

- Argyropoulou MI, Metafratzi Z, Kiortsis DN, Bitsis S, Tsatsoulis A, Efremidis S. T2 relaxation rate as an index of pituitary iron overload in patients with beta-thalassemia major. *AJR Am J Roentgenol.* 2000; 175: 1567-1569.

## Reply

We agree entirely with Dr. Banerjee that multitransfused patients of beta thalassemia are susceptible to multiple endocrine dysfunctions of clinical import and hence need comprehensive evaluation. Cost considerations largely dictate the extent of evaluation especially in a country like ours. Regarding serum ACTH levels for diagnosis of secondary adrenal insufficiency, we beg to differ from Dr. Banerjee. A large overlap of ACTH levels, between normal and proven secondary adrenal insufficiency, has been documented in literature(1) and hence the test has limited value. The more discriminant CRH stimulation test is not routinely used in

clinical practice because of cost and non-availability. We concur with the views on pituitary MR imaging as an index of iron overload. In addition to T2 relaxation rate, the pituitary to fat signal intensity ratio (P/F) has been used as another marker of iron overload. The degree of reduction of P/F ratio correlates well with presence of hypogonadotropic hypogonadism, with a sensitivity of 90%, specificity of 89% and an overall accuracy of 89%(2).

**R.K. Marwaha,**

*Division of Hematology and Oncology,  
Advanced Pediatric Center, PGIMER,  
Chandigarh 160 012, India.*

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## Fluid Resuscitation in Septic Shock

In reference to recent article(1) on this subject, we have the following comments to offer:

- In the study, authors have compared the efficacy of saline with degraded gelatin in saline. So they have compared the crystalloid with colloid in crystalloid. The study would have been more authenticated if comparison would have been made between crystalloid and pure colloid as 5% albumin, fresh frozen plasma, synthetic

colloid solutions (heta starch, dextran 40, dextran 60).

- Authors have used fluid boluses even after 6 hours up to 24 hours of fluid resuscitation. Ideally, if the administration of 60mL/kg of crystalloid results in no improvement in septic shock, myocardial dysfunction should be considered. That needs the inotropic support in the form of dopamine or epinephrine(2).

**K.K. Locham,  
Manpreet Sodhi,**

*Department of Pediatrics,  
Government Medical College,  
Patiala 147 001, Punjab, India.*

## REFERENCES

1. Upadhyay M, Singhi S, Murlidharan J, Kaur N, Majumdar S. Randomized evaluation of fluid resuscitation with crystalloid (saline) and colloid (polymer from degraded gelatin in saline) in pediatric septic shock. *Indian Pediatr* 2005; 42: 223-231.
2. Stormorken A, Powell KR, Sepsis and Shock. *In: Behrman RE, Kliegman RM, Jenson HB, editors. Nelson Textbook of Pediatrics. 17th ed. New Delhi: Elsevier; 2004, p 846-850.*

## Reply

Thanks for giving this opportunity to clarify some doubts that the readers have about composition of various colloids, and fluid therapy of septic shock.

1. The composition of various colloids that are available commercially is shown in *Table I(1)*. It may be seen that all the

hydroxyethyl starches are very expensive. Moreover, there is no clear-cut advantage of albumin over crystalloids despite several metanalysis and randomized trials in adults. Hence we selected gelatin polymer (Haemaccel<sup>®</sup>) for this study. It has a long track record of safety and efficacy in adults, which is borne out of case-series involving thousands of patient(3). Haemaccel<sup>®</sup> (Gelatin Polymer in Saline) is one of the least expensive colloid solutions available, and has good water binding capacity and reasonable duration of action. It also has lesser side effects as compared to dextran.

2. In septic shock, infection triggers endogenous mediators, which in turn injure the capillary endothelium and other organs. Vascular injury leads to mal-distribution of circulation with vasodilata-

TABLE I—Characteristics of Various Colloids.

	Albumin	Haemaccel	Hetastarch	Pentastarch	Dextran 40
M <sub>w</sub> (kDa)	69	35	450	200	40
Sodium (mmol/L)	130-160	145	154	154	154
Potassium (mmol/L)	1	5.1	0	0	0
Duration of action (Hrs)	6	3-4	>8	6-8	3-4
Water binding (ml H <sub>2</sub> O/g colloid)	18	41.7	20	30	37

available colloids are “colloids in saline” solutions.

There is no justification for use of fresh frozen plasma as a volume expander because of high risk of disease transmission associated with it(2). Dextrans are inappropriate for volume expansion in children because of high incidence of adverse effects. Albumin, and

tion and pooling of blood (arterial and venous) and capillary leaks leading to loss of intravascular fluid to interstitial space (“third spacing”). The major physiologic aberration, therefore, in septic shock is hypovolemia and reduced pre-load. Myocardial dysfunction is next important physiologic aberration, responsible for poor tissue perfusion. Vasoactive and