

Initial intravenous fluid prescription in general paediatric in-patients aged >28 days and <18 years: consensus statements.

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Background & Objectives: The prescription of intravenous fluid (IVF) is an essential management modality in hospital paediatrics. The traditional practice of administering hypotonic maintenance IVF (0.18-0.3% sodium chloride [NaCl]) was based on the Holliday–Segar formula published in 1957. However, since the 1990s, more than 100 cases of hyponatremia-related iatrogenic death or permanent neurologic impairment have been reported, nearly all studies have shown that hospital acquired hyponatremia is related to hypotonic fluid administration. This is related to the high incidence of non-osmotic stimuli of antidiuretic hormone (SIADH) in sick children, which leads to an impaired ability to excrete free water. In this context, the current practice statement is intended to guide all clinicians who prescribe IVF in children, encouraging methodological prescription practices to minimize fluid and electrolyte morbidities.

Basic intravenous fluid concepts: Osmolality is the concentration of a solution expressed as the number of solute particles per kilogram of solution (plasma). Tonicity is a measure of the effective osmolality between two fluid compartments separated by a semi-permeable membrane (eg, a cell membrane). For our purposes, tonicity refers to the sodium concentration of the fluid. Dextrose does not affect tonicity because it is rapidly metabolised in the blood stream.

Methods: A literature search from January 2000 to December 2019 were collected. All RCTs and meta-analyses regarding maintenance IVF were reviewed. Studies included paediatric RCTs where medical patients constituted more than 50% of the study population. Studies excluded were in which surgical or intensive care patients comprised the majority of patients, as well as studies in which IVF served both rehydration and maintenance purposes.

ACADEMIC P.E.A.R.L.S

Pediatric Evidence And Research Learning Snippet



Intravenous fluid therapy: recommendations for pediatric age group

Recommendations :

- Intravenous fluid should be administered only when the enteral route is considered inappropriate or inadequate; IVF should be discontinued once enteral route can be substituted.
- Intravenous fluid should be prescribed with the same care and consideration as used for medication. Individual clinical situations must be assessed, with specific attention to the patient's volume status, pathophysiological and biochemical state.
- When IVF is prescribed, the three components of prescription (deficit replacement, maintenance, and management of ongoing loss) should be considered separately. Replacement of fluid deficit should usually be with non-glucose containing isotonic fluids at the appropriate rate.
- Initial IVF and maintenance IVF types: most children aged >28 days to <18 years should receive isotonic solutions with appropriate potassium chloride and dextrose as maintenance IVF.
- Calculations of maintenance IVF rate should include all oral, enteral, drug, and blood products, normally using the Holliday–Segar formula. Patients at risk of SIADH may require fluid restriction.
- All children receiving IVF should undergo regular clinical and biochemical monitoring to assess their responses to therapy and changes in clinical status. Monitoring frequencies should be based on a risk assessment involving the child's age, clinical and volume statuses, stability, IVF proportion, and presence of biochemical abnormalities.

EXPERT COMMENT



“While there is strong evidence that isotonic solutions are the most appropriate maintenance IVF for the vast majority of hospitalized children, a reflexive approach to IVF prescription should be avoided. Intravenous fluid should be prescribed with the same care used for medications; with the rate and type of fluid tailored to the individual's clinical and patho-physiological statuses. Regular monitoring and reassessment with appropriate fluid readjustment are critical considerations. ”

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With warm regards,

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Reference

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