Nephrogenic Diabetes Insipidus Diagnosis and Management

Nephrogenic diabetes insipidus is diagnosed by the presence of hypernatremia, normal or increased plasma osmolality, and decreased urine osmolality. Tests that can be used to differentiate it from other disorders include the water deprivation test and DDAVP test. Treatments include stopping triggers, thiazide diuretics, amiloride, and indomethacin.



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Diagnosis

Hypernatremia

Hiker-salt-shaker

Hypernatremia can result from nephrogenic diabetes insipidus and is defined as a sodium level greater than 145 mmol/L. It is an effect of free water loss from polyuria.

Normal or Increased Plasma Osmolality

Normal-sign Up-arrow Plasma-TV Ozzy

Normal or increased plasma osmolality (?300 mOsm/Kg) can be seen in patients with diabetes insipidus, either central or nephrogenic. This will differentiate it from primary polydipsia, which presents with normal or low plasma osmolality (?280 mOsm/Kg).

Decreased Urine Osmolality

Down-arrow Urinal Ozzy

Decreased urine osmolality is seen in this disorder. It is also seen in central diabetes insipidus (DI). Patients present with a urine osmolality < 300 mOsmol/kg in Complete DI and 300–500 mOsmol/kg in Partial DI. It occurs due to the inability to concentrate urine in the nephron.

Water Deprivation Test

Water-bottle Restricted-belt Test-tubes

A water deprivation test (restriction) will cause no change or a slight increase in urine osmolality in patients with diabetes insipidus, both central and nephrogenic. This will distinguish diabetes insipidus from primary polydipsia, which presents with a significant rise in urine osmolality, (>700 mOsm/kg).

Desmopressin Test

Designated Driver Vase-present Test-tube

When desmopressin is administered to patients with nephrogenic diabetes insipidus (DI), urine osmolality may slightly increase or remain unchanged from baseline. This is different from central DI, in which desmopressin causes an increase of >50%. Desmopressin is helpful to differentiate between nephrogenic and central DI.

Management

Stop Triggers

Stop-sign Trigger

The first step in managing nephrogenic diabetes insipidus is to stop triggers. These include drugs such as lithium and electrolyte imbalances (e.g., hypokalemia and hypercalcemia).

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Thiazide Diuretics

Tarzan Die-Rocket

Thiazide diuretics are used to trigger hypovolemia. This will induce aldosterone secretion from the renin-angiotensin-aldosterone system, promoting the water and sodium reabsorption. As a result, less water will be delivered to the collecting duct where ADH should act.

Amiloride

Amelia-rider

Amiloride may be used to treat lithium-induced nephrogenic diabetes insipidus. It acts by blocking epithelial sodium channels (ENaCs) in the nephron.

Indomethacin

Indigo-moth-man

Indomethacin is an NSAID that inhibits prostaglandin synthesis. As prostaglandins antagonize ADH, a decrease in prostaglandins will increase ADH.

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