Use of Albumin in Intensive Care Units in the United Kingdom

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ABSTRACT

Objective: *To review the use of intravenous albumin solutions in intensive care units in the United Kingdom.*

Methods: *A postal questionnaire was sent to the clinical directors of all intensive care units in the United Kingdom (n = 292) asking about their use and indications for intravenous albumin solutions.*

Results: *Responses were received from 261 (89.4%) intensive care units (ICUs). The units were classified as general ICUs (n = 198), paediatric ICUs (n = 22) and combined intensive care/coronary care units (ICU/CCUs) (n = 41). Of the 261 units that replied, 181 (69.3%) reported using intravenous albumin, although the indications varied between units particularly in paediatric intensive care units. The alternatives to albumin also varied between the units. The general ICUs favoured hydroxyethyl starch (n = 129, 65.2%) and/or gelatin solutions (n = 87, 43.9%), as did the combined ICU/CCUs (n = 28, 68.3% and/or n = 23, 56.1% respectively). However, of the paediatric ICUs that used an alternative to albumin solutions (n = 21/22), 12 favoured crystalloid solutions (54.5%) and 9 favoured gelatin solutions (40.9%).*

We also assessed the impact of the recent review by the Cochrane Injuries Group Reviewers on the use of albumin and found that the respondents of 131 units (50.2%) reported that this study influenced their use of intravenous albumin. Of the 80 units that did not use albumin solutions, 33 units reported that they had ceased using intravenous albumin following the review from the Cochrane Injuries Group Reviewers.

Conclusions: *Approximately two-thirds of intensive care units in the United kingdom reported using intravenous albumin, although the indications varied between units. In many of these units the use of intravenous albumin had been influenced by the recent review by the Cochrane Injuries Group Reviewers on the use of albumin.* (**Critical Care and Resuscitation 2001; 3: 19-21**)

Key words: Intravenous fluid, albumin, intensive care units

A recent review of studies in which intravenous solutions with albumin had been compared with solutions without albumin for hypovolaemic, burns and hypoalbuminaemic patients, concluded that there was an increase in mortality in critically ill patients treated with albumin.[1]

The reviewers suggested that albumin should not be used except within the context of a randomised controlled trial (RCT) and that the licensed indications for intravenous albumin should be reviewed. Considerable debate followed.[2-4]

Since this review, issues of albumin to the regional blood centres have decreased by 40%.[5] The United Kingdom Committee on Safety of Medicines have advised doctors to restrict the use of, and take special care when using, human albumin.[6]

We conducted a postal survey on current use of albumin in intensive care units throughout the United Kingdom.

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Table 1. Questionnaire on albumin use in Intensive Care Units in the United Kingdom

1.	Does your unit use albumin? *(please tick one)*	Yes ☐	No ☐	
2.	What concentrations do you use? *(please tick)*	4.5% - 5% ☐	20% - 25% ☐	
3.	Please tick the boxes for the indications you would use albumin			
	Burns	☐	☐	
	Hypoalbuminaemia (non specific)	☐	☐	
	Chronic liver disease	☐	☐	
	Nephrotic syndrome	☐	☐	
	Hypovolaemia	☐	☐	
	Oedema	☐	☐	
	Other (s) *(please state)*	☐	☐	
4.	Has your usage been influenced by the recently published Cochrane meta-analysis recommendations ? *(please tick one)*	Yes ☐	No ☐	
5.	Which of the following fluids do you think has predominantly replaced albumin in your unit? *(please tick all that apply)*			
	None	☐		
	Crystalloids	☐		
	Gelatins	☐		
	Dextrans	☐		
	Starches	☐		

Table 2. Number (and percentage) of intensive care units and their indications for intravenous albumin

	Burns	Hypo-albuminaemia	Chronic liver disease	Nephrotic Syndrome	Hypo-volaemia	Oedema
All units (n = 261)	74 (28.4%)	85 (32.6%)	30 (11.5%)	34 (13%)	77 (29.5%)	41 (15.5%)
Paediatric units (n = 22)	14 (63.6%)	5 (22.7%)	2 (9.1%)	6 (27.3%)	18 (81.8%)	2 (9.1%)
General units (when treating paediatric patients. n = 183) *	24 (13.1%)	11 (6.0%)	3 (1.6%)	8 (4.4%)	20 (10.9%)	6 (3.3%)

* excluding the 15 general units (out of 198) who do not treat paediatric patients

METHODS

In June 1999, a questionnaire was sent to the Clinical Directors of all intensive care units (ICUs) in the United Kingdom (n = 292) with one follow-up mailing in July 1999 (Table 1). The ICU list was obtained from the Intensive Care National Audit and Research Centre database.

Units were asked about specific indications for adult and paediatric use of intravenous albumin, the alternative solutions used and whether their use of albumin had changed following the recent review by the Cochrane Injuries Group Reviewers on the use of intravenous albumin.

RESULTS

Replies were received from 261 intensive care units (89.4%). Of those that replied, the units were classified as general ICUs (n = 198), paediatric ICUs (n = 22) and combined intensive care/coronary care units (ICU/CCUs) (n = 41). In total, 181 (69.3%) ICUs reported using albumin; 132 (66.7%) general ICUs, 21 (95.5%) paediatric ICUs and 28 combined ICU/CCUs

(68.3%). The specific indications for intravenous albumin used by each unit are shown in Table 2.

Reported alternatives to albumin varied between the units. For example, general ICUs favoured hydroxyethyl starch (n = 129, 65.2%) and/or gelatin solutions (n = 87, 43.9%), as did the combined ICU/CCUs (n = 28, 68.3% and/or n = 23, 56.1% respectively). However, paediatric ICUs prefered crystalloid (n = 12, 54.5%) and/or gelatin solutions (n =9, 40.9%).

Of the 261 responding units, 131 (50.2%) reported that they were influenced by the study from the Cochrane Injuries Group Reviewers. Of the 181 that reported using albumin, 73/132 (55.3%) general ICUs, 10/21 (47.6%) paediatric ICUs and 15/28 (53.6%) combined ICU/CCUs reported that they had been influenced by the review. Of the 80 units that reported they did not use albumin, 27/67 (40.3%) general ICUs, 1/1 (100%) paediatric ICUs and 5/12 (41.7%) combined ICU/CCUs (i.e. 41.8%) reported that they had ceased using intravenous albumin solutions following the review from the Cochrane Injuries Group Reviewers.

DISCUSSION

Despite the review of intravenous albumin use by the Cochrane Injuries Group Reviewers, over two thirds of general ICUs and combined ICU/CCUs, and almost all paediatric ICUs continued to use albumin.

From Table 1, it can be seen that there are marked differences in the reported indications for using albumin by type of unit, especially for children. For example, it appears that children are far less likely to receive albumin in a general ICU when compared with a dedicated paediatric ICU. These results may reflect the current opinion held by many paediatricians that the Cochrane review had insufficient evidence to alter paediatric practice.[2,3]

Hydroxyethyl starch and gelatin solutions were found to be the main alternatives to albumin in general ICUs and combined ICU/CCUs, whereas crystalloid and gelatin solutions were favoured by paediatric ICUs. These preferences may be influenced by cost: colloid solutions (e.g. hydroxyethyl starch, gelatin) are charged to the intensive care unit but albumin is paid for by the issuing blood bank. Another factor that could influence the prescription of albumin may be related to the maximum safe, recommended, daily volumes of some of the colloid solutions.

Despite criticisms of the Cochrane Injuries Group Reviewers study[2-4] (e.g. heterogeneity in design and end-points of the studies), the review seems to have influenced the use of intravenous albumin in the United Kingdom ICUs with 33 of the 79 units not using albumin reporting that they had changed their practice following the Cochrane Injuries Group Reviewers study. That these previous users have now become non-users is also confirmed by the reduction in albumin issues to regional blood centres and hospitals.[5]

The use of albumin remains controversial and the variation in reported use suggests that a well conducted, large scale, RCT of sufficient statistical power is needed to determine its indications.

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