



Diabetes Insipidus

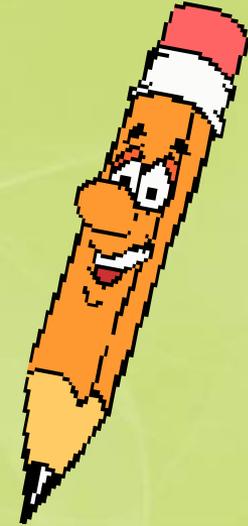
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Outline

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- ❖ **Pathophysiology**
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Definition of Diabetes Insipidus

- **It is a disease result of hyposecretion of antidiuretic hormone (ADH) or vasopressin which produce state of uncontrolled diuresis.**
- **It is posterior pituitary hypofunction.**

DIABETES INSIPIDUS

History of →



Head Injury

or



Pituitary Tumor

or



Craniotomy

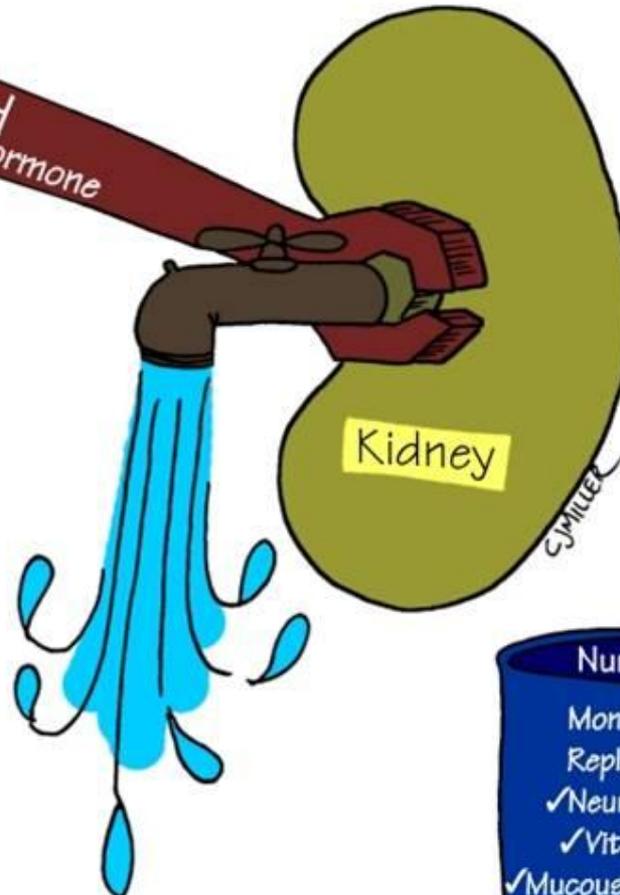


Pituitary Gland

ADH
Anti-Diuretic Hormone

Rx:

Vasopressin
DDAVP



Kidney



S&S

Up to 20L Urine/Day
↓ Specific Gravity
↓ Osmolarity
Hypovolemia
↑ Thirst
Tachycardia
↓ BP



Nursing Care

Monitor Fluids
Replace Fluids
✓ Neuro Status
✓ Vital Signs
✓ Mucous Membranes



Classification

Central diabetes insipidus.

Nephrogenic diabetes insipidus.

Gestational diabetes insipidus.

**Dipsogenic diabetes insipidus or
psychogenic polydipsia**

Etiology

Central diabetes insipidus

The cause of central diabetes insipidus in adults most commonly due to surgery, a tumor, an illness (such as meningitis), inflammation or a head injury.

For children, the cause is often an inherited genetic disorder. In some cases the cause is unknown. This damage disrupts the normal production, storage and release of ADH.

Etiology

Nephrogenic diabetes insipidus.

✿ Nephrogenic diabetes insipidus occurs when there's a defect in the kidney tubules — the structures in the kidneys that cause water to be excreted or reabsorbed. This defect makes the kidneys unable to properly respond to ADH. The defect may be due to an inherited (genetic) disorder or a chronic kidney disorder. Certain drugs, such as lithium and demeclocycline (a tetracycline antibiotic), also can cause nephrogenic diabetes insipidus.

Etiology

Gestational diabetes insipidus

✱ Gestational diabetes insipidus occurs only during pregnancy and when an enzyme made by the placenta which destroys ADH in the mother.

Etiology

Primary polydipsia or Dipsogenic diabetes insipidus or psychogenic polydipsia

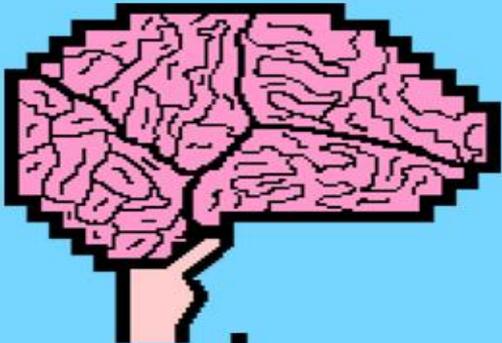
- ✿ Primary polydipsia can be the result of abnormal thirst caused by damage to the thirst-regulating mechanism, situated in the hypothalamus. Primary polydipsia can also be caused by mental illness.

Or Etiology

- ✿ Primary cause is idiopathic(45% -50%) .
- ✿ Secondary cause includes:
 - Trauma
 - Tumors
 - Infections as meningitis or encephalitis.
 - Clinical Surgery
 - Radiation

Pathophysiology:

The renal tubular collecting ducts are unable to concentrate urine secondary to vasopressin deficiency. The collecting duct concentrates urine by reabsorbing water, a function controlled by the posterior pituitary gland via secretion of vasopressin or antidiuretic hormone (ADH).



1 Hypothalamus
 Vasopressin is produced in the hypothalamus

2 Vasopressin (ADH)



Posterior Pituitary
 Vasopressin is then released by the posterior pituitary

3 Vasopressin (ADH)



Kidneys
 Vasopressin binds to receptors on kidneys allowing increased water reabsorption from urine

5 Increased Urine Osmolality (decreased urine volume)

6 Decreased Serum Osmolality (increased serum volume)

7 Decreased serum osmolality is detected by hypothalamus & ADH production is reduced



Risk factors

- ✿ Nephrogenic diabetes insipidus that's present at or shortly after birth usually has a genetic cause that permanently alters the kidneys' ability to concentrate the urine.
- ✿ Nephrogenic diabetes insipidus usually affects males, though women can pass the gene on to their children.

Complication

- **Dehydration** can cause:
 - Dry mouth
 - Muscle weakness
 - Low blood pressure (hypotension)
 - Elevated blood sodium (hypernatremia)
 - Sunken appearance to your eyes
 - Fever
 - Headache
 - Rapid heart rate
 - Weight loss
- **Electrolyte imbalance** can cause symptoms, such as:
 - Fatigue or lethargy
 - Irritability
 - Nausea
 - Loss of appetite
 - Muscle pains

Clinical manifestation

Polyuria

Dehydration

Enuresis

Hyperthermia

Polydipsia

Conti..Clinical manifestation

Azotemia : High levels of nitrogen-containing compounds (such as urea, creatinine, various body waste compounds, and other nitrogen-rich compounds) in the blood

Conti..Clinical manifestation

Urine specific gravity < 1.006

Weight gain

Serum Na⁺ and Cl⁻ low

Conti..Clinical manifestation

**Young infants :Server dehydration ,
Circulatory collapse, high fever.**

**Growth retardation ,Sexual maturation delayed ,
Central nervous system damage (mental
retardation).**

Diagnostic evaluation



- **Water deprivation test** : it is restriction of oral fluids and observation of consequent changes in urine volume and concentration ,in DI fluid restriction has little or no effect on urine formation but cause weight loss from dehydration.

Conti..Diagnostic evaluation



- **Urinalysis.** If the urine is less concentrated — meaning the amount of water is high relative to other excreted substances

Conti..Diagnostic evaluation



Magnetic resonance imaging (MRI)

To look for abnormalities in or near the
pituitary gland

Medical management



Daily hormone replacement of vasopressin.



Ensure adequate fluid replacement



Identify and correct the underlying pathology

Conti..Medical management



Desmopressin administration

It act on the distal tubules and collecting ducts of the kidney to increase water reabsorption as long acting analog of anti-diuretic hormone (ADH)

There are several formulation available :

- Intranasal solution**
- Intranasal spray**
- Parenteral (IM) rarely**
- Oral**

Conti...Medical management



Daily serum electrolytes and osmolality and daily urine osmolality are required until stable



Ensure most recent serum Na result is above 145 mmol/L prior to administration of desmopressin.



Patient weight daily .

Conti...Medical management



All urine specific gravity checked and documented .



Strict fluid balance chart with out put totaled 6 hrs .

Nursing consideration



Explain to the parent the difference between diabetes insipidus and diabetes mellitus.



Teach the parent and child correct procedure for preparation and administration of the drug.



The children should wear medical alert identification .

Conti...Nursing consideration



Advise the children to carry nasal vasopressin spray for temporary relief symptoms. Give a diet low in solutes.



Closely monitor urine output.



Educate patient and parent about replacing fluids and the conditions that increase fluid needs.

Conti...Nursing consideration



The patient should also avoid coffee, tea, or other caffeinated substances..



Inform the parent about follow up care and emergency measures.



Instruct the patients about how administer the medication

Conti...Nursing consideration



Vasopressin should be caution if Patient with coronary artery disease because the medicine causes vasoconstriction



Inform the parent about follow up care and emergency measures.



Instruct the patients about how administer the medication

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Thank You