

ENDOCRINE SYSTEM

**Caring for Clients with
Disorders of the Pituitary and Adrenal Glands
NUR 142**

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HYPOTHALAMUS & PITUITARY GLAND

- ⊙ Hypothalamus

- TRH = Thyroid Releasing Hormone
- CRH = Corticotropic Releasing Hormone
- GHRF = Growth Hormone Releasing Factor

- ⊙ Hypothalamus is the control center for CNS and endocrine system activities

PITUITARY GLAND

⊙ Posterior Pituitary

- Vasopressin/ADH
- Oxytocin

⊙ Anterior Pituitary

- Follicle-stimulating hormone = FSH
- Luteinizing Hormone = LH
- Interstitial cell stimulating hormone = ICSH
- Prolactin – milk production
- Adrenocorticotrophic Hormone = ACTH
- Thyroid stimulating hormone = TSH
- Growth Hormone – somatotropin
- Melanocyte stimulating hormone - pigment

HORMONE ACTION

Hormone Excess

- Failure of negative feedback, ectopic site production, failure of inactivation or excretion, or may be iatrogenic
- TX: total or partial gland removal, drugs to suppress production or suppress tropic release, antagonist

Hormone Target Cell Receptor Resistance

- Receptor defect, auto-antibody-body injury or destruction, heredity, absent target cells
- TX: enhancing hormone receptor interaction

HYPERPITUITARISM

DISORDER OF THE ANTERIOR PITUITARY

- Secretion of too much GH
- Condition is gigantism if occurs in children prior to closure of epiphyses in bones
 - Gigantism usually caused by tumor of pituitary or malfunction of hypothalamus
 - Client will reach a height of 7 feet or more without treatment

HYPERPITUITARISM:

Signs and Symptoms

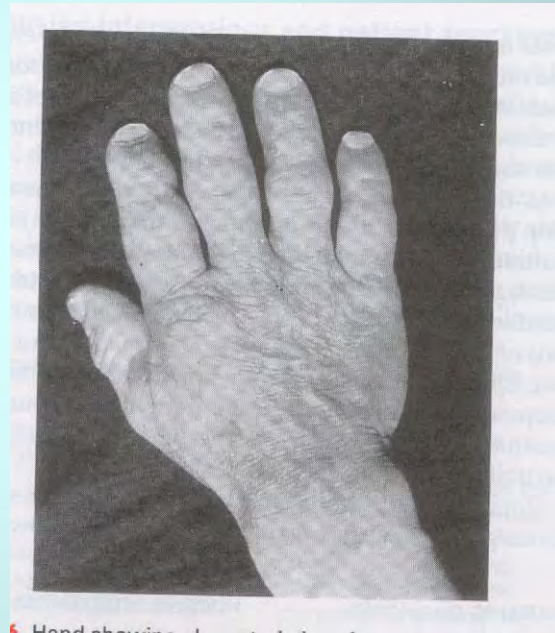
⊙ Children: Gigantism

- Accelerated skeletal growth causes pain, headache, and muscle weakness
- Cardiomegaly (enlarged heart)
- Hepatomegaly (enlarged liver)

⊙ Adulthood

- Condition is called *acromegaly*
- Usually caused by benign tumor or hypothalamic malfunction
- Height does not change, as the epiphyses have closed
- Long bones widen, and feet and hands enlarge

THE PROGRESSION OF ACROMEGALY



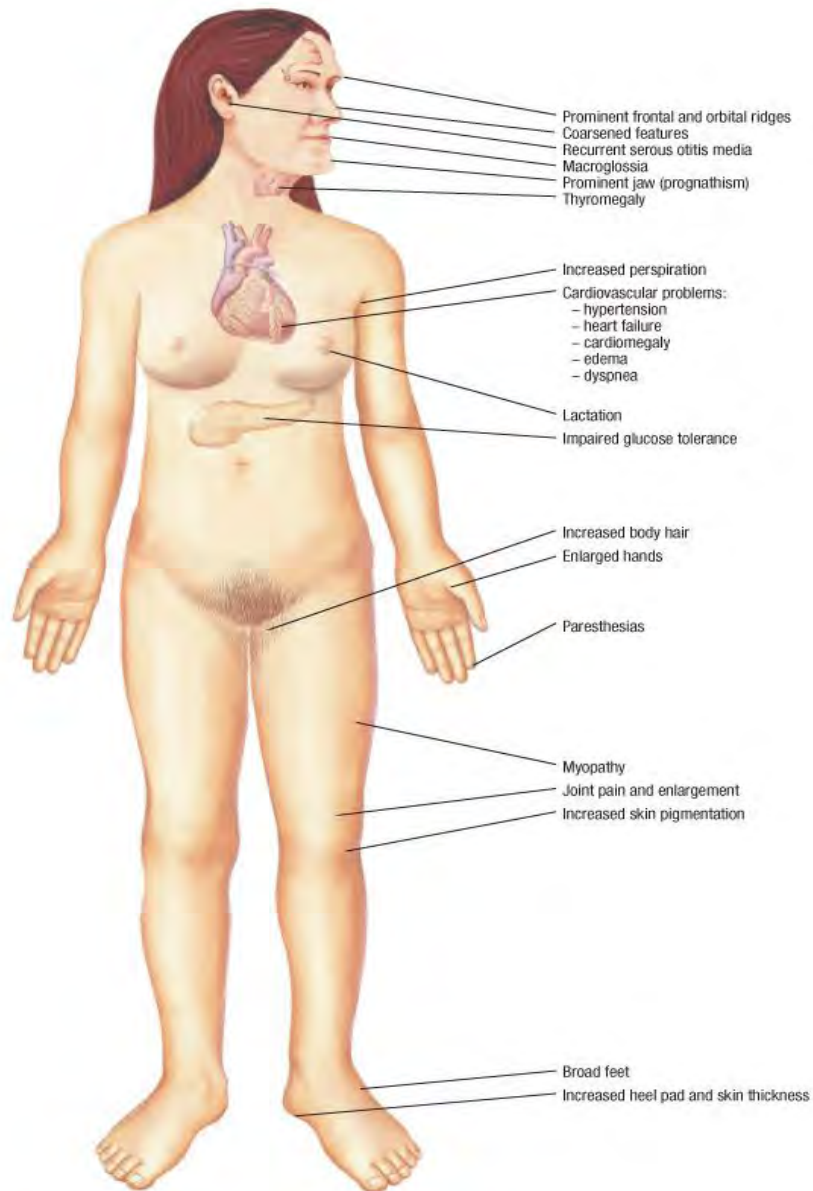


Acromegaly results from the over-production of growth hormone after the epiphyseal cartilages have fused. Bone shapes change, and cartilaginous areas of the skeleton enlarge. Notice the broad facial features and the enlarged lower jaw.

CLINICAL MANIFESTATIONS

- Face changes to a coarse appearance with a bulbous nose, thickened lips, protruding forehead and jaw
- Enlarged internal organs
- Muscle weakness and symptoms of arthritis
- Difficulty chewing and swallowing
- Male impotence or amenorrhea
- Visual disturbances and headaches possibly occurring if a tumor is present
- Diabetes is a secondary condition that may result from hyperpituitarism due to GH increasing blood glucose levels

EFFECTS OF GROWTH HORMONE EXCESS



LABORATORY AND DIAGNOSTIC TESTS

⊙ Laboratory Tests:

- Growth Hormone
- Plasma ACTH
- Serum TSH
- Serum LH

⊙ Diagnostic Tests:

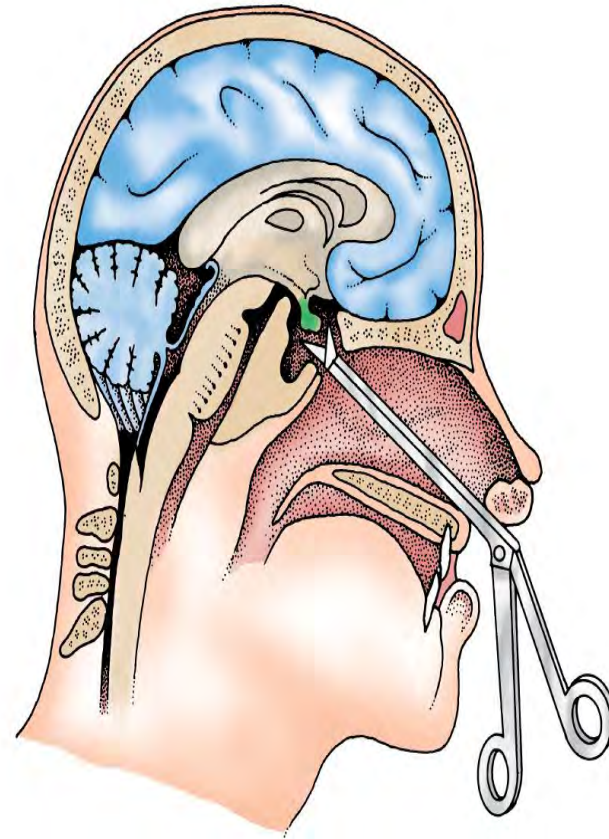
- Wrist and Hand X-Ray
- X-Ray Study of Stella Turcica
- CT of the Pituitary Gland
- MRI of the Pituitary Gland

TREATMENT OF HYPERPITUITARISM

- ◎ Drug therapy
 - Dopamine agonists – Parlodel, Sandostatin
- ◎ Surgical Management
 - Hypophysectomy

HYPOPHYSECTOMY

- ◉ Description: The removal of the pituitary gland
- ◉ Complications include:
- ◉ Increased intracranial pressure
- ◉ Bleeding
- ◉ Meningitis
- ◉ Pre and Post op Care



POST-OP TREATMENT

- Initiative postoperative care similar to craniotomy care
- Monitor vital signs
- Monitor level of consciousness and neurological status
- Monitor for increased ICP
- Monitor for bleeding
- Elevate the head of the bed
- Monitor for adrenal insufficiency
- Administer corticosteroids as prescribed on time
- Monitor fluids and electrolyte values
- Monitor for temporary diabetes insipidus due to Antidiuretic hormone (ADH) disturbances
- Avoid water intoxication
- Instruct the client to avoid sneezing, coughing, and blowing the nose
- No brushing teeth for two weeks

HYPERPITUITARY-ACROMEGALY

* Diagnosis - ↑ Serum Somatotropin (growth hormone)
X-Rays, MRI
Physical Exam
Oral glucose challenge test - level does not ↓

* Complications - ↑ ICP & Enlarged Tumor
↑ Blood Sugar



* Clinical Manifestations -

- Enlarged Pituitary Gland
- Headache
- Visual Disturbances
- Slanting Forehead
- Coarse Facial Features
- Protruding Jaw
- ↑ BP, CHF
- Menstrual Changes
- Sleep Apnea
- Hypertrophy of Soft Tissue
Such as Tongue, Skin and
Visceral Organs
- Enlargement Of Small
Bones In The Hands And Feet



PITUITARY DWARFISM

⦿ Dwarfism

- If not enough GH secreted, condition is called dwarfism
- Child's growth stunted
- Sexual development may be delayed
- Most often caused by a pituitary gland tumor or hypopituitarism

⦿ Diagnosis and Treatment of Dwarfism

- Serum GH levels, x-rays, and scans to detect tumor
- GH stimulation test to assess response to induced hypoglycemia
- Possible surgery to remove any tumor found
- GH injections for hypopituitarism

GROWTH HORMONE

- ⦿ Secreted by the anterior pituitary
- ⦿ Regulates growth of individual
- ⦿ Used before closure of the child's bone epiphyses
- ⦿ Adverse reactions: Hypothyroidism, insulin resistance, swelling, joint pain, muscle pain
- ⦿ Used cautiously in patients with thyroid disease and diabetes; during pregnancy

POSTERIOR PITUITARY GLAND DISORDERS

- ⦿ Too much or too little ADH
- ⦿ Too little ADH: diabetes insipidus
- ⦿ Too much ADH: SIADH

DIABETES INSIPIDUS (DI)

- Posterior pituitary does not secrete enough ADH.
- Without enough ADH, the kidneys do not reabsorb enough water, resulting in large amounts of dilute urine output.
- May be caused by:
 - Tumor in pituitary gland
 - Intake of glucocorticoid medications
 - Intake of alcohol
 - Head trauma, which can be reversed with treatment

KEY FEATURES OF DIABETES INSIPIDUS

- ⊙ Postural Hypotension
- ⊙ Decreased pulse pressure
- ⊙ Tachycardia
- ⊙ Weak Peripheral pulses
- ⊙ Hemoconcentration
 - HGB, HCT
- ⊙ Urine output ↑
- ⊙ Increased thirst
- ⊙ Dehydration
 - Irritability*
 - Hyperthermia*
 - Lethargy to coma*
 - Ataxia*
 - Decreased cognition*
 - Poor skin turgor

DIAGNOSIS OF DI

- If not treated, hypovolemic shock may ensue and result in death
- Diagnosis based on symptoms and on serum osmolarity levels
- Urine specific gravity levels of less than 1.005 are an indication
- Scans done to diagnose a pituitary gland tumor

LABORATORY VALUES FOR PATIENTS WITH DIABETES INSIPIDUS

Value	Normal	Diabetes insipidus (DI)
Serum ADH	1 to 5 pg/ml	Decreased in central DI, may be normal with nephrogenic or psychogenic DI
Serum osmolality	285 to 300 mOsm/kg	>300 mOsm/kg
Serum sodium	135 to 145 mEq/L	>145 mEq/L
Urine osmolality	300 to 1400 mOsm/kg	<300 mOsm/kg
Urine specific gravity	1.005 to 1.030	<1.005
Urine output	1 to 1.5 L/24 hr	30 - 40 L/24 hours
Fluid intake	1 to 1.5L/24 hr	>50 L/24 hours

TREATMENT OF DI

- Replacement of ADH is treatment of choice
 - Aqueous vasopressin (Pitressin), a synthetic form
 - Desmopressin (DDAVP)
- Sodium restricted
- Electrolytes and fluids replaced by IV 0.45 percent sodium chloride
- If pituitary partially secreting ADH, chlorpropamide (Diabenese) often used to stimulate ADH production

TREATMENT

- ⦿ Monitor electrolyte values
- ⦿ Vasopressin tannate (Pitressin Tannate) or DDAVP (Desmopressin Acetate) as prescribed
- ⦿ Monitor I&O, weights, specific gravity of urine
- ⦿ Instruct the client to avoid foods or liquids with a diuretic-type action
- ⦿ Maintain the intake of adequate fluids
- ⦿ Instruct the client in the administration of medications as prescribed

POSTERIOR PITUITARY HORMONES

VASOPRESSIN

- ⦿ Regulate reabsorption of water by the kidneys
- ⦿ Secreted by pituitary when body fluids must be conserved
- ⦿ Used in treating diabetes insipidus
- ⦿ Adverse reactions: Tremor, sweating, vertigo, nasal congestion, nausea, abdominal cramping, water intoxication

NURSING PROCESS: ASSESSMENT

⊙ Preadministration assessment

- Take blood pressure, pulse and respiratory rate; auscultate the abdomen; record the findings

⊙ Ongoing assessment

- Observe patient for signs of an excessive dosage after administration of the drug
- Reassure the patient that recovery will occur in few minutes

NURSING CARE OF CLIENTS WITH DI

- Observe for poor skin turgor, dry skin, and dry mucous membranes.
- Check vital signs frequently for decreasing blood pressure and increasing heart rate to prevent hypovolemic shock.
- Monitor urine specific gravity, urine and serum osmolarity, electrolytes, and level of consciousness.
- Keep physician informed of changes.
- Reinforce necessity of low-sodium diet to help decrease hypernatremia.

NURSING CARE OF CLIENTS WITH DI

- Encourage clients to verbalize and discuss feelings.
- Provide support and comfort measures.
- Assist the client and family to cope and understand the medication plan.
- Develop strategies to increase self esteem and a positive body image.
- Provide the client and family with information on support groups.
- Determine the client's level of understanding of the DI disease process and treatment, and provide teaching as needed to increase compliance.

SYNDROME OF INAPPROPRIATE ANTIDIURETIC HORMONE (SIADH)

- Occurs when posterior pituitary gland secretes too much ADH, which causes:
 - Too much water to be reabsorbed by kidneys into bloodstream, resulting in:
 - Fluid overload of bloodstream
 - Dilution of blood
 - Decreased osmolarity

CLINICAL MANIFESTATIONS

- ⊙ Changes in level of consciousness (LOC)
- ⊙ Mental status changes
- ⊙ Water retention
- ⊙ Weight gain
- ⊙ Hypertension
- ⊙ Signs of fluid volume overload
 - Tachycardia
 - Anorexia, nausea, vomiting
 - Hyponatremia
 - Headache
 - Hypothermia

SIADH

⊙ Diagnosis of SIADH

- Serum and urine levels of sodium are tested.
- Osmolarity concentrations are calculated.
- A water load test may be conducted and will show retention of water when SIADH is present.
- Client is checked for other possible sites of ADH secretion.

⊙ Treatment of SIADH

- Client must be on strict fluid restriction.
- Hypertonic saline fluids are ordered to counteract hyponatremia.
- Diuretics, such as Lasix, are ordered.

NURSING CARE OF CLIENTS WITH SIADH

- Auscultate lung sounds.
- Measure weight as ordered (gain and moist lung sounds can be due to fluid volume excess).
- Maintain any orders for fluid restriction.
- Monitor serum sodium and urine values, urine specific gravity, and osmolarity.
- Offer frequent oral care, ice chips, and hard candy.
- If client requires sodium, offer broth, soft drinks, and tomato juices.
- Be alert for diminishing level of consciousness or seizure activity and promote safety measures.

DIABETES INSIPIDUS

- ⊙ Increased urination
- ⊙ Increased thirst
- ⊙ Nocturia
- ⊙ Dehydration
- ⊙ Hypernatremia
- ⊙ ↓ Urine sp. Gravity
- ⊙ ↑ Serum osmolality
- ⊙ ↓ Urine osmolality

SIADH

- ⊙ Decreased urination
- ⊙ Hypertension
- ⊙ Weight gain
- ⊙ Fluid retention
- ⊙ Hyponatremia
- ⊙ ↑ Urine sp. Gravity
- ⊙ ↓ serum osmolality
- ⊙ ↑ Urine osmolality

NURSING CARE OF CLIENTS WITH PITUITARY DISORDERS: ASSESSMENT

- Admission assessment - thorough history to determine:
 - Excessive weight gain or loss
 - Fluid intake and output
 - Signs of pituitary tumor including headaches and visual disturbances
 - Measurement of children's height and weight compared to growth charts
 - Asking adult clients about menstrual irregularities or problems with impotence that may suggest hormonal imbalance

NURSING CARE OF CLIENTS WITH PITUITARY DISORDERS

⊙ Nursing Diagnoses

- Deficient (or Excess) Fluid Volume
- Risk for Disproportionate Growth
- Delayed Growth and Development
- Impaired Urinary Elimination
- Ineffective Coping

⊙ Desired Outcomes

- Will maintain fluid volume balance
- Will experience appropriate growth and development for age
- Urinary elimination will reach normal levels with medication

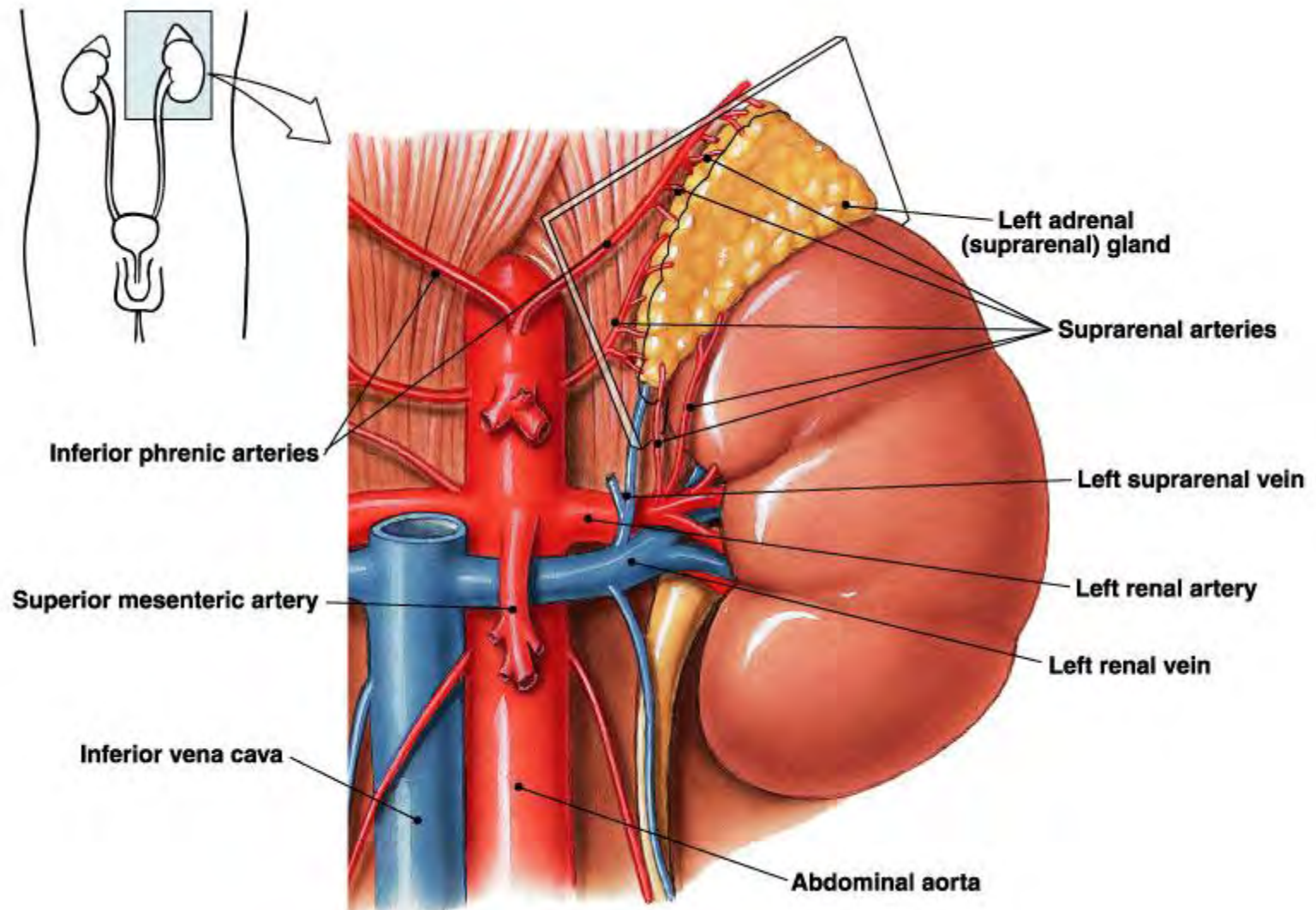
NURSING CARE OF CLIENTS WITH PITUITARY DISORDERS

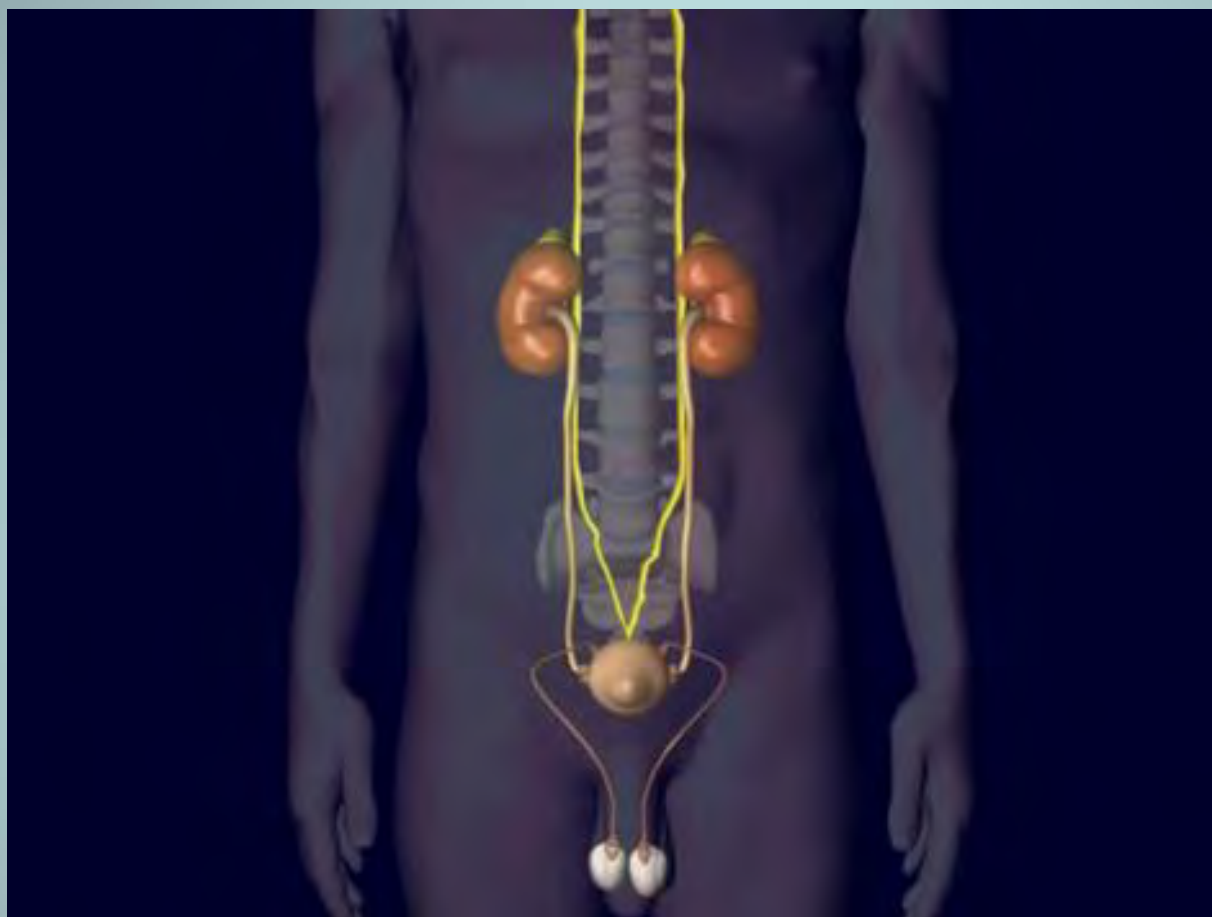
◎ General Interventions

- Measuring weight gain/loss daily for fluid volume deficit/excess
- Monitoring intake and output closely and documenting carefully
- Implementing safety measures for clients with visual disturbances, eating difficulties, and muscle weakness
- Monitoring blood glucose levels and checking for changes in neurologic status every 2 to 4 hours

ADRENAL GLAND

- ⊙ Rests upon each kidney
- ⊙ Regulates sodium and electrolyte balance
- ⊙ Affects carbohydrate, fat and protein metabolism
- ⊙ Influences the development of sexual characteristics
- ⊙ Sustains the flight or fight response
- ⊙ Two glands:
 - Cortex – outer glandular region in three layers
 - Medulla – inner neural tissue region





HORMONES OF THE ADRENAL MEDULLA

- ⊙ The inner core of the adrenal gland
- ⊙ Works as part of the sympathetic nervous system
- ⊙ Produces two similar hormones (catecholamines)
 - Epinephrine
 - Norepinephrine
- ⊙ These hormones prepare the body to deal with short-term stress

DISORDERS OF THE ADRENAL CORTEX

CORTICOSTEROIDS

- ◎ Adrenal cortex steroid hormones
 - Glucocorticoids
 - Regulate metabolism and ↑ blood glucose
 - Critical to physiologic stress response
 - Mineralocorticoids regulate
 - Sodium balance
 - Potassium balance

ADRENAL GLAND HORMONES

S Sugar (Glucocorticoids)

S Salt (Mineralcorticoids)

S Sex (Androgens)



LABORATORY AND DIAGNOSTIC TESTS

⦿ Laboratory:

- Plasma ACTH
- Plasma Cortisol
- Serum Aldosterone
- Serum Sodium
- Serum Potassium
- Urine: ketosteroids and hydrocorticosteroid

⦿ Diagnostic:

- Ultrasound of adrenal gland
- CT scan of adrenal gland
- Adrenal angiography

ADRENAL GLAND DISORDERS

- ⊙ Cushing's syndrome: elevated adrenocortical hormones – body's protective mechanism fails
- ⊙ Addison's disease: insufficient adrenocortical hormone: electrolytes and fluid balance is unstable
- ⊙ Pheochromocytoma: tumor in the adrenal medulla – causes severe hypertension that may result in CVA

ADRENAL GLAND HYPOFUNCTION

Primary causes

- Idiopathic *
- TB
- Metastatic cancer
- Fungal lesions
- AIDS
- Hemorrhage
- Gram-neg. sepsis

Secondary causes

- ⊙ Pituitary tumors
- ⊙ Sheehan's syndrome
- ⊙ Hypophysectomy
- ⊙ High dose pituitary radiation
- ⊙ High dose whole brain radiation

***Most common cause**

ADDISON'S DISEASE

- Occurs when adrenal glands do not secrete enough corticosteroids
- Mostly found in women between 30 and 50 years of age
- May be an autoimmune disorder in which adrenal cortex attacks and destroys itself
- Can also be caused by adrenalectomy
- Onset is slow
- 90 percent of the adrenal gland must be destroyed before symptoms of adrenal insufficiency develop

ADRENOCORTICAL INSUFFICIENCY

- ⦿ May be the result of adrenal suppression by exogenous steroid use
- ⦿ Manifestations include muscle weakness, anorexia, GI symptoms, fatigue, dark pigmentation of skin and mucosa, hypotension, low blood glucose, low serum sodium, high serum potassium, mental changes, apathy, emotional lability, confusion
- ⦿ Diagnostic tests; adrenocortical hormone levels, ACTH levels, ACTH stimulation test

NURSING PROCESS: ASSESSMENT

- ⦿ Level of stress; note any illness or stressors that may precipitate problems
- ⦿ Fluid and electrolyte status
- ⦿ VS and postural blood pressures
- ⦿ Note signs and symptoms related to adrenocortical insufficiency such as weight changes, muscle weakness, and fatigue
- ⦿ Medications
- ⦿ Monitor for signs and symptoms of Addisonian crisis

NURSING PROCESS: DIAGNOSES

- ⦿ Risk for fluid volume deficit
- ⦿ Activity intolerance and fatigue
- ⦿ Knowledge deficit

INTERVENTIONS

- ◎ Risk for fluid deficit
 - ◎ monitor for signs and symptoms of fluid volume deficit, encourage fluids and foods, select foods high in sodium, administer hormone replacement as prescribed
- ◎ Activity intolerance
 - ◎ avoid stress and activity until stable, perform all activities for patient when in crisis, maintain a quiet non-stressful environment, measures to reduce anxiety

ETIOLOGY AND PATHOPHYSIOLOGY

- ⊙ All three classes of adrenal corticosteroids are ↓ in Addison's disease
 - Glucocorticoids
 - Mineralocorticoids
 - Androgens
- ⊙ Common cause in industrialized countries is autoimmune response to adrenal tissue
- ⊙ Susceptibility genes have been identified
- ⊙ Other endocrine conditions often found

ETIOLOGY AND PATHOPHYSIOLOGY

- ⊙ Other causes of Addison's disease
 - Tuberculosis (rare in North America)
 - Infarction
 - Fungal infections
 - AIDS
 - Metastatic cancer
 - Iatrogenic Addison's disease may be due to adrenal hemorrhage
- ⊙ Most often occurs in adults <60 years old
- ⊙ Affects both genders equally
- ⊙ More common in white females if from autoimmune response

CLINICAL MANIFESTATIONS

- ⦿ Does not become evident until 90% of adrenal cortex is destroyed
- ⦿ Disease usually advanced before diagnosis
- ⦿ Primary features
 - Progressive weakness
 - Fatigue
 - Weight loss
 - Anorexia
 - Skin hyperpigmentation

CLINICAL MANIFESTATIONS

- ◉ Muscle weakness
- ◉ Fatigue
- ◉ Joint/muscle pain
- ◉ Anorexia
- ◉ Nausea, vomiting
- ◉ Abdominal pain
- ◉ Bowel changes
- ◉ Weight loss
- ◉ Salt craving
- ◉ Hyperpigmentation
- ◉ Anemia
- ◉ Orthostatic Hypotension
- ◉ Hyponatremia
- ◉ Hyperkalemia
- ◉ hypercalcemia

CLINICAL MANIFESTATIONS

- ◎ Skin hyperpigmentation seen primarily in
 - Areas exposed to sun
 - Pressure points
 - Over joints
 - In skin creases, especially creases



Addison's disease is caused by hyposecretion of corticosteroids, especially glucocorticoids. Pigment changes result from stimulation of melanocytes by ACTH, which is structurally similar to MSH.

HYPERPIGMENTATION



(From Chew SL, Leslie D: *Clinical endocrinology and diabetes: an illustrated colour text*, Edinburgh, 2006, Churchill Livingstone.)

Fig. 50-130

COMPLICATIONS

- ⊙ Risk for life-threatening addisonian crisis caused by
 - Insufficient adrenocortical hormones
 - Sudden, sharp decrease in these hormones
 - Triggered by stress from infection, surgery, trauma, hemorrhage, psychologic
 - Sudden withdrawal of corticosteroid replacement therapy

COMPLICATIONS

- ⊙ Severe manifestations of glucocorticosteroid and mineralocorticoid deficiencies
 - Hypotension
 - Tachycardia
 - Dehydration
 - Hyponatremia
 - Hyperkalemia
 - Hypoglycemia
 - Fever
 - Weakness
 - Confusion

COMPLICATIONS

- ⦿ Hypotension can lead to shock
- ⦿ Circulatory collapse is often unresponsive to usual treatment
- ⦿ GI manifestations include severe vomiting, diarrhea, and abdomen pain
- ⦿ Pain in lower back or legs

DIAGNOSTIC STUDIES

- ⊙ Subnormal levels of cortisol
- ⊙ Levels fail to rise over basal levels with ACTH stimulation test
 - Latter indicates primary adrenal disease
 - Positive response to ACTH stimulation indicates functioning adrenal gland

DIAGNOSTIC STUDIES

⊙ Abnormal laboratory findings

- Anemia
- ↑ BUN
- Low urine cortisol levels

⊙ Abnormal laboratory findings

- Hyperkalemia
- Hyponatremia
- Hypoglycemia

COLLABORATIVE CARE

- ⊙ Hydrocortisone

- Most commonly used as replacement therapy

- ⊙ Glucocorticoid dosage must be

↑ during times of stress to prevent Addisonian crisis

- ⊙ Treatment directed at

- Shock management
- High-dose hydrocortisone replacement
- Large volumes of 0.9% saline and 5% dextrose administered to reverse hypotension and electrolyte imbalances until BP returns to normal

NURSING IMPLEMENTATION

◎ Acute intervention

- Frequent assessment necessary
- Assess vital signs and signs of fluid and electrolyte imbalances every 30 minutes to 4 hours for first 24 hours
- Take daily weights
- Administer corticosteroid therapy diligently
- Protect against infection
- Assist with daily hygiene
- Protect from extremes
 - Light, Noise, Temperature

NURSING IMPLEMENTATION

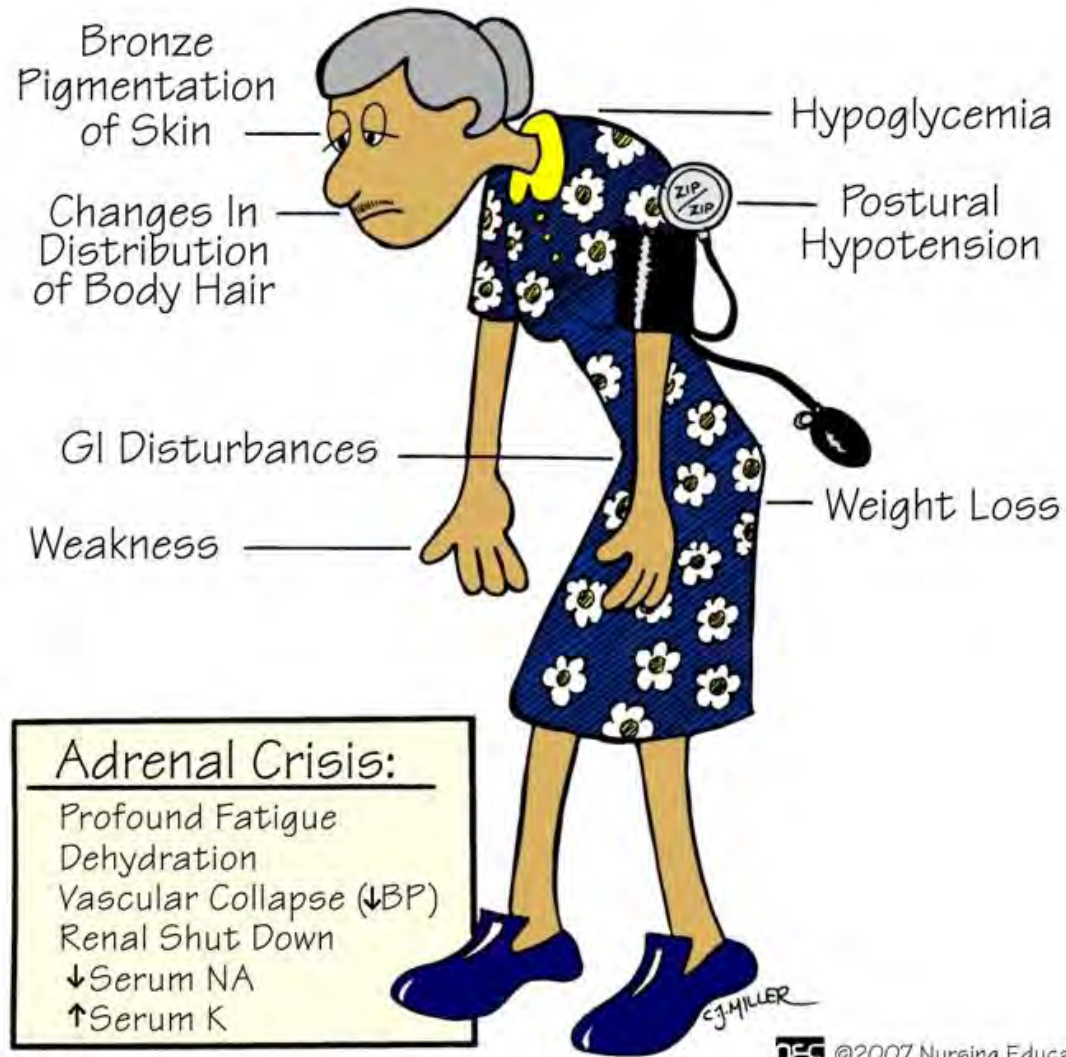
- ◎ Teach signs and symptoms of corticosteroid deficiency and excess
 - Instruct patient to report them to their health care provider
- ◎ Always wear a medical alert bracelet
- ◎ Provide handouts on drugs causing
↑ need for glucocorticoids
- ◎ Instruct on how to take BP and report findings
- ◎ Carry emergency kit with IM hydrocortisone, syringes, and instructions for use
 - Teach patient and significant others how to give IM injection

EFFECTS OF CORTICOSTEROID THERAPY

- ⦿ Long-term use of corticosteroids can lead to complications and side effects
- ⦿ Reserved for cases with risk of death or loss of function
- ⦿ Potential benefits must be weighed against risks
- ⦿ Expected effects of corticosteroid therapy
 - Anti-inflammatory action
 - Immunosuppression
 - Maintenance of normal BP
 - Carbohydrate and protein metabolism

ADDISON'S DISEASE

Adrenocortical Insufficiency



CUSHING'S SYNDROME

- ◎ A condition resulting from the hypersecretion of glucocorticoids from the adrenal cortex
- ◎ Can result from the prolonged administration of corticosteroids
- ◎ Causes of Cushing's Disease
 - Adrenal tumor increasing secretion of cortisol
 - A pituitary tumor increasing ACTH production, causing excessive cortisol to be produced
 - Chronic steroid therapy can induce symptoms
 - Ectopic release of ACTH from lung and pancreatic tumors

CUSHING'S SYNDROME

- ⊙ Due to excessive adrenocortical activity or corticosteroid medications

Manifestations include

- ⊙ hyperglycemia which may develop into diabetes, weight gain, central type obesity with “buffalo hump,” heavy trunk and thin extremities, fragile thin skin, ecchymosis, striae, weakness, lassitude, sleep disturbances, osteoporosis, muscle wasting, hypertension, “moon-face”, acne, increased susceptibility to infection, slow healing, virilization in women, loss of libido, mood changes, increased serum sodium, decreased serumpotassium

CUSHING'S SYNDROME



This woman with Cushing's syndrome has several classic signs, including facial hair, buffalo hump, and moon face. From Rubin, E. & Farber, J. L. (2005). *Pathology* (4th ed.). Philadelphia: Lippincott Williams & Wilkins.

NURSING PROCESS: ASSESSMENT

- ◉ Activity level and ability to carry out self-care
- ◉ Skin assessment
- ◉ Changes in physical appearance and patient responses to these changes
- ◉ Mental function
- ◉ Emotional status
- ◉ Medications

NURSING PROCESS: DIAGNOSES

- ⦿ Risk for injury
- ⦿ Risk for infection
- ⦿ Self-care deficit
- ⦿ Impaired skin integrity
- ⦿ Disturbed body image
- ⦿ Disturbed thought processes

NURSING PROCESS: PLANNING

- ◎ Goals may include
 - decreased risk of injury
 - decreased risk of infection
 - increased ability to carry out self-care activities
 - improved skin integrity, improved body image
 - improved mental function
 - absence of complications

INTERVENTIONS

- ◉ Decrease risk of injury: establish a protective environment; assist as needed; encourage diet high in protein, calcium, and vitamin D.
- ◉ Decrease risk of infection: avoid exposure to infections, assess patient carefully as corticosteroids mask signs of infection.
- ◉ Plan and space rest and activity.
- ◉ Meticulous skin care and frequent, careful skin assessment.
- ◉ Explanation to the patient and family about causes of emotional instability.

CORTICOSTEROID THERAPY

- ◎ Widely used drugs to treat adrenal insufficiency, suppress inflammation and autoimmune response, control allergic reactions, and reduce transplant rejection
- ◎ Common corticosteroids
- ◎ Patient teaching
 - Timing of doses
 - Need to take as prescribed, tapering required to discontinue or reduce therapy
 - Potential side-effects and measures to reduction of side-effects

QUESTION

Is the following statement True or False?

Oversecretion of adrencorticotropic hormone (ACTH) or the growth hormone results in Graves' disease.

ANSWER

False

Oversecretion of adrenocorticotrophic hormone (ACTH) or the growth hormone results in Cushing's disease, NOT Graves' disease. Graves' disease results from an excessive output of thyroid hormones caused by abnormal stimulation of the thyroid gland by circulating immunoglobulins.

CLINICAL MANIFESTATIONS

- ◎ Cushing's disease and primary adrenal tumors are more common in women aged 20 to 40
- ◎ Ectopic ACTH production more common in m
 - Weight gain in truncal area with thin arms and legs
 - Buffalo hump below back of neck
 - "Moon face" look due to fatty tissue deposits
 - Muscle wasting
 - Easy bruising and thin skin

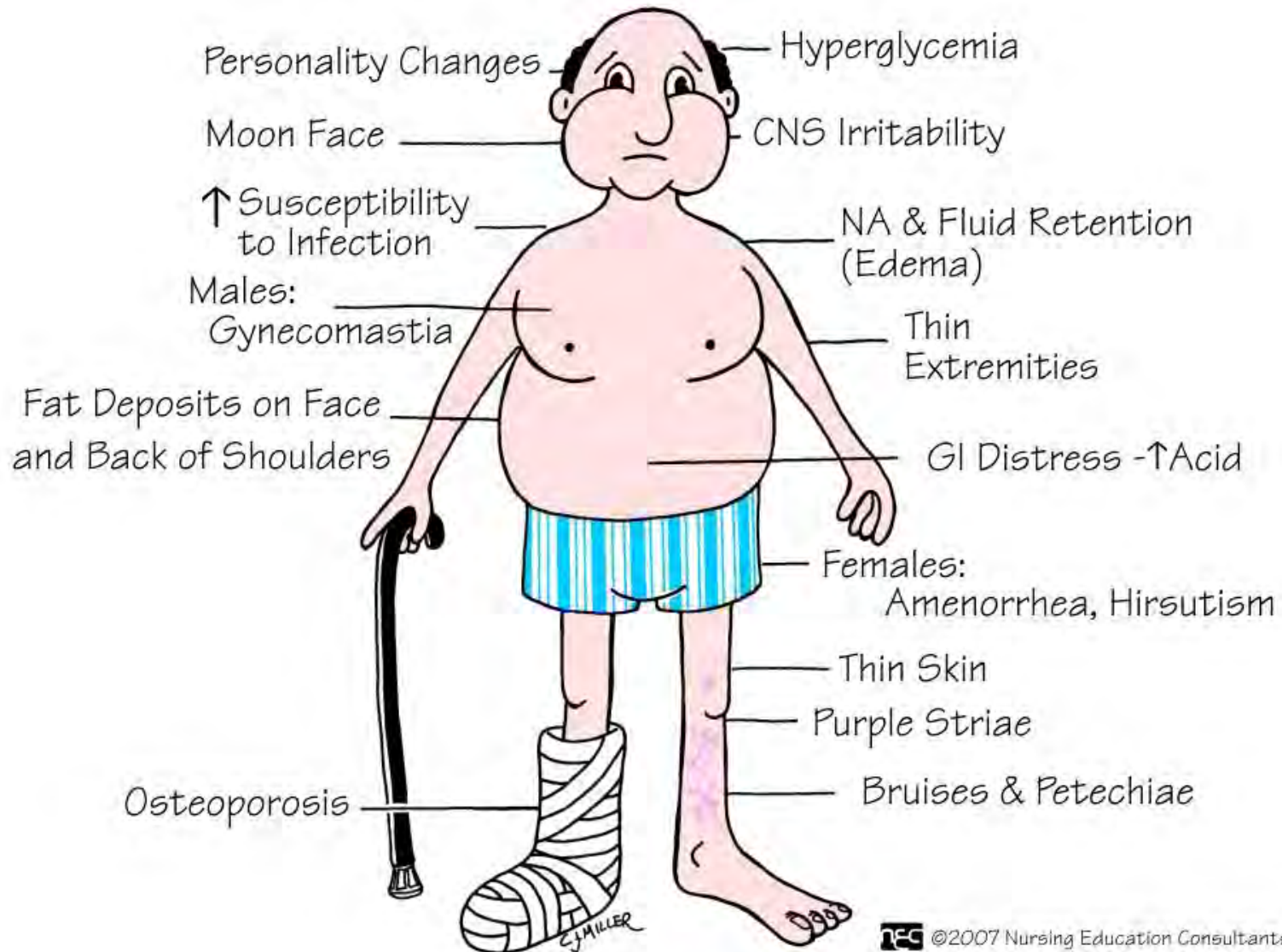
CLINICAL MANIFESTATIONS

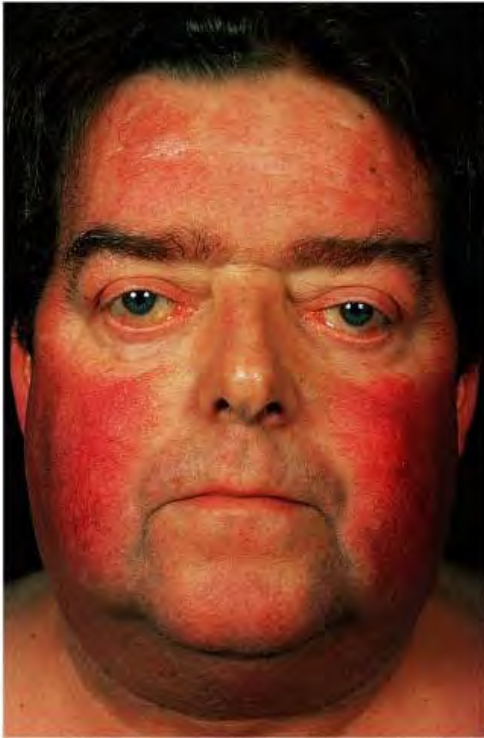
- ◎ Protein wasting
 - Catabolic effects of cortisol
 - Leads to weakness especially in extremities
 - Protein loss in bones leads to osteoporosis, bone and back pain
- ◎ Mineralocorticoid excess may cause hypertension secondary to fluid retention
- ◎ Adrenal androgen excess may cause
 - Pronounced acne
 - Virilization in women
 - Feminization in men

DIAGNOSTIC STUDIES

- ⊙ 24-Hour urine for free cortisol
 - Levels of 50 to 100 mcg/day in adults indicates Cushing syndrome
- ⊙ High-dose dexamethasone suppression test used for borderline results of 24-hour urine cortisol
- ⊙ False positives can occur with depression, stress, or alcoholism
- ⊙ Plasma cortisol levels may be elevated with loss of diurnal variation
- ⊙ CT and MRI of pituitary and adrenal glands

CUSHING'S SYNDROME





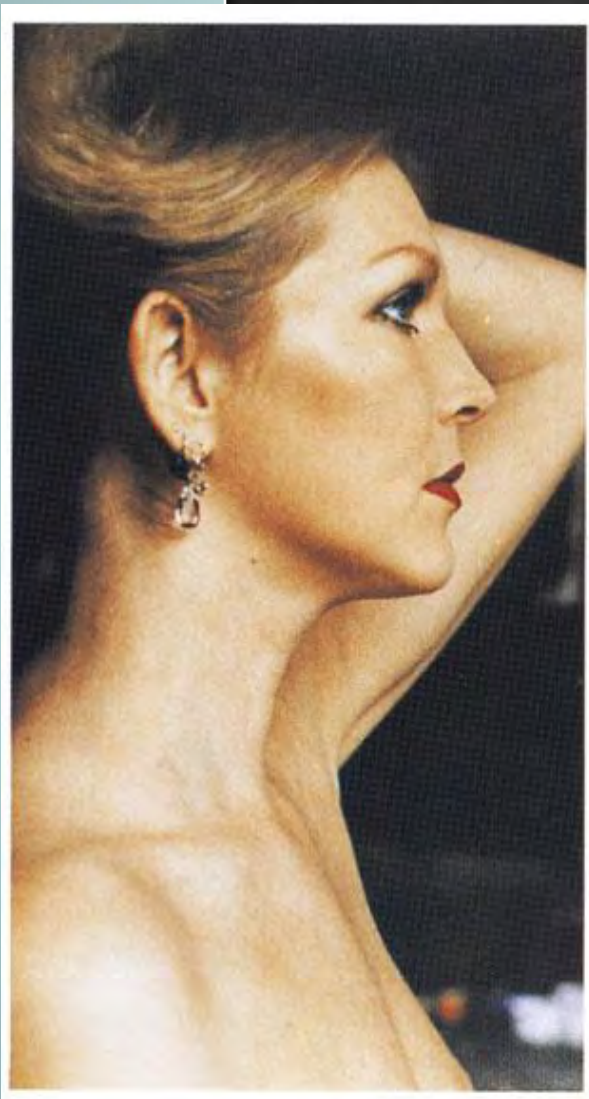
Cushing's disease is caused by hypersecretion of glucocorticoids. Lipid reserves are mobilized, and adipose tissue accumulates in the cheeks and at the base of the neck.

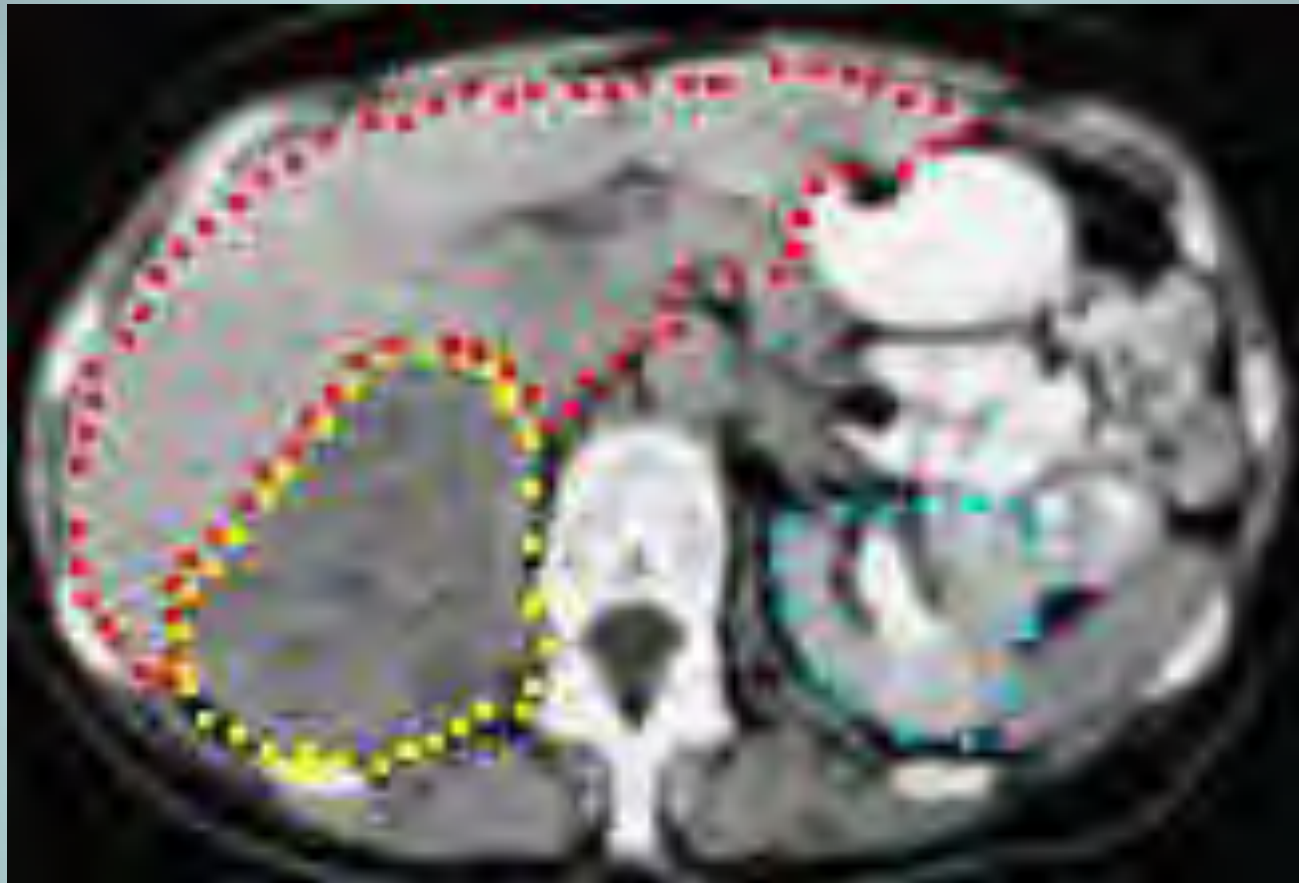


CUSHING SYNDROME

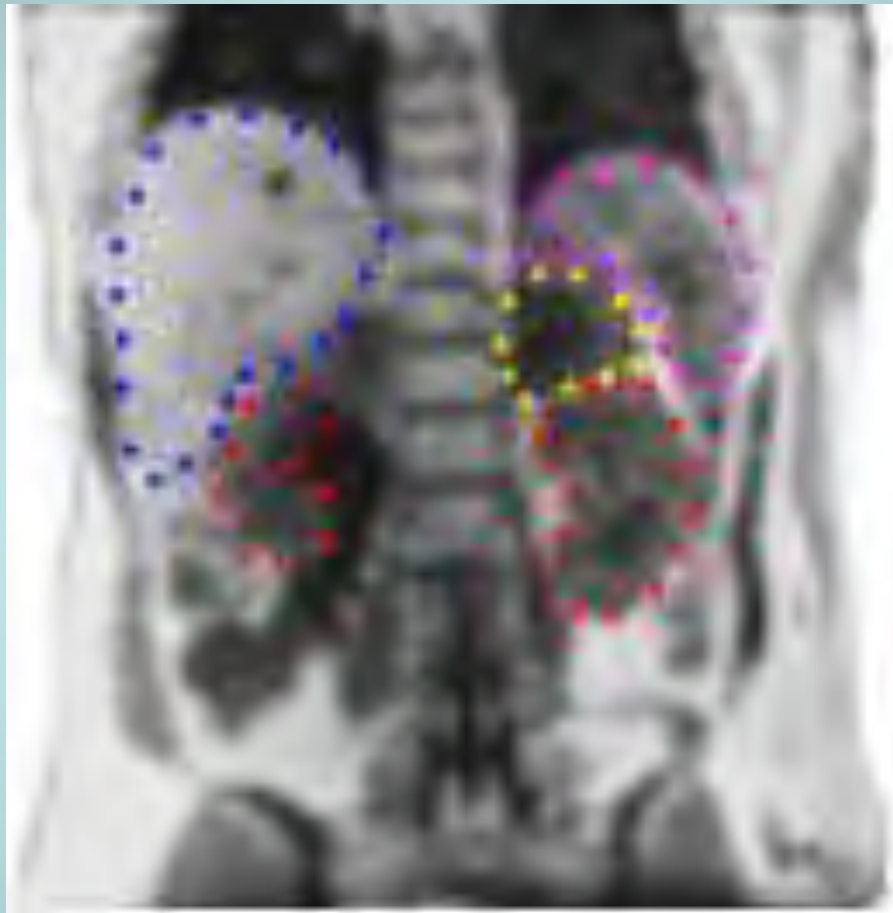
CLINICAL MANIFESTATIONS













COLLABORATIVE CARE

- ⊙ Primary goal is to normalize hormone secretion
- ⊙ Treatment depends on cause
 - Pituitary adenoma
 - Surgical removal of tumor and/or radiation
 - Adrenal tumors or hyperplasia
 - Adrenalectomy
 - Ectopic ACTH-secreting tumors
 - Managed by treating primary neoplasm
- ⊙ Drug therapy indicated when surgery is contraindicated or as adjunct to surgery

COLLABORATIVE CARE

- ◎ If Cushing syndrome develops during use of corticosteroids
 - Gradually discontinue therapy
 - Decrease dose
 - Convert to an alternate-day regimen
- ◎ Gradual tapering avoids potentially life-threatening adrenal insufficiency

NURSING DIAGNOSES

- ⦿ Risk for infection
- ⦿ Imbalanced nutrition related to decreased appetite
- ⦿ Disturbed self-esteem related to altered body image
- ⦿ Impaired skin integrity

NURSING PLANNING

- ◎ Patient goals include
 - Experience relief of symptoms
 - Have no serious complications
 - Maintain positive self-image
 - Actively participate in therapeutic plan

NURSING IMPLEMENTATION

- ⦿ Acute intervention

- Monitor

- Vital signs
 - Daily weight
 - Glucose
 - Infection
 - Signs and symptoms of abnormal thromboembolic phenomena

- ⦿ Emotional support

- Patient may feel unattractive or unwanted
 - Nursing staff should remain sensitive to patient's feeling and be respectful
 - Reassure patient physical symptoms will resolve when hormone levels return to normal

PREOPERATIVE CARE

- Patient should be in optimal physical condition
- Control hypertension and hyperglycemia
- Hypokalemia must be corrected with diet and potassium supplements
- High-protein diet helps correct protein depletion
- Teaching depends on surgical approach

NURSING IMPLEMENTATION

⦿ Postoperative care

- Risk of hemorrhage is increased because of high vascularity of adrenal glands
- Manipulation of glandular tissue may release hormones into circulation
- BP, fluid balance, and electrolyte levels tend to be unstable because of hormone fluctuations

⦿ Postoperative care

- Bed rest until BP is stabilized after surgery
- Meticulous care should be taken when accessing skin, circulation, or body cavities to avoid infection
 - Normal inflammatory responses are suppressed

TREATMENT

- ⊙ Monitor I&O and weight
- ⊙ Monitor for urinary glucose
- ⊙ Provide good skin care
- ⊙ Allow the client to discuss feelings related to body appearance
- ⊙ High-protein, low-calorie diet with potassium supplements
- ⊙ Adrenalectomy is a possibility
- ⊙ Radiation Therapy

HYPERALDOSTERONISM

- ⦿ A hypersecretion of aldosterone from the adrenal cortex of the adrenal gland
- ⦿ Due to an adrenal lesion that is usually benign
- ⦿ Excessive aldosterone secretion
 - Sodium retention
 - Potassium
 - Hydrogen ion excretion
- ⦿ Hallmark of hyperaldosteronism
 - Hypertension with hypokalemic alkalosis

HYPERALDOSTERONISM

⊙ Clinical Manifestations

- Generalized weakness
- Increased thirst, nocturia, and polyuria
- Weight gain and edema
- Headache
- Hypertension
- Positive Chvostek's sign
- Hyperkalemia and hyponatremia

⊙ Treatment:

- Monitor vital signs
- Monitor I&O and weight
- Monitor muscular strength
- Monitor electrolytes
- Maintain sodium restriction as prescribed
- Administer Antihypertensives and potassium supplements as prescribed
- Removal of tumor if indicated

PHEOCHROMOCYTOMA

- ⦿ A catecholamine-producing tumor, usually found in the adrenal gland but also may be found in the abdomen
- ⦿ It causes hypersecretion of the hormones of the adrenal medulla and the secretion of excessive amounts of Epinephrine and Norepinephrine
- ⦿ It is typically a benign tumor but can be malignant
- ⦿ Surgical excision of the adrenal gland is the primary treatment

ETIOLOGY AND PATHOPHYSIOLOGY

- ⊙ Results in severe hypertension
- ⊙ If untreated, may lead to
 - Diabetes mellitus
 - Cardiomyopathy
 - Death
 - Mimic stimulation of sympathetic division of autonomic nervous system
 - headaches, palpitations, profuse diaphoresis, tachycardia
 - flushing, apprehension, feeling of impending doom

CLINICAL MANIFESTATIONS

- Intermittent hypertensive episodes
- Hypermetabolism
- Emotional instability
- Hyperglycemia and glycosuria
- Pain in the chest or abdomen with nausea and vomiting
 - Weight loss
- Severe, episodic hypertension
- Severe, pounding headache
- Tachycardia with palpitations
- Profuse sweating
- Abdominal or chest pain
- ◎ Diagnosis is often missed

DIAGNOSTIC STUDIES

- ⦿ Best test is measurement of urinary fractionated metanephrines and catecholamines in 24-hour collection
- ⦿ Plasma catecholamines are elevated
- ⦿ CT and MRI used for tumor localization



<http://endocrineweb.com>

TREATMENT

- ⦿ Monitor vital signs
- ⦿ Monitor cardiovascular, neurological, and renal status
- ⦿ Monitor for hypertensive attacks because hypertension can precipitate a CVA or sudden blindness
- ⦿ Be alert to stimuli that can precipitate a hypertensive crisis: such as increased abdominal pressure, and vigorous abdominal palpation
- ⦿ Avoid opiates preoperatively because they can precipitate a hypertensive crisis
- ⦿ Monitor urine for glucose and acetone
- ⦿ Promote rest and a non-stressful environment

TREATMENT

- ◎ Patient needs
 - Rest
 - Nourishment
 - Emotional support
- ◎ Stress importance of
 - Follow-up care
 - Routine BP monitoring

ADRENALECTROMY

- ⦿ The surgical removal of an adrenal gland
- ⦿ Lifelong steroid replacement is necessary with a bilateral Adrenalectomy
- ⦿ Temporary steroid replacement, up to 2 years, is necessary for a unilateral Adrenalectomy
- ⦿ Catecholamine levels drop as a result of surgery, which can result in cardiovascular collapse, hypotension, and shock; the client needs to be monitored closely

TREATMENT-PREOPERATIVELY

- Monitor electrolytes and correct electrolyte imbalances
- Monitor for cardiac irregularities
- Monitor for hyperglycemia
- Protect the client from infections
- Administer steroids as prescribed

TREATMENT POSTOPERATIVE

- ◎ Hemorrhage: can occur post surgery due to high vascularity of the adrenal glands
 - Monitor vital signs
 - Monitor I&O and if urinary output is less than 30 mL per hour, notify the physician because this may be indicative of impending shock and renal failure
 - Monitor daily weights
 - Monitor electrolytes
 - Monitor for signs of shock and hemorrhage particularly during first 24 to 48 hours