

# 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/ $\mu$ L 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<sub>5</sub>W/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.

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**ALDOMET® (Methyldopa | MSD)**

Tablets, containing 125, 250, or 500 mg methyldopa; Oral Suspension, containing 250 mg methyldopa per 5 ml and alcohol 1%.

**Contraindications:** Active hepatic disease, such as acute hepatitis and active cirrhosis; if previous methyldopa therapy has been associated with liver disorders (see Warnings); hypersensitivity.

**Warnings:** It is important to recognize that a positive Coombs test, hemolytic anemia, and liver disorders may occur with methyldopa therapy. The rare occurrences of hemolytic anemia or liver disorders could lead to potentially fatal complications unless properly recognized and managed. Read this section carefully to understand these reactions. With prolonged methyldopa therapy, 10% to 20% of patients develop a positive direct Coombs test, usually between 6 and 12 months of therapy. Lowest incidence is at daily dosage of 1 g or less. This on rare occasions may be associated with hemolytic anemia, which could lead to potentially fatal complications. One cannot predict which patients with a positive direct Coombs test may develop hemolytic anemia. Prior existence or development of a positive direct Coombs test is not in itself a contraindication to use of methyldopa. If a positive Coombs test develops during methyldopa therapy, determine whether hemolytic anemia exists and whether the positive Coombs test may be a problem. For example, in addition to a positive direct Coombs test there is less often a positive indirect Coombs test which may interfere with cross matching of blood. At the start of methyldopa therapy, it is desirable to do a blood count (hematocrit, hemoglobin, or red cell count) for a baseline or to establish whether there is anemia. Periodic blood counts should be done during therapy to detect hemolytic anemia. It may be useful to do a direct Coombs test before therapy and at 6 and 12 months after the start of therapy. If Coombs-positive hemolytic anemia occurs, the cause may be methyldopa and the drug should be discontinued. Usually the anemia remits promptly. If not, corticosteroids may be given and other causes of anemia should be considered. If the hemolytic anemia is related to methyldopa, the drug should not be reinstated. When methyldopa causes Coombs positivity alone or with hemolytic anemia, the red cell is usually coated with gamma globulin of the IgG (gamma G) class only. The positive Coombs test may not revert to normal until weeks to months after methyldopa is stopped.

Should the need for transfusion arise in a patient receiving methyldopa, both a direct and an indirect Coombs test should be performed on his blood. In the absence of hemolytic anemia, usually only the direct Coombs test will be positive. A positive direct Coombs test alone will not interfere with typing or cross matching. If the indirect Coombs test is also positive, problems may arise in the major cross match and the assistance of a hematologist or transfusion expert will be needed.

Fever has occurred within first 3 weeks of therapy, occasionally with eosinophilia or abnormalities in liver function tests, such as serum alkaline phosphatase, serum transaminases (SGOT, SGPT), bilirubin, cephalin cholesterol flocculation, prothrombin time, and bromsulphalein retention. Jaundice, with or without fever, may occur, with onset usually in the first 2 to 3 months of therapy. In some patients the findings are consistent with those of cholestasis. Rarely fatal hepatic necrosis has been reported. These hepatic changes may represent hypersensitivity reactions; periodic determination of hepatic function should be done particularly during the first 6 to 12 weeks of therapy or whenever an unexplained fever occurs. If fever and abnormalities in liver function tests or jaundice appear, stop therapy with methyldopa. If caused by methyldopa, the temperature and abnormalities in liver function characteristically have reverted to normal when the drug was discontinued. Methyldopa should not be reinstated in such patients. Rarely, a reversible reduction of the white blood cell count with primary effect on granulocytes has been seen. Reversible thrombocytopenia has occurred rarely. When used with other antihypertensive drugs, potentiation of antihypertensive effect may occur. Patients should be followed carefully to detect side reactions or unusual manifestations of drug idiosyncrasy.

**Pregnancy and Nursing:** Use of any drug in women who are or may become pregnant or intend to nurse requires that anticipated benefits be weighed against possible risks; possibility of fetal injury or injury to a nursing infant cannot be excluded. Methyldopa crosses the placental barrier, appears in cord blood, and appears in breast milk.

**Precautions:** Should be used with caution in patients with history of previous liver disease or dysfunction (see Warnings). May interfere with measurement of: urinary uric acid by the phosphotungstate method, serum creatinine by the alkaline picrate method, and SGOT by colorimetric methods. Since methyldopa causes fluorescence in urine samples at the same wavelengths as catecholamines, falsely high levels of urinary catecholamines may be reported. This will interfere with the diagnosis of pheochromocytoma. It is important to recognize this phenomenon before a patient with a possible pheochromocytoma is subjected to surgery. Methyldopa is not recommended for patients with pheochromocytoma. Urine exposed to air after voiding may darken because of breakdown of methyldopa or its metabolites.

Stop drug if involuntary choreoathetotic movements occur in patients with severe bilateral cerebrovascular disease. Patients may require reduced doses of anesthetics; hypotension occurring during anesthesia usually can be controlled with vasopressors. Hypertension has occurred after dialysis in patients on methyldopa because the drug is removed by this procedure.

**Adverse Reactions:** *Central nervous system:* Sedation, headache, asthenia or weakness, usually early and transient; dizziness, lightheadedness, symptoms of cerebrovascular insufficiency, paresthesias, parkinsonism, Bell's palsy, decreased mental acuity, involuntary choreoathetotic movements; psychic disturbances, including nightmares and reversible mild psychoses or depression. *Cardiovascular:* Bradycardia, prolonged carotid sinus hypersensitivity, aggravation of angina pectoris. Orthostatic hypotension (decrease daily dosage). Edema (and weight gain) usually relieved by use of a diuretic. (Discontinue methyldopa if edema progresses or signs of heart failure appear) *Gastrointestinal:* Nausea, vomiting, distention, constipation, flatulence, diarrhea, colitis, mild dryness of mouth, sore or "black" tongue, pancreatitis, sialadenitis. *Hepatic:* Abnormal liver function tests, jaundice, liver disorders. *Hematologic:* Positive Coombs test, hemolytic anemia. Bone marrow depression, leukopenia, granulocytopenia, thrombocytopenia. Positive tests for antinuclear antibody, LE cells, and rheumatoid factor. *Allergic:* Drug-related fever, lupus-like syndrome, myocarditis. *Dermatologic:* Rash as in eczema or lichenoid eruption; toxic epidermal necrolysis. *Other:* Nasal stuffiness, rise in BUN, breast enlargement, gynecomastia, lactation, hyperprolactinemia, amenorrhea, impotence, decreased libido, mild arthralgia, myalgia.

**Note:** Initial adult dosage should be limited to 500 mg daily when given with antihypertensives other than thiazides. Tolerance may occur, usually between second and third months of therapy; increased dosage or adding a diuretic frequently restores effective control. Patients with impaired renal function may respond to smaller doses. Syncope in older patients may be related to increased sensitivity and advanced arteriosclerotic vascular disease; this may be avoided by lower doses.

For more detailed information, consult your MSD Representative or see Prescribing Information. Merck Sharp & Dohme, Division of Merck & Co., Inc., West Point, PA 19486

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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.<sup>1</sup> 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.<sup>2</sup> 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.<sup>3</sup> It is theorized that to sustain adequate nutrition, hunger may override the thirst mechanism for water and solute regulation in an infant.<sup>4</sup> Nearly up to the onset of convulsions infants cry and vigorously continue to drink in the face of fluid overload.<sup>5</sup> The excess of hypotonic oral fluids results in some washout of the normal medullary solute gradient necessary to concentrate urine.<sup>6</sup>

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.<sup>1,2</sup>

### 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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