Herbal Teas and Water Intoxication in a Young Child

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The use of herbal teas in home remedies for common childhood illnesses is a frequent practice in the Mexican-American population in southern Colorado. The use of chamomile tea (manzanilla) and peppermint tea (yerba buena) is especially prevalent. The prolonged use of these teas, in the absence of other oral intake, however, can result in clinical water intoxication and subsequent hyponatremic seizures because of inadequate sodium content.

Case Report

A 10-week-old Mexican-American girl was admitted to the hospital for lethargy, projectile vomiting, and seizures on the third day of a mild upper respiratory tract infection. The child was born to a 16-year-old mother after an uncomplicated term pregnancy. Birth weight was 3.5 kg. She did well in the newborn period and had a normal developmental course. At the onset of coryza, the family replaced her regular diet of infant formula with iron, supplemented frequently with water, exclusively with peppermint, primarily, and chamomile teas. By history the child ingested 180 to 200 mL/kg/d during the three-day period.

Physical examination revealed a child in distress with pallor, shallow respirations, and tonic-clonic movements. Admission weight was 5.5 kg. Vital signs revealed a rectal temperature of 94° F; pulse, 150 beats/min; respiratory rate, 40 min; and a systolic blood pressure of 80 mmHg. The skin was well hydrated without rashes or evidence of trauma. The anterior fontanelle was tense and bulging. Pupils were constricted and sluggishly reactive to light. The abdomen was markedly distended, with decreased bowel sounds, and no organomegaly. Neurologically the child was lethargic with right-sided seizure activity. There was withdrawal to painful stimuli.

The patient was given a total dose of 75 mg of phenobarbital intramuscularly and 12 mg of diazepam intravenously without clinical results. A spinal tap revealed clear fluid, 3 white blood cells, normal glucose, and normal protein. Initial serum electrolytes were as follows: sodium, 112 mEq/L; potassium, 4.6 mEq/L; chloride, 82 mEq/L; and carbon dioxide, 20 mEq/L. Serum ammonia, calcium, and blood urea nitrogen were unremarkable. Initial blood sugar was 186 mg/dL. Admission complete blood count had a hemoglobin of 9.0 g/dL and hematocrit of 24.9 percent, adequate platelets, and a white blood count of 17,800/μL with a minimal left shift. Urinalysis was unremarkable with a specific gravity of 1.011.

Once the diagnosis of severe hyponatremia was made, the child was treated with a 3 percent sodium chloride solution at a rate of 25 mL/h for 4 hours. Controlled and rapid increase in the serum sodium to a physiological range was indicated in the face of unabated seizure activity. When serum sodium balance was achieved, intravenous fluids were changed to $D_5W/0.2$ sodium chloride solution with maintenance potassium chloride. Subsequent electrolyte determinations were normal. The patient was transfused with 60 cc of packed red blood cells to correct anemia.

The child's seizures stopped during the course of concentrated sodium treatment. Following this treatment, an electroencephalogram (EEG) showed multifocal epileptiform discharges. The patient was placed on a maintenance dosage of oral phenobarbital when discharged home on the fourth hospital day.

Continued on page 936

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Table 1. Sodium and Potassium Content		
	Sodium (mEq/L)	Postassium (mEq/L)
Tap water (control)	0.9	0.13
Peppermint tea	0.9	1.9
Chamomile tea	1.7	2.5

At 6 months of age her EEG was normal, and she was tapered off the anticonvulsant.

Discussion

Seizures secondary to excessive free water intake in young children resulting from feeding mismanagement have been well documented.[1] As in this case, hypothermia and hyperglycemia are common findings upon presentation. The neurological findings appear to correlate with the degree of hyponatremia and the rate of decrease in the serum sodium level.[2] These neurological manifestations are attributed to the intracellular fluid influx in neurons. The hypothermia is speculated to be from overhydration in the hypothalamic thermoregulatory center.[3] It is theorized that to sustain adequate nutrition, hunger may override the thirst mechanism for water and solute regulation in an infant.[4] Nearly up to the onset of convulsions infants cry and vigorously continue to drink in the face of fluid overload.[5] The excess of hypotonic oral fluids results in some washout of the normal medullary solute gradient necessary to concentrate urine.[6]

It was clinically felt, from the findings of both projectile vomiting and relatively high urine specific gravity in the patient presented, that this child had concomitant abnormal water retention on the basis of cerebral edema and the syndrome of inappropriate antidiuretic hormone (SIADH).

The prolonged use of peppermint tea and chamomile tea as exclusive oral hydrating agents is inappropriate because of the teas' sodium content. Results of analysis by flame photometer are displayed in Table 1.

As administered in this case, peppermint and chamomile teas are not adequate oral agents for prolonged use in the absence of other electrolyte sources. More appropriate oral fluids would be the prepared glucose-electrolyte agents (30 mEq Na/L) or jello water (10 to 12 mEq Na/L). Family

education in outpatient fluid therapy should be recognized by providers of child health care.

References

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Assessing the Reliability of Data From Patient Medical Records

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Research performed in the community practice setting and using medical records, although highly appropriate for the study of common clinical conditions, involves a unique set of methodologic problems. The credibility of research conducted in this setting will depend in large part upon how effectively the investigators deal with these problems. One common concern in practice-based research is data reliability.

Reliability is a property of measurement that refers to the replicability or stability of measurement results. A measure is reliable if, when repeatedly applied to an unchanging object, it yields the same result. Investigators often neglect any formal assessment of the reliability of their measures and in effect implicitly assume them to be perfectly reliable. If the reliability of a measure is not assessed, conclusions drawn from the research are subject to criticism.

This communication describes an assessment of the reliability of data abstracted from hospital records used in a study describing the obstetrical experience of a rural family practice. The focus here is on how reliably data were abstracted from medical records. Other types of reliability, such as that concerning the initial recording of data in the chart, though important, are beyond the scope of this study. Others have discussed problems with the reliability of morbidity data and with encounter-based data collection in more general terms.[1,2]

Methods

In a study of the obstetrical experience of residency-trained family physicians in rural practice, data were abstracted from the hospital charts of 709 deliveries occurring between 1976 and 1980. The data abstraction form covered 64 items including demographic characteristics of the gravida, pregnancy history, prenatal complications, intrapartum complications and interventions, postpartum complications and interventions, and characteristics and complications of the newborn. All data abstraction was done by a single accredited records technician.

A random sample of 50 of the 709 hospital

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Continued on page 939