

A Case of Diabetes Insipidus

by

David F. Dean

Department of Biology
Spring Hill College

Case Presentation

Amanda Richards is a 20-year-old junior in college. She is majoring in biology and hopes someday to be a pediatrician. Beginning about a month ago, Amanda noticed that she was waking up once, sometimes twice a night, by the need to go to the bathroom. More recently, she has noticed that she needs to go to the bathroom during her school day much more frequently than before, sometimes as often as once every hour.

At first Amanda thought that her increased frequency of urination was due to the coffee she drank, but when she reduced her coffee consumption to one cup in the morning, she still needed to go to the bathroom just as often. In addition, Amanda was buying bottled water by the case, and she found herself never without a beverage in her hand or nearby. She also noticed that her urine seemed pale and colorless.

When Amanda told her mother of her problem, her mother became very concerned and arranged for Amanda to see the family physician. Her physician found no abnormalities on physical examination. However, a blood chemistry profile revealed Amanda's plasma sodium level to be 149 mEq/L, plasma osmolarity was 308 mOsm/L, and her fasting plasma glucose was 85 mg/dl. An analysis of Amanda's urine showed a urine osmolarity of 200 mOsm/L. The urine sample was negative for the presence of glucose.

An extensive history revealed that no other member of the family had ever displayed Amanda's symptoms. Amanda had no history of traumatic head injury and an MRI of her brain was normal.

Next, a two-hour water deprivation test was performed on Amanda. After two hours of not being able to drink water, the osmolarity of her plasma and urine were measured a second time. This time her urine osmolarity was unchanged; however, the osmolarity of her plasma increased to 315 mOsm/L. She was then injected with a drug called DDAVP. One hour after the injection, the osmolarity of her plasma decreased to 290 mOsm/L and the osmolarity of her urine increased to 425 mOsm/L.

Based upon the results above, Amanda's medical history, and the results of the MRI, a diagnosis of idiopathic pituitary diabetes insipidus was made.



Questions

1. Describe the mechanism by which normal fluid regulation in the body occurs.
2. What is considered to be excessive thirst and urination in an adult?
3. List and briefly describe the four types of diabetes insipidus.
4. How is pituitary diabetes insipidus diagnosed?
5. In what ways is diabetes insipidus similar to diabetes mellitus? In what ways do they differ?
6. How does the mechanism by which diuresis occurs with diabetes insipidus differ from that which occurs in diabetes mellitus?
7. How does diabetes insipidus compare with a condition called syndrome of inappropriate anti-diuretic hormone (SIADH)?
8. What other conditions result in polyuria and polydipsia (PU/PD)?
9. What is DDAVP and how is it administered?
10. Why should a person who has pituitary diabetes insipidus and does not feel unreasonably inconvenienced by the symptoms take treatment?
11. Why is ADH also known as *vasopressin*?

Image Credit: Detail of *The Sick Girl* by Edvard Munch, 1894, etching, Berliner Kupferstichkabinett.

Copyright © 2004 by the **National Center for Case Study Teaching in Science**.

Originally published 10/29/04 at <http://www.sciencecases.org/seasonal/seasonal.asp>

Please see our **usage guidelines**, which outline our policy concerning permissible reproduction of this work.