Introduction
Diabetes Insipidus is characterized by polyuria, defined as urine output exceeding 3 L/day in adults and 2 L/m2 in children. There are three major causes of polyuria:
1. Primary polydipsia (also called psychogenic polydipsia): characterized by a primary increase in water intake.
2. Central DI (also called neurogenic DI): associated with deficient secretion of antidiuretic hormone (ADH).
   - Most often idiopathic (possibly due to autoimmune injury to the ADH-producing cells)
   - Can be induced by trauma, pituitary surgery, or hypoxic or ischemic encephalopathy.
3. Nephrogenic DI: characterized by normal ADH secretion but varying degrees of renal resistance to its water-retaining effect.

Case Presentation and Anesthetic Management
The case involved a 14 year old girl with history of Neurofibromatosis Type 1 and seizure disorder who was undergoing, under general anesthesia, endoscopic resection of left thalamic pilocytic astrocytoma that had resulted in development of hydrocephalus.

Brain MRI showing left Thalamic Pilocytic Astrocytoma

She was induced with versed, fentanyl and propofol; and was maintained with sevoflurane. During surgery she was noted to have very high urine output; in excess of administered fluids. She had not received corticosteroids (which can cause hyperglycemia and glucosuria) or mannitol; both of which cause osmotic diuresis and are commonly used during neurosurgery to reduce cerebral edema.

Central Diabetes Insipidus (DI) was suspected and was confirmed with findings of elevated serum sodium at 161 mmol/L (140 preop) along with low urine osmolality (161 mOsm/kg) in the face of rising serum osmolality (310 mOsm/kg). Urine specific gravity was also low at 1.003.
Desmopressin was given intravenously during the surgery and resulted in a decrease in polyuria along with lowering of her serum sodium and serum osmolality and subsequent rise in urine osmolality.

Discussion
Central Diabetes Insipidus is common during and after neurosurgery and is caused by decreased release of antidiuretic hormone (ADH) because of damage to the Hypothalamic-Pituitary axis. Most cases are not permanent and only require brief course of desmopressin. Usual dose of desmopressin is 2-4 mcg/day when used iv or sc; or more commonly 10-40 mcg/day when used as an intranasal spray.

Learning Objectives
1. Define causes and risk factors for DI.
2. Intraoperative management of DI.
3. Describe clinical features and tests for definitive diagnosis of DI.

References