Proceeding

Investigating the Prescribing of Human Albumin in a Teaching Hospital in Thailand

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Background and objective: Human albumin is a high cost medication and the rational use of it is in question. In Thailand, the national guideline for albumin use has not been established so that the criteria-based guideline was developed for promoting the rational use of human albumin in individual institutions including Srinagarind hospital. The aim of this study was to assess the rationale of human albumin prescribing in our hospital.

Methods: Data was retrospectively collected from human albumin prescriptions and patient medical record at Srinagarind hospital during November 2015 to February 2016. The appropriateness of prescribing was assessed in the aspects of indication, process indicator and contra-indication. All data were analyzed and reported using descriptive statistics.

Results: There were 221 human albumin prescriptions from 154 patients during the study period. It was mostly used as fluid resuscitation (48.9%), followed by abdominal paracentesis (15.4%) and nephritic syndrome (13.6%). Process indicator measurement composed of albumin level (82.5%), central venous pressure (50%) and both (72.7%). Anemia which was contra-indication was found in 12.2% of patients. The appropriateness of prescribing in the aspects of indication, process indicator and contra-indication were 99.5, 90.9 and 87.7%, respectively.

Conclusion: Prescribing of human albumin was usually complied with the hospital control measure but albumin used in patients with contra-indication should be diminished.

Introduction

Albumin is a major plasma protein produced by liver cell. It has a lot of function in human body including maintain of oncotic pressure and micro-vascular integrity and transportation of hormones, fatty acid, bile salts, bilirubin, trace elements and drugs. Moreover, albumin relates to acid-base balance, antioxidant, and anticoagulant. From its properties, human albumin is widely used in various types of patients especially in severe cases, such as shock, burn

and cirrhosis. Although human albumin is very useful, many adverse reactions may occur while using, for example, anaphylactoid reaction, central nervous system irritability, acute renal insufficiency and increase ascites fluid has been reported[1]. Human albumin solution is classified as an expensive medicine and appropriate use of this agent is in question[2]. Definite guideline of human albumin use in Thailand is not well established so that criteria for controlling albumin use were developed for each institute including in Srinagarind hospital. Since, the fiscal year budget (2014) reported the high cost of human albumin prescribing (17,087,929 baht) or 1.3% of hospital budget, the albumin use should be reviewed and the complying with hospital control measure should be assessed. This study was performed to review the use of human albumin at Srinagarind hospital. Then, the appropriateness of albumin prescribing could be assessed.

Methods

Study design and population

This retrospective descriptive study reviewed the use of human albumin for treating any indications in patients admitted at Srinagarind hospital, Faculty of Medicine, Khon Kaen University during November 2015 to February 2016. Patients with unavailable medical record would be excluded from the study. The study protocol was approved by Ethic Committee of Human Reseach, KhonKaen University (HE591008)

Data collection, data analysis and statistical analysis

The information including demography, clinical condition and albumin prescribing of patient receiving human albumin from human albumin prescription and medical record were collected and assessed. The data would be analyzed using Microsoft excel and demonstrated with descriptive statistics (as frequency and percentage)

Results

1. Albumin consumption

During the study period, there were 361 patients received human albumin. The number of albumin use composed of 1198 vials of 5% human albumin solution in 256 patients, 288 vials of 20% albumin in 43% patients and 480 vials of 25% albumin in 62 patients. Total albumin cost 3,173,172 baht.

2. Patients' characteristics

From 361 patients received human study during studied period, 207 patients were excluded because of unavailable patient medical record. Therefore, only 154 patients with 221 human albumin prescribing were recruited into the present study. The proportion of gender distributed between male and female was 59.7% and 40.3%. The range of patient's age and weight were 22 days to 100 years and 3 to 83 kg, respectively. The range of patient hospitalization was 1-171 days. Most of patient used civil servant medical benefit scheme (47.4%) followed by universal coverage (43.5%), social security and self-payment as summarized in Table 1.

Table 1 Patients' characteristics

Demographic data	Value
Gender	
- Male : Female	92 (59.7%) : 62 (40.3%)
Age	
- Range	22 days – 100 years
- Mean (SD)	54.6 (22.9) years
- Median (IQR)	59 (27.8) years
Weight	
- Range	3-83 kg
- Mean (SD)	53.0 (16.6) kg
- Median (IQR)	55 (19) kg
Length of hospital stay	
- Range	1-171 days
- Mean (SD)	27.1 (22.7) days
- Median (IQR)	21 (25) days
Right to receive health services	
- Civil servant	73 cases (47.4%)
- Universal coverage	67 cases (43.5%)
- Social security	9 cases (5.8%)
- Self-payment	5 cases (3.2%)

3. Rationale of human albumin use

There were seven indications from several indications of US FDA approval, adopted for human albumin use at Srinagarind hospital. Human albumin was mostly prescribed as fluid resuscitation in patients with severe septic shock (48.9%), followed by large volume abdominal paracentesis (15.4%), and nephritic syndrome (13.6%) as shown in Table 2. Along with albumin prescribing, albumin level, central venous pressure and both were obtained in 160 (100%), 3 (50%) and 40 (72.7%) patients. However, human albumin was prescribed in 27 patients (12.2%) with anemia, a contra-indication for albumin use. Therefore, the appropriateness of human albumin use in terms of indication, process indicators and contra-indication equaled to 99.5, 90.9 and 87.7%, respectively.

Table 2 Rationale of human albumin use

Category	Number of prescribing (%)
Indication	
1. Priming solution for open heart surgery	23 (10.4)
2. Abdominal paracentesis> 4 liters in cirrhosis	34 (15.4)
3. Hypoxemia in ARDS with refractory hypoxemia PaO_2/FiO_2< 100 and total protein ≤ 5 g/dl	2 (0.9)
4. Spontaneous bacterial peritonitis in cirrhosis	15 (6.8)
5. Nephritic syndrome with cardio-respiratory compromised (dyspnea, hypoventilation, hypotension, poor tissue perfusion, wide A-a gradient)	30 (13.6)
6. Hepatorenal syndrome in cirrhosis	8 (3.6)
7. Fluid resuscitation in severe septic shock with serum albumin ≤ 2.5 g/dl and not respond to crystalloids	108 (48.9)
8. Other indication (hypoalbuminemia)	1 (0.5)
Process indicator (Required laboratory data) [a]	
1. Albumin	158 (71.5)
2. CVP	3 (1.3)
3. Albumin and CVP	40 (18.1)
Contra-indication	
1. Severe anemia	27 (12.2)
2. Hypersensitivity to albumin, excipients or container	-

[a]Albumin is indicated for indication 1,3,5 ; CVP is indicated in indication 7 and both albumin and CVP is indicated in indication 2,4,6

Discussion

Human albumin prescribing at Srinagarind Hospital was usually appropriate in all 3 aspects and the rate of appropriateness was higher than previous study[3-5]. The highest portion of prescribing (48.9%) was belonged to management of patient with severe septic shock with serum albumin less than 2.5 g/dl and did not respond to crystalloids by which 5% human albumin was proper for this indication. The other common indications were for nephritic syndrome (18.1%) and abdominal paracentesis (15.4%) and the product selection was depended on protein requirements, the need of oncotic replacement of the patient, cost-effectiveness, and prescriber's decision. A previous study at a private hospital in Bangkok showed that the most common indications of human albumin were hypoalbuminemia (48%) and cirrhosis (9%) among 9 proper indications[3]. Different criteria were set up such as hypoalbuminemia was not included in appropriate indication in this study meanwhile heart surgery was not included in proper indication in previous study. Two studies of albumin utilization in university hospital in Iran showed inappropriateness of albumin use 36.2-74.8% and hypoalbuminemia accounted for 3-

13.1%[4,5]. At Srinagarind hospital, human albumin order form was used to control the prescribing and promote the rational use. When doctors would like to prescribe human albumin, not only write on the doctor order sheet in patient medical record, but also fill information into human albumin order form including indication, dosage regimen and laboratory. This process could enhance doctor to realize the rational of drug use and promote higher appropriateness of human albumin utilization. However, inappropriate use still occurred and was belonged to use in patients with anemia. The other control measure should be set up to diminish the use in patient with contraindication. In the future, it would be better if the albumin order form can be implemented into real-time electronic database system of Srinagarind hospital.

Conclusion

Prescribing of human albumin was complied with the hospital control measure in term of indication (100%) and process indicator (over 50%). However, albumin was used in 12.2% of patients with contra-indication and should be diminished.

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