Evaluation of the Appropriate Use of Albumin in Adult Patients in the Emergency Department of Hospital Prof. Doutor Fernando Fonseca

Elias, C. *, Carrera, R., Moutinho, M. **, Almeida, P. *****

* Pharmacist of the Pharmaceutical Services of HFF; ** Trainee of Pharmacy Classical University of Lisbon; *** Pharmacy Department Director of HFF

1.Introduction

Albumin is a high molecular weight protein predominantly distributed in the extravascular space although is the most common protein in the intravascular space (1). In the intravascular space it has several physiological functions such as: ions, metabolites and drugs transport, oncotic agent, anticoagulant/ antithrombotic agent by inhibition of plaquetary aggregation, thiols supply and the maintenance of the membrane permeability (1). There has been some controversy about albumin prescription in critical patient context, and nowadays, there aren't defined guidelines for its use, neither consensus about its safety administration (2). However, many institutions have been doing some studies about albumin prescription, defining their own guidelines (3,4).
Consensually, albumin is prescribed with an evidence level of I and II in hypoalbuminemia (albumin<2,0g/dl), in paracentesis with a predicted large volume (4 litres) extraction and in plasmapheresis (if the volume is higher than 20ml/kg per session) (5,6).

2. Aim

Characterize the use of albumin, evaluating how appropriate is the prescription in an Emergency Department (ED) of a Portuguese General Hospital.

3. Methods

Every albumin prescription from the ED of Hospital Prof. Doutor Fernando Fonseca, EPE (HFF), was retrospectively evaluated, concerning the 2009 year. The registries of albumin prescriptions (human albumin 20%, 50ml, injectable), were identified, by the Pharmacy Department, and analyzed respecting to diagnosis/reason of albumin administration. The clinical analyses of the patients with hypoalbuminemia were reviewed and the extracted volumes, after paracentesis, were identified. The patient demographic data were registered.
All these information was registered in a database created in the program Microsoft Excel.

4. Results

Characterization of albumin prescription

Amongst the 15 328 ED patients, 79 (0,5%) were identified as patients to whom albumin was prescribed and administered. There was more than one albumin administration in 20 patients from the 79, identified as successive hospitalizations (**Figure 1**). A total of 356 albumins were administered corresponding to 136 administrations. The most frequent justification for albumin prescription was tension ascites in patients with chronic hepatic disease (CHD) (**Figure 2 and Table 1**).

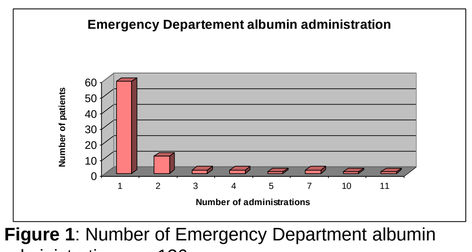

Figure 1: Number of Emergency Department albumin administrations; n=136.

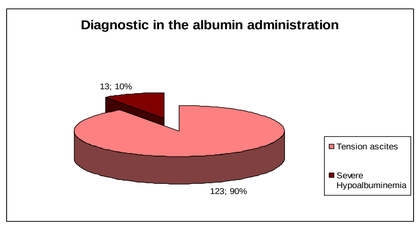

Figure 2: Diagnosis in albumin prescription; n=136

Diagnosis	Possible cause	Nº of administrations	Procedure
Tension ascites	CHD	45	paracentesis
	Ethanolic CHD	12	paracentesis
	Neoplasm	4	paracentesis
	Without information	62	paracentesis
Serious hypoalbuminemia	Neoplasm	2	
	CHD	1	
	Nephrotic Syndrome	1	
	Without information	9	

Table 1: Diagnosis in albumin prescription; n=136

Tension ascites

Amongst the 79 patients to whom albumin was administered, 67 were diagnosed with ascites and were subjected to paracentesis. 123 albumins were administered to these patients, corresponding to an average of 3,7 albumin for each episode (a total of 327 units administered).
The majority of the patients were male (67%, n=45) and 88% (n=59) ranged between 40 and 80 years old. (**Figure 3**).
19 of the 67 patients were subjected to recurrent hospitalization with albumin administration (**Figure 4**). These recurrent hospitalizations represented 73 albumin administrations.
These recurrent patients were mostly male (n=15, 80%) and their age ranged between 40 and 83 years old.
22 of the 67 patients, died through 2009. Fifteen patients belonged to the group who had only one albumin administration and the other seven belonged to the recurrent group.

Regarding the albumin prescription related to evacuation paracentesis, each unit that is administered should correspond to a drainage of two litres of ascitic liquid. Almost all the prescriptions seemed to be in agreement with this principle, however it was not possible to quantify the real volume of removed liquid.

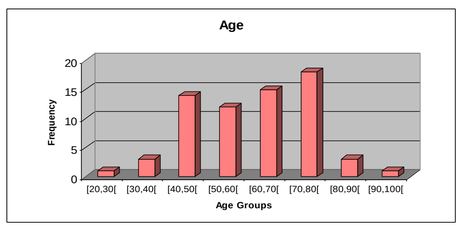

Figure 3: Age characterization of patients with albumin prescription due to tension ascites; n=67.

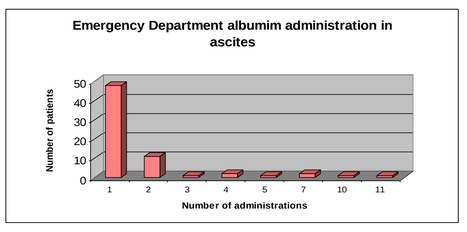

Figure 4: Albumin administration in ascites in the Emergency Department; n=123.

Hypoalbuminemia

In the context of albumin administration due to serious hypoalbuminemia, was observed that the patients had albumin values below 2 g/dl (values between 1 and 1.9 g/dl) (**Figure 5**). 13 administrations were performed to replace the albumin levels in 12 patients (one of these patients had a second hospitalization with albumin administration due to hypoalbuminemia).
The treatment of hypoalbuminemia did not reveal a high effectiveness, since only in two patients the values of serum albumin were equal or higher than 2 g/dl.
The majority of the patients were female (83%; n=10) and 42% ranged between 60 and 70 years old (**Figure 6)**. Eight of these twelve patients presented an abnormal hepatic function. Eight patients with hypoalbuminemia died (61,5%) and six of these eight patients had abnormal hepatic function.

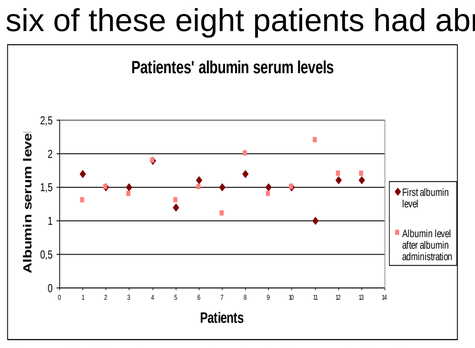

Figure 5: Albumin serum levels before and after its administration; n=13.

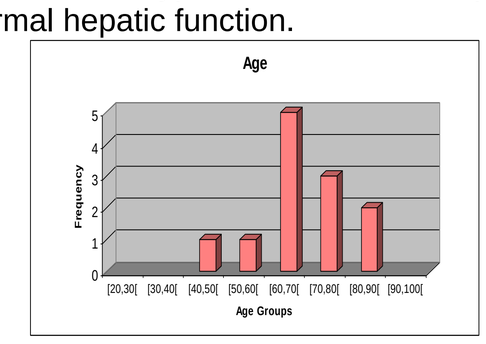

Figure 6: Age characterization of patients with albumin prescription due to hypoalbuminemia; n=12.

5. Discussion

The majority of albumin consumption, concerning ED, is related to evacuation paracentesis in patients with CHD. 28,3% of these patients are recurrent and correspond to about 60% of all albumin administrations, which accentuates the importance of the CHD patients' treatment.

The albumin prescription to treat hypoalbuminemia seems to be associated to the female gender and to a poor response to treatment. In this group of patients, a high mortality rate and a low albumin serum level recovery was observed. Hypoalbuminemia seems to be more associated with elderly patients when compared to the patients of paracentesis.

6. Conclusions

Albumin prescription is confined to a small population within the ED. Although the albumin prescription seems to be in agreement with the current recommendations, the guidelines for albumin administration to treat hypoalbuminemia should be revised.

Even today, some controversy exists around albumin prescription in critical patients. It is necessary to develop more clinical trials about albumin efficacy and safety, in order to improve the clinical outcome as well as to optimize drug costs.

7. References

1.- Vargas E. *et al*; "Use of Albumin in Two Spanish University Hospitals?"; European Journal Clinical Pharmacology 97; 52:465-470
2.- McIntyre L., Green R; "Albumin Administration in the Management of Critical Ill Patients: Is It Safe?"; Annals of Emergency Medicine 2009; 54(1):114-115
3.- Debrix I. *et al*; "Clinical Practice Guidelines for the use of Albumin: Results of a Drug Use Evaluation in a Paris Hospital"; Pharmacy Word Science 1999; 21(7):11-16
4.- Soni N., Margarson M.; "Albumin. Where are we now?"; Current Anaesthesia and Critical Care 2004; 15:61-68
5.- Vermeulen, L., *et al*; " A paradigm for Consensus"; Arch Intern Med 1995; 155:373-379
6.- UNC Anesthesia; "UNC Fluid Guidelines, by Indication"; www.unc.edu, May 2000

For further information, e-mail: claudia.g.elias@hff.min-saude.pt