

CASE G—EVALUATION OF HIGH URINE OUTPUT

A 36 year old man with a history of alcohol abuse was admitted for evaluation of seizures. On the evening following admission, he fell, hitting his head. While the wound was being sutured, he became less responsive and lapsed into a coma. He was taken to the operating room for treatment, but did not regain consciousness as of when these results were observed late in the evening after surgery. His urine output had averaged 800 cc per hour in the three hours after surgery. What is the significance of the urine osmolality in this case? What is the most likely diagnosis? Assuming your diagnosis is correct, how would you use urine osmolality to monitor treatment in this patient?

SPECIMEN	Na	K	Cl	CO ₂	BUN	Creatinine	Glucose	Osmolality
Admission	137	4.2	103	25	15		94	
Next a.m.	155	4.3	116	26	17	1.1	95	
Next p.m.	172	4.6	132	27	19	1.2	112	353
Urine	32	9.0	15					105

As discussed in case F, increased urine output with a decreased urine osmolality is caused by one of only two disorders. In this case, psychogenic polydipsia can easily be eliminated from the list of possibilities, since this patient was comatose. Excess fluid administration during surgery could be raised as a possibility, but would not explain the increase in serum sodium and osmolality. The results in this case are virtually diagnostic for diabetes insipidus.

The history of head trauma is typical; about 30% of cases follow accidental brain injury. Therapy with ADH was begun, and frequent (every 2 hour) measurements of urine osmolality were used to both decide on an initial dosage of the drug and to monitor continued treatment of the patient, with the goal to keep the urine osmolality over 300 (as long as fluid was being administered to the patient) and to keep urine volume to less than 60 cc/hr. While diabetes insipidus due to trauma often resolves, in this patient it continued until the patient died about one month following this accident.

In a patient in whom the diagnosis is not as obvious as in this case, a water deprivation test is often performed. This can be dangerous, and careful monitoring of the patient to avoid severe dehydration is needed. Specimens for urine osmolality (or, in this case, specific gravity is often used) are obtained hourly. The test is discontinued if the urine osmolality rises above 500 or if the patient loses more than 3% of body weight without a rise in urine osmolality.

Some recognize a "partial diabetes insipidus" in which osmolality rises to 500 but not to maximal concentration. Since, as mentioned in the text, maximal concentrating ability can be affected by age and other renal disease, this may be difficult to diagnose. If failure of urine osmolality to rise is the cause for finishing the test, ADH may be administered to see if the kidneys can then respond. As mentioned in the discussion for case F, however, response to ADH may be difficult to interpret if the disorder has been present for a relatively long period of time.

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