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Dehydration

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Qualifying Diagnosis

THIS

+ TWO or more of THESE

Any acute change in
condition

- * Reduced urine output in 24 hours or reduced oral intake by approximately 25% or more of average intake for 3 consecutive days
- * New onset of Systolic BP < 100 mm Hg (Lying, sitting or standing)
- * 20% increase in Blood Urea nitrogen (e.g. from 20 to 24) OR 20% increase in Serum Creatinine (e.g. from 1.0 to 1.2)
- * Sodium > 145 or < 135
- * Orthostatic drop in systolic BP of 20 mmHg or more going from supine to sitting or standing

Definition

- Loss of total body water with or without salt at a greater rate than the body can replace
- Intravascular volume depletion = net loss of total body sodium and reduction intravascular volume
- Leads to hypotension, compensatory tachycardia, decreased tissue perfusion, shock
- Complications: fall, functional decline, delirium, orthostasis

Dehydration

Loss of Water & Sodium

Blood loss
Net Na⁺ loss
Or both

Renal Regulation

Na⁺ crucial; retention
of H₂O has marginal
effect on intravascular volume

Tachycardia,
Hypotension,
Dry axilla

Hypotonic <280
Hyponatremia <135

Replace with
Isotonic saline until
intravascular replete

Loss of Water

Inability to access
Impaired thirst

Thirst and urine conservation

Normal pulse,
Normal or low BP, no edema
Dry axilla;
Measure glucose

Hypertonic >290
Hypernatremia >145

Replace with
Isotonic saline until intravascular
replete; then 5% dextrose

Risk Factors for Dehydration

| | | |
|------------------------------|---|---|
| Altered Thirst | <ul style="list-style-type: none">• Focal CNS lesions• Hypodipsia of Aging• Medications | |
| Decreased Cognitive Function | <ul style="list-style-type: none">• Delirium• Dementia• Depression | <ul style="list-style-type: none">• Sedation• Psychosis• Paranoia |
| Increased Fluid Losses | <ul style="list-style-type: none">• Diarrhea• Fever• Vomiting | <ul style="list-style-type: none">• Diuretics• Specialty Air-flow mattresses |
| Limitations in Oral Intake | <ul style="list-style-type: none">• Dysphagia• Fear of urinary incontinence• Inadequate tube feeding volume | <ul style="list-style-type: none">• Limited mobility• Modified fluid consistency• Need for feeding assistance |

Medications that Increase Risk

| Medication | Mechanism of Action |
|---------------|---|
| ACE-I, ARB | Prevent activation of pathway for compensatory sodium retention |
| Caffeine | Direct diuresis |
| Diuretics | Direct diuresis |
| Laxative | Direct water loss |
| Lithium | Direct diuresis |
| Theophylline | Direct diuresis |
| TCA, SSRI | Hyponatremia, SIADH |
| Vit D/Calcium | Hypercalcemia |

Signs & Symptoms of Dehydration

- Change in ADLs
- Change in mental status
- Constipation
- Decreased urine output
- Dizziness
- Postural hypotension
- Tachycardia
- Weakness
- Wt. loss (3-5# in short time)

Physical Exam – helpful measures

- No criteria are diagnostic
- Severe postural dizziness (unable to sit up)
- Postural pulse difference of 30+
- Dry axilla supports but doesn't prove
- Presence of signs and symptoms alone not sufficient for diagnosis; absence of signs & symptoms doesn't rule out dehydration

Physical Exam – nondiagnostic criteria

- Orthostasis has many causes such as autonomic dysfunction & is very common in elderly thus limited diagnostic utility
- Dry mucus membranes – mouth breathing, anticholinergic meds
- Capillary refill and skin turgor
- Sunken eyes (62% sensitivity)

Assessment – nondiagnostic criteria

- Urine color – no correlation between plasma osmolality or urine specific gravity
- Intake and output difficult to measure
- Weight fluctuation due to diseases and medications is common

Lab monitoring

- Gold standard for diagnosing dehydration and monitoring hydration
- Minimum: BUN, Cr, CO₂, Na, K, Ca, Gluc
- BUN: Cr ratio less useful as high prevalence of renal disease

Treatment

- Water can be replaced PO, enterally, IV, SQ
- Management depends on patient goals, facility capabilities, availability of experienced staff to administer treatment & monitor

Oral Rehydration

- Ice chips
- Popsicles
- Sorbet
- Water
- Clear juices
- Broth

Intravenous

- 1-2 L of NS until SBP >100 then D5 ½ NS

Hypodermoclysis - advantages

- Avoid hospitalization
- Ease of use
- Less risk of infection, phlebitis, etc.
- Lower risk of fluid overload (than IV)
- No need for IV certified nurse

Hypodermoclysis - disadvantages

- Limited volume can be administered
- 1ml/min or 60ml/hr. maximum
- 1500ml/site or 3000ml/day maximum
- Pain or edema at injection site

Hypodermoclysis - guidelines

- Use isotonic or hypotonic solution
- Change site after 1500ml of fluid
- Anterior lateral thigh is preferred site
- Other sites: anterior medial thigh, abdomen, subclavicular thorax, subscapular area back
- Hyaluronidase can increase absorption

Hypodermoclysis - contraindications

- Existing or imminent shock or hypotension
- Severe dehydration requiring hospitalization
- Severe HF, acute MI, generalized edema, skin infection or allergic skin diseases at injection site
- Need administration of parenteral medication

Treating comorbid conditions

- Treat underlying infections
- Reduce or hold diuretics, ACE-I, ARB
- Stop or reduce antibiotics causing diarrhea
- Remove salt and fluid restrictions
- Review altered consistency diets

Monitoring rehydration

- Mental and physical function, vital signs, alertness
- Monitor for over hydration – edema, rapid wt. gain, SOB, crackles
- Lab tests – look for trends rather than absolute numbers

Cautions

- Excess free water replacement can cause water intoxication and brain damage
- Overly rapid rehydration can cause heart failure

Strategies to Prevent Dehydration

- Increase awareness of contributing factors: fever, hot weather, diarrhea, vomiting
- Identify acute illness early
- Offer fluids regularly, provide preferred beverages
- Promptly report decreased fluid intake
- Hydration cart
- Manage urinary incontinence
- Use swallowing exercises & cues before thickened liquids

SIADH diagnostic criteria

- No diuretics
- No signs volume depletion, edema
- Normal thyroid and adrenal function
- Plasma osmolality < 275 mOsm/kg
- Urine osmolality > 100 mOsm/kg
- Urine sodium > 40 mg/dL

SIADH supplemental criteria

- BUN less than 10
- Correction of hyponatremia with fluid restriction
- Elevated AVP (arginine vasopressin) levels
- Failure to correct with 0.9% saline
- Fractional excretion of Na⁺ greater than 1%
- Uric acid <4

References

- AMDA – Clinical Practice Guideline: Dehydration and Fluid Maintenance in the Long-Term Care Setting