Incriminated agents inducing hemolysis include the well-known sulfonamides and antimalarial drugs, nitrofurantoin, infections such as hepatitis,[8] and unripe peaches.[9] An extensive list of compounds causing hemolysis in G6PD deficiency is readily available in standard textbooks of hematology, but the frequency of appreciable hemolysis associated with each of the listed agents is not. In this patient, the history of fava bean ingestion was emphatically denied by both parents, as was a large number of possible agents known to induce hemolysis in G6PD deficiency. Only when the vernacular term for fava bean (yewdow) was used was a history of fava bean ingestion obtained. Yewdow is a popular snack food in Asia similar to potato chips or peanuts in America. Within the Cantonese community, it is known as *chundow.* A photograph of the beans may be helpful when attempting to elicit an accurate history (Figure 1). As the cultural and ethnic diversity increases in the western United States, added knowledge of these differences is required to properly inform patients of pertinent inciting agents to avoid within their cultural milieu.

REFERENCES

1. Bapat JP, Baxi AJ: Mechanism of hemolysis of G-6-PD deficient red cells: Changes in membrane lipids and polypeptides. Blut 1982; 44:355-362
2. Allison AC: Glucose-6-phosphate dehydrogenase deficiency in red blood cells of East Africans. Nature 1960; 186:531-532
3. Motulsky AG: Metabolic polymorphisms and the role of infectious diseases in human evolution. Hum Biol 1960; 32:28-61
4. Usanga EA, Luzzatto L: Adaptation of *Plasmodium falciparum* to glucose-6-phosphate dehydrogenase-deficient host red cells by production of parasite-encoded enzyme. Nature 1985; 313:793-795
5. Golenser J, Miller J, Spira DT, et al: Inhibitory effect of a fava bean component on the in vitro development of *Plasmodium falciparum* in normal and glucose-6-phosphate dehydrogenase deficient erythrocytes. Blood 1983; 61:507-510
6. Panich V: Tropical Asia—Glucose-6-phosphate dehydrogenase deficiency, part 2. Clin Haematol 1981; 10:800-814
7. Schwartz IK, Chin W, Newman J, et al: Glucose-6-phosphate dehydrogenase deficiency in Southeast Asian refugees entering the United States. Am J Trop Med Hyg 1984; 33:185-186
8. Chan TK, Todd D: Haemolysis complicating viral hepatitis in patients with glucose-6-phosphate dehydrogenase deficiency. Br Med J 1975; 1:131-133
9. Globerman H, Navok T, Chevion M: Haemolysis in a G6PD-deficient child induced by eating unripe peaches. Scand J Haematol 1984; 33:337-341

Neurogenic Diabetes Insipidus in an Initially Healthy Neonate

BRIAN K. SMITH, MD
JOHN S. FRIDEN, MD
Ogden, Utah

NEUROGENIC DIABETES INSIPIDUS in the newborn period is rare but has been described previously in neonates with infections, congenital brain malformations, intraventricular hemorrhage, and hypoxia.[1-4] This report concerns a 21-day-old infant with central diabetes insipidus in whom no predisposing factors were evident at the time of diagnosis.

Report of a Case

The patient, a 21-day-old female infant, was born to a 20-year-old primigravid woman at 38 weeks' gestation after an uneventful pregnancy. The vaginal delivery was without complication. The infant weighed 3,200 grams (7 lb 1 oz) at birth. She had mild transient tachypnea of the newborn that did not require supplemental oxygen and resolved spontaneously within 12 hours. The baby nursed well while in the hospital and was discharged home on the third postpartum day, weighing 3,062 grams (6 lb 12 oz). Office visits at 10 days and 20 days of age dealt with parental concerns of feeding difficulties and hard stools. Because of progressive vomiting, diarrhea, lethargy, and irritability, however, the infant was admitted to hospital at 21 days of age for evaluation. The parents had not noted the baby to have fever. Of significance was that they had been feeding the patient strained water boiled with rice and caraway seeds, which the infant preferred over formula or breast-feeding.

On physical examination, the infant was lethargic. Her temperature and vital signs were normal, and she weighed 3,200 grams (7 lbs 1 oz). The general physical findings were within normal limits, with the exception of dry mucous membranes and decreased skin turgor, indicating an approximately 5% dehydration. The initial laboratory studies elicited the following values: serum sodium 157 mmol per liter, potassium 4.9 mmol per liter, chloride 127 mmol per liter, carbon dioxide 16 mmol per liter, blood urea nitrogen 8 mmol per liter (normal, 3.0 to 6.5), and creatinine 71 μmol per liter (0.8 mg per dl [normal, 50 to 110 μmol per liter]). A leukocyte count was 11.6×10^9 per liter with polymorphonuclear neutrophils 0.22 and lymphocytes 0.72. The hematocrit was 0.48. The initial urinalysis revealed a specific gravity of 1.003, and the results were otherwise normal. A sepsis workup consisting of urine, cerebrospinal fluid, and blood cultures was negative for pathogens.

The infant was hydrated with an intravenous solution of 5% dextrose-isotonic fluid at 150 ml per kg per day after an intravenous bolus of 10 mg per kg of body weight. By 18 hours after admission, the infant's hydration status was slightly improved. Her weight had increased only 50 grams to 3,250 grams, and the urine output remained elevated at 4.3 ml per kg per hour. The child remained somewhat lethargic, and the electrolytes were only modestly corrected, with a serum sodium level of 151 mmol per liter, potassium 4.1 mmol per liter, chloride 129 mmol per liter, and CO_2 22 mmol per liter. Serum and urine osmolalities were 480 and 50 mmol per kg, respectively. Despite intravenous rehydration, her weight 24 hours later had increased only 35 grams and her urine output remained high at 5.6 ml per kg per hour. Diabetes insipidus was suspected, and a diagnostic argipressin (8-α-arginine vasopressin) infusion was administered intravenously at a rate of 0.3 units per kg per hour over a period of ten hours. Twelve hours after the infusion was started, the serum and urine osmolalities were 288 and 485 mmol per kg, respectively, and the urine specific gravity had risen from 1.003 to 1.022. The infant's weight increased 75 grams to 3,335 grams, and the urine output decreased to 3 ml per kg per hour. Treatment with desmopressin acetate, 0.05 ml given intranasally each morning, was begun, resulting in a return to normal of her serum electrolytes and urine specific gravity. The following day her weight had increased another 85 grams to 3,420 grams. Because of an increased nighttime urine output, however, and a nocturnal decrease of the urine specific gravity, the dosage of desmopressin was changed to 0.025 ml twice a day. Further evaluation for the source of the diabetes insipidus was undertaken and revealed the following normal results: a random serum cortisol level

(Smith BK, Friden JS: Neurogenic diabetes insipidus in an initially healthy neonate. West J Med 1989 Oct; 151:460-461)

Drs Smith and Friden are in private practice in Ogden, Utah.

Reprint requests to Brian K. Smith, MD, McKay-Dee Family Practice Center, 3955 Harrison Blvd, Ogden, UT 84403.

TABLE 1.—*Causes of Neurogenic Diabetes Insipidus in the Neonatal Period*

Intracranial defects
Holoprosencephaly
Septo-optic dysplasia
Infections
Listerial sepsis
Meningitis—streptococcal
Meningococcal septicemia
Intracranial tumors
Trauma
Intraventricular hemorrhage
Brain death

of 121 nmol per liter (4.4 μg per dl [normal, 110 to 520 nmol per liter]), thyroid-stimulating hormone level of 3.9 mU per liter, an unenhanced brain computed tomographic scan showing no intracranial defects, normal optic nerves and septum pellucidum, and normal plain films of the skull and long bones.

The infant had complete resolution of vomiting and lethargy, and the findings of a physical examination on discharge were completely within normal limits. She was feeding well on formula and was sent home on a regimen of intranasal desmopressin. At 12 weeks of age she was noted to have poor response to visual stimuli. An ophthalmologic examination revealed nystagmus and hypoplastic optic nerves—approximately 10% normal size. The diagnosis of de Morsier's syndrome (septo-optic dysplasia) was made.

Discussion

Neurogenic diabetes insipidus of neonates usually presents in a patient with known predisposing risk factors (Table 1). As such, the neonate is typically being treated or followed for the preexisting conditions, and diabetes insipidus is discovered because of abnormal laboratory values or urine output. The patient we describe presented with diabetes insipidus at 21 days of age with no known predisposing conditions, and an initial workup proved uninformative regarding a cause. Of interest is that the baby reportedly preferred water over formula since birth, although previous physical examinations revealed no signs of dehydration. Additionally, eye movements and gross visual responses were noted to be normal in the newborn nursery. A further evaluation at 3 months of age revealed diminished visual responses and findings consistent with de Morsier's syndrome (septo-optic dysplasia).

The de Morsier's syndrome is caused by congenital midline brain malformations thought to occur at 6 to 8 weeks of gestational age and involves cerebral structures, optic nerves, pituitary gland, and the hypothalamus to a variable degree. It usually affects the offspring of young primigravid mothers (which was the case in this patient). Unlike the patient described here, infants with de Morsier's syndrome usually present with ophthalmologic abnormalities as the chief parental concern.[5] The endocrine abnormalities are found subsequently and can be multiple or isolated, although growth hormone deficiency is the most consistent abnormality. Approximately 40% of patients will have an absence of the septum pellucidum, although its presence or absence does not correlate with endocrine abnormalities.[6] Again, the patient we described had a normal septum pellucidum.

This case exemplifies the need for continued follow-up to determine the cause of central diabetes insipidus in an infant once the diagnosis has been made. Greger and co-workers reported that in a series of 58 children, the cause of diabetes insipidus could eventually be found in more than 90% of patients.[7] An ongoing evaluation of patients with diabetes insipidus in whom no obvious cause is evident should include a computed tomographic scan of the brain at intervals, repeated evaluations of the hypothalamic-pituitary axis, and astute physical examinations.

REFERENCES

1. Jenkins HR, Hughes IA, Gray OP: Cranial diabetes insipidus in early infancy. Arch Dis Child 1988; 63:434-435

2. Kappy MS, Sonderer E: Sublingual administration of desmopressin—Effectiveness of an infant with holoprosencephaly and central diabetes insipidus. Am J Dis Child 1987; 141:84-85

3. Adams JM, Kenny JD, Rudolph AJ: Central diabetes insipidus following intraventricular hemorrhage. J Pediatr 1976; 88:292-294

4. Fenton LJ, Kleinman LI: Transient diabetes insipidus in a newborn infant. J Pediatr 1974; 85:79-81

5. Izenberg N, Rosenblum M, Parks JS: The endocrine spectrum of septo-optic dysplasia. Clin Pediatr 1984; 23:632-636

6. Stanhope R, Preece MA, Brook CGD: Hypoplastic optic nerves and pituitary dysfunction. Arch Dis Child 1984; 59:111-114

7. Greger NG, Kirkland RT, Clayton GW, et al: Central diabetes insipidus—22 years' experience. Am J Dis Child 1986; 140:551-554

Occult Retroperitoneal Carcinoid Tumor With Flushing and Solitary Lung Metastasis

JEFFREY A. JACKSON, MD
Temple, Texas

HOPE D. SHIPMAN, MD
Houston

FLUSHING IS the hallmark symptom of the carcinoid syndrome, occurring in 63% to 96% of affected patients.[1-4] By the time of overt symptoms, patients with carcinoid syndrome usually have liver metastases and pronounced elevations in urinary 5-hydroxyindoleacetic acid (5-HIAA), and the diagnosis is straightforward. We describe the diagnostic challenge of a patient with flushing who had initially normal to minimally elevated urinary 5-HIAA levels and a small pulmonary nodule and later was shown to have an occult metastatic carcinoid tumor of apparent retroperitoneal origin. His dramatic response to the long-acting somatostatin analogue, compound SMS-201-995 (octreotide [Sandostatin, Sandoz Research Institute, East Hanover, NJ]), with relief of subsequent intractable abdominal pain is also reported.

Report of a Case

The patient, a 58-year-old man, had mild facial flushing and intermittently loose stools in April 1985. That fall, his internist measured 24-hour urinary 5-HIAA concentrations on three occasions, with values of 40, 43, and 60 μmol per day (normal 10 to 52), and abdominal computed tomography

(Jackson JA, Shipman HD: Occult retroperitoneal carcinoid tumor with flushing and solitary lung metastasis. West J Med 1989 Oct; 151:461-463)

From the Department of Medicine, Division of Endocrinology, Scott and White Clinic, Scott and White Memorial Hospital, Scott, Sherwood and Brindley Foundation, Texas A&M University College of Medicine, Temple. Dr Shipman is currently with the McGregor Medical Association, Houston.

Reprint requests to Jeffrey A. Jackson, MD, Division of Endocrinology, Department of Medicine, Scott and White Clinic, 2401 S 31st St, Temple, TX 76508.