cultation), the event had not resolved at the time of arrival to the emergency department, or the patient was aged more than 1 year.

Of the 74 cases (52%) that met the criteria for BRUE, 69 (93%) qualified as higher-risk BRUE. The most frequent reasons for classification as higher-risk BRUE were age less than 2 months or corrected age less than 45 weeks (51 cases), repeat event (18 cases), event duration greater than 1 min (16 cases), concerning social assessment (5 cases) and family history of sudden death (4 cases). Several patients met more than one higher-risk criterion. None of the infants was classified as higher-risk based on need for cardiopulmonary resuscitation (CPR) by a trained medical provider.

Of the 5 infants that met the criteria for lower-risk BRUE, 3 underwent diagnostic tests (blood tests, cranial ultrasound, echocardiogram, electroencephalogram). All test results were normal, save for the incidental finding in the echocardiogram of a haemodynamically insignificant aorto-pulmonary collateral arteries and patent foramen ovale in 1 patient. In these infants, there were no abnormalities in the vital signs during the hospital stay, repeat episodes or diagnosis of severe underlying disease. The mean length of stay in these 5 patients was 1.8 days.

In the group of 69 patients that met the criteria for higher-risk BRUE, diagnostic tests were performed in 48% in the emergency department and in 74% during the hospital stay. Ten percent of these patients experienced a repeat event during the stay. Abnormal test results or relevant diagnoses from testing included diagnosis of convulsive seizures in 1 infant, 1 case of congenital hypothyroidism (the results of the newborn screening for metabolic diseases became available during the hospital stay), 1 case of respiratory infection by respiratory syncytial virus, 1 case of meningitis caused by enterovirus and detection of haemodynamically insignificant aorto-pulmonary collateral arteries in 1 infant. The mean length of stay in this group was 2.6 days.

Recent guidelines recommend educating parents on how to perform CPR. Such training was only delivered in 3 cases (2%): all 3 met the criteria for higher-risk BRUE, and 2 were managed with home cardiorespiratory monitoring.

There are limitations to our study, chief of which is its retrospective design.

Only half of the infants admitted due to ALTE met the criteria for BRUE. Most infants that experienced these events were aged less than 2 months, which made them qualify as higher risk on account of the age criterion. Only 7% of patients with BRUE met the criteria for lower risk BRUE, so testing and hospital admission could only have been avoided in this percentage of the total.

References

1. Tieder JS, Bonkowsky JL, Etzel RA, Franklin WH, Gremse DA, Herman B, et al. Brief resolved unexplained events (formerly apparent life-threatening events) and evaluation of lower-risk infants. Pediatrics. 2016;137:e20160591.
2. Brand DA, Altman RL, Purtill K, Edwards KS. Yield of diagnostic testing in infants who have had an apparent life-threatening event. Pediatrics. 2005;115:885–93.
3. Zwemer E, Claudius I, Tieder J. Update on the evaluation and management of brief resolved unexplained events (previously apparent life-threatening events). Rev Recent Clin Trials. 2017;12:233–9.
4. Colombo M, Katz ES, Bosco A, Melzi ML, Nosetti L. Brief resolved unexplained events: Retrospective validation of diagnostic criteria and risk stratification. Pediatr Pulmonol. 2019;54:61–5.
5. Jiménez Asin A, Ruiz Contreras J. Episodio aparentemente letal. In: Marín Ferrer M, Ordoñez Saez O, Palacios Cuesta A, editors. Manual de Urgencias de Pediatría. Hospital Doce de Octubre. 1st ed. Ergon; 2011. p. 91–9.
6. Carbayo Jiménez T, Cedena Romero P. Eventos breves resueltos e inexplicados/episodio aparentemente letal (BRUE/ALTE). 2nd ed. Ergon; 2018. p. 127–33.

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Home monitoring of sodium in children with adipsic diabetes insipidus*

Monitorización domiciliaria de sodio en niños con diabetes insípida y adipsia

Dear Editor,

Children with diabetes insipidus associated with the lack of thirst (adipsia) may experience severe oscillations in their serum sodium levels requiring frequent and prolonged hospitalizations. On one hand, they are at risk of hyponatraemia resulting from excessive fluid intake due to absolute or relative overdosage of desmopressin. On the other hand, due to the absence of thirst, they are also at risk of hypernatraemia due to fluid deprivation if lost fluids are not properly replenished.[1,2]

We present the cases of 3 children with panhypopituitarism with antidiuretic hormone deficiency (central diabetes insipidus) and adipsia as immediate complications of surgical removal of large hypothalamic tumours. After a protracted postoperative hospital stay due to countless episodes of hyponatraemia and hypernatraemia, patients could be discharged home and managed at the outpatient level by providing parents with a portable system for measuring capillary blood sodium levels at home.

The patients were 2 girls and 1 boy aged 5.5, 15 and 9 years, respectively, that had undergone surgery for treatment of craniopharyngioma, optic nerve glioma and mixed germ cell tumour and were hospitalised for

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Table 1 Printout of recommendations given to parents for home-based care after hospital discharge.

Prevention of hypernatraemia
Administer a fixed amount of fluids daily to cover baseline needs and immediately replenish fluid losses of any kind, including:
Polyuria: replenish the volume in excess of the usual urine volume
Insensible losses (heat, fever, physical activity or tachypnoea), gastrointestinal losses (diarrhoea, vomiting) or other fluid losses (haemorrhage, effusion, etc)
Prevention of hyponatraemia
Before administering DP, wait for the effects of the previous dose to be done (abundant and clear urine)
Avoid excessive fluid intake
Serum sodium measurements
Regular measurements (every 1, 2 or 3 days, depending on stability of patient), plus measurement in the event of any disease or symptom
Acceptable values in these children range from 138 to 148 mEq/L
Sodium <138 mEq/L (hyponatraemia or level in the lower limit of normal)
In case of mild symptoms (nausea, vomiting, headache) or no symptoms: restrict fluids and wait for urine to be abundant and clear before administering another dose of DP. Reduce total daily fluid intake by 5%
In case of severe symptoms (confusion, respiratory distress, coma, seizures, apnoea): alert the emergency department to prepare administration of IV hypertonic saline solution
Sodium >148 mEq/L (significant hypernatraemia)
In case of no symptoms or mild symptoms (irritability): replenish dehydration losses properly and increase the total daily fluid intake by 5%
In case of severe symptoms (hypertonia, hyperreflexia, decreased level of consciousness): contact emergency department and bring patient for IV rehydration

DP, desmopressin; IV, intravenous.

96, 105 and 53 days (42, 9 and 23 of these days in the intensive care unit). The complications from abnormal sodium levels in these patients included status epilepticus and cerebral oedema secondary to hyponatraemia in the 2 younger patients and thromboembolic disease secondary to hypernatraemia in the adolescent patient.

We provided parents with a portable blood analysis device (EPOC point-of-care blood analysis system; Epocal Inc, Ottawa, Canada) that has been validated for measurement of capillary blood sodium concentrations on account of the good correlation of these measurements with those obtained by benchtop methods.[3] The system requires 92 μL of capillary blood per test and provides results in 3.5 min, with an approximate cost of 5 euro per measurement. The device is portable, as it weighs only 680 g, and can perform 50 measurements on one battery charge. We held a training session for parents and primary care providers (paediatricians and nurses) on the use of this system, and during the hospital stay we trained parents on how to collect capillary blood samples, on the management protocol and how to respond to abnormal sodium levels. Table 1 presents the contents of the printout of recommendations given at discharge. Families were informed that they could contact the clinic by telephone between 13:30 and 15:00 pm on weekdays.

The 3 families assumed the responsibility to monitor serum sodium levels at home, which they preferred over visiting a health care centre or laboratory. The patients have returned to school and leisure activities, and parents have returned to work. At the time of this writing, the duration of at-home follow-up in the 3 patients has been of 20, 10 and 7 months, with a follow-up visit at our clinic every 3 months. In this interval, they have needed to visit the emergency department 6 times for reasons related to their sodium levels (Table 2), leading to short hospitalizations (<48 h), except in one case in which hypernatraemia triggered acute kidney injury, which prolonged the hospital stay to 14 days.

Home monitoring of capillary blood sodium levels is a rare practice, with barely half a dozen of children using

Table 2 Emergency department visits during home-based follow-up after hospital discharge with home monitoring of capillary blood sodium levels.

Patient (age)	Reason	Serum sodium (mEq/L)	Length of stay
1 (5.5 years)	Convulsive seizures	139 (previous, 155)	24 h
1 (5.5 years)	Status epilepticus	126	48 h
1 (5.5 years)	Convulsive seizures	132	6 h
2 (9 years)	Confusion	132	6 h
3 (15 years)	Confusion	170	14 days
3 (15 years)	Fever and difficulty eating	157	24 h

this approach reported in the current international literature, but this measure is completely accepted by its users.[4–6] With its implementation, we are taking another step to increase patient safety, family quality of life and, ultimately, to make paediatrics practice more humane. The use of home serum sodium monitoring could facilitate patient discharge, reduce the frequency of readmissions and the associated lengths of stay, reduce the number of visits to health care centres, allow an earlier return to school, work and leisure activities and open more time for children to enjoy their childhoods. A structured educational programme is essential in this approach to facilitate adherence to treatment by the family and good communication between health professionals (nurse-paediatrician) and between levels of care (primary care-hospital-based care).

References

1. Di Iorgi N, Morana G, Napoli F, Allegri AE, Rossi A, Maghnie M. Management of diabetes insipidus and adipsia in the child. Best Pract Res Clin Endocrinol Metab. 2015;29:415–36.
2. Prete A, Corsello SM, Salvatori R. Current best practice in the management of patients after pituitary surgery. Ther Adv Endocrinol Metab. 2017;8:33–48.
3. Kim C, Kim H. Emergency medical technician-performed point-of-care blood analysis using the capillary blood obtained from skin puncture. Am J Emerg Med. 2018;36:1215–21.
4. Van der Linde AAA, van Herwaarden AE, Oosting JD, Claahsen-van der Grinten HL, de Grouw EPLM. For debate: Personalized health care: as exemplified by home sodium measurements in a child with central diabetes insipidus and impaired thirst perception. Pediatr Endocrinol Rev. 2018;15:276–9.
5. Hameed S, Mendoza-Cruz AC, Neville KA, Woodhead HJ, Walker JL, Verge CF. Home blood sodium monitoring, sliding-scale fluid prescription and subcutaneous DDAVP for infantile diabetes insipidus with impaired thirst mechanism. Int J Pediatr Endocrinol. 2012;2012:18.
6. Green RP, Landt M. Home sodium monitoring in patients with diabetes insipidus. J Pediatr. 2002;141:618–24.

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PCR test for SARS-CoV-2 persistently positive. Virus detection is not always COVID-19☆

Test de PCR a SARS-CoV-2 persistentemente positivo. No siempre la detección del virus es COVID-19

To the Editor:

From December 31, 2019, when the detection of 27 cases of pneumonia of initially unknown aetiology was reported, to present, when there are more than 11 million confirmed cases of coronavirus disease 2019 (COVID-19), our knowledge about severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been increasing. In Spain, the Asociación Española de Pediatría (Spanish Association of Pediatrics) created a specific working group[1] and we have at our disposal the entire international scientific output of the past months. However, several aspects of this disease remain unknown. The duration of the period of infectiousness and viral shedding is still under investigation. Based on the most recent evidence, the period during which polymerase chain reaction (PCR) tests for SARS-CoV-2 are positive is longer than the period of infectiousness. Some studies have evinced absence of viral culture viability despite positive PCR tests in samples with viral loads of less than 10^5 copies RNA/mL.[2] Other studies have reported positive PCR tests following negative tests and clinical recovery, but this new detection has not been associated with clinical worsening or transmission to contacts in any case.[3] Although this is known,[4] there are cases in which uncertainty arises in clinical practice and we need to rely on different aspects to discern between prolonged viral shedding, detection of nonviable microorganisms, reinfection or reactivation.

What differentiates the case presented here from others is the positive detection of SARS-CoV-2 by PCR more than 50 days after the first positive test in association with respiratory symptoms. The patient was a girl aged 4 years that received a diagnosis of SARS-CoV-2 infection on March 31, 2020 based on a positive PCR test after presenting with isolated fever of 5 days' duration. The fever was managed at home, with a good outcome and full resolution after 6 days of illness. A follow-up PCR was not performed at the time to confirm clearance of the virus. On May 20, 2020 the patient presented in our hospital with a new episode of fever with onset 3 days prior, this time associated with cough and moderate respiratory distress. The physical examination revealed mild chest retractions and disseminated subcrepitant rales predominantly on the right side, and the haemoglobin concentration remained at 95%. The chest radiograph revealed peribronchial cuffing with a mild infiltrate in the right lower lobe. The salient findings of the initial blood workup were a white blood cell count of 15.7×10^9/L, with 84% neutrophils, and a level of C-reactive protein of 159 mg/L and a procalcitonin (PCT) level of 0.38 ng/mL. The patient received a diagnosis of superinfection in the context of bronchitis and was admitted to hospital to receive inhaled bronchodilators and intravenous antibiotherapy; she did not require oxygen therapy during the stay. Per the current protocol, we performed SARS-CoV-2 and respiratory pathogen panel PCR tests at the time of admission. The PCR test for detection of SARS-CoV-2 was positive again. The results of the blood tests were not positive for any other indica-

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