

WORKING GROUP

Activities of the Working Group on Hydration and Electrolyte Disorders of the Spanish Society of Pediatric Emergencies over the past ten years

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The physiological mechanisms regulating water and electrolyte homeostasis in children have specific characteristics that differ from those in adults. Pediatric emergency physicians manage patients presenting with a wide range of clinical conditions, some of which involve disturbances in water balance, electrolyte balance, or acid-base status. In other cases, patients may simply require oral or intravenous fluid therapy for a limited period due to various reasons.

In response to these needs, 10 years ago, a group of pediatricians from the Spanish Society of Pediatric Emergencies (SEUP) established a Working Group (WG) dedicated to this field, with the aim of standardizing the management of related clinical conditions. The group's initial objectives included developing protocols, guidelines, and recommendations based on scientific evidence. Thus, the SEUP Working Group on Hydration and Electrolyte Disorders (SEUP-HED-WG) was formed.

INFORMATION SOURCES: MANUALS, PROTOCOLS, AND ALGORITHMS

Our first activity was aimed at preparing the “Manual for the diagnosis and treatment of dehydration and electrolyte disorders in Pediatric Emergency Departments”⁽¹⁾, a pocket-

et-sized manual designed to support the rapid management of electrolyte disturbances and the initiation of oral or intravenous fluid therapy, both in cases of dehydration and for maintenance purposes.

In line with the work of the SEUP, the WG has developed and periodically updated the protocol for the management of “Dehydration in the Context of Acute Gastroenteritis”, as part of the SEUP Diagnostic and Therapeutic Protocols in Pediatric Emergency Medicine⁽²⁾, together with the corresponding clinical algorithm⁽³⁾. The most recent update, published in 2024, includes not only revised dosing and fluid volume recommendations based on the degree and type of dehydration, but also the option of using balanced intravenous solutions in treatment. These protocols are routinely implemented in pediatric emergency departments and primary care settings, both nationally and internationally.

In 2021, the group published the “Document of Recommendations on Rapid Intravenous Rehydration in Acute Gastroenteritis” in *Anales Españoles de Pediatría*⁽⁴⁾. This document was selected for inclusion in the English edition of the journal⁽⁵⁾. It provides consensus-based recommendations, supported by scientific evidence, to standardize the use of rapid intravenous rehydration (RIR) in emergency departments. The project was developed using the GRADE methodology, involving the formation of an expert panel; the creation of a catalogue of research questions and identification of key issues; prioritization of each item; a comprehensive literature review; evaluation and synthesis of the scientific evidence (GRADE); and the subsequent review, discussion, and formulation of recommendations. Ten clinical questions were defined, resulting in 16 recommendations addressing the safety of RIR, its indications and contraindications, duration, optimal fluid composition, infusion rate, and the clinical and laboratory monitoring required during treatment.

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QUALITY IMPROVEMENT: QUALITY INDICATORS AND “DO-NOT-DO” RECOMMENDATIONS

The SEUP-HED-WG has collaborated with the Quality Improvement Group on the “SEUP Quality Indicators” manual. The indicator “Use of intravenous rehydration in dehydrated patients with acute gastroenteritis”⁽⁶⁾ was developed, establishing that oral rehydration is the therapy of choice for dehydration associated with acute gastroenteritis and that intravenous rehydration should be used in less than 5% of cases of acute gastroenteritis.

With the aim of improving clinical practice in emergency departments, a list of “Do-Not-Do” Recommendations when rehydrating a patient with acute gastroenteritis was developed⁽⁷⁾. These include initiating rehydration without first estimating fluid deficit, using non-approved oral rehydration solutions (ORS), selecting intravenous rehydration as the first option when oral rehydration is not contraindicated, administering hypotonic saline solutions, and failing to monitor for signs of volume overload during rehydration, particularly when using intravenous fluids.

FAMILY INFORMATION RESOURCES

Information sheets on the home management of vomiting and acute gastroenteritis have been developed⁽⁸⁾. These materials provide clear guidance on appropriate care and monitoring at home, helping to standardize the information provided at discharge. Parent information sheets are widely used not only in pediatric emergency departments but also in primary care settings.

In the summer of 2023, coinciding with a heatwave, the group produced informational posters aimed at families and caregivers⁽⁹⁾. Under the slogans “In summer and in the sun, children can suffer heat stroke” and “In summer and in the sun, avoid intense exercise to prevent heat stroke”, the posters provided basic guidance to help prevent the adverse effects of prolonged sun exposure.

Similarly, in the context of treating acute gastroenteritis, the WG promoted the slogan “Don’t do your children wrong, give oral rehydration solution” to reinforce the message that fluid and electrolyte losses should be replaced with oral rehydration solutions, not commercial beverages.

TRAINING

In 2021, the Working Group was asked by the SEUP to lead the online seminar “Fluid therapy in different clinical situations”. The seminar addressed topics including rapid intravenous rehydration, hyponatremia, and severe dehydration⁽¹⁰⁾. It remains available on the SEUP Campus under the Online Seminars section.

Finally, we would like to emphasize that intravenous fluid therapy is likely the most frequently prescribed treatment in hospitals⁽¹¹⁾. The introduction of new balanced solutions, already incorporated into guidelines for the management of hypovolemic states, presents a new challenge in the context of dehydration and maintenance fluid therapy. However, the

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implementation of these guidelines remains limited by the unavailability of a balanced isotonic fluid that also contains glucose.

The work carried out over the years by the SEUP-HED-WG has focused on developing evidence-based resources to support patient care and to assist families and caregivers in the home management of these highly prevalent conditions. Specialist physicians from 16 hospitals, both within Spain and internationally, have contributed to the development and implementation of these activities.

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