the reperfusion of tissues. In our study, shock was an independent risk factor for the death of the elderly patients with AOSC.

Advanced age was also an independent risk factor for death of elderly patients with AOSC in this study. Many studies show that advanced age is associated with the death of patients with acute cholangitis (11−13). Firstly, the elderly have a common degeneration of physiologic function. Secondly, the immune function of the elderly decreases, which makes the infection difficult to control. Lastly, the elderly often have co-morbidities. Our study showed that mortality was higher in the ERCP plus surgery group than in the ERCP group, which could be associated with the fact that patients requiring a further surgery had more severe and more complicated pathogenetic conditions.

Low platelet count can be caused by bone marrow suppression in the presence of severe infection (14), and is a predictive factor for acute suppurative cholangitis (15). Our results further showed that low platelet count was also an independent risk factor for death of elderly patients with AOSC.

The presence of co-morbidities is associated with adverse clinical outcomes for patients with acute cholangitis (8). Our study showed that the presence of co-morbidities was correlated with the mortality of elderly patients with AOSC. Many studies show that delay in treatment is also correlated with death of patients with acute cholangitis (8, 10, 16), which was reconfirmed by our study: delay in treatment (door to treatment time > 24 hours) was correlated with the mortality of elderly patients with AOSC.

Hypoproteinaemia and hyperbilirubinaemia were also correlated with death of elderly patients with AOSC in our study. It is well known that hypoproteinaemia is correlated with mortality in critical patients. Hyperbilirubinaemia may cause oxidative stress, inflammation and apoptosis (17, 18). Recent studies suggest that hyperbilirubinaemia was correlated with the death of patients with acute cholangitis (10, 19). Our results showed that hyperbilirubinaemia was correlated with death of elderly patients with AOSC, which was accordant with the finding.

CONCLUSION

In conclusion, shock, ERCP plus surgery, advanced age, low platelet count, presence of co-morbidities, door to treatment time > 24 hours, hypoproteinaemia and hyperbilirubinaemia were the independent risk factors for the death of elderly patients with AOSC. Strategies to deal with these risk factors should be researched to reduce mortality of elderly patients with AOSC in the future.

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