

- An isotope of radioactive iodine is injected into a vein in the arm, then a special camera produces an image of the thyroid on a computer screen to identify nodules or growths in the thyroid gland
- Check if the client had undergone a radiographic contrast agents test within the past 3 months, to avoid invalid results
- Instruct NPO after midnight on the day before the test; if iodine is used the scan will be done 24 hours after ingestion. If technetium intravenous is used the scan will be done after 30 minutes.
- **Indications** – hyperthyroidism and to assess thyroid nodules when client has hyperthyroidism
- **Contraindications** – in pregnancy and breastfeeding since it is done by administering a radioisotope.
- **Nursing considerations** – reassure the client that radioactive medication is not dangerous, check from HCP on discontinuation of medications, instruct client to maintain NPO status after midnight on the day before the test, and if iodine is used, the client will fast for an additional 45 minutes after ingestion of oral isotope and the scan will be done in 24 hours.

f) Needle aspiration of thyroid tissue

- Fine needle aspiration through the skin into the thyroid nodule to get tissue for cytological examination
- Ensure light pressure on the aspiration site after removing the tissue needed

g) Glucose tolerance test (GTT)

- A medical test in which glucose is given and blood samples are taken afterward to determine how quickly it is cleared from the body
- Used in diagnosis of diabetes mellitus
- **Normal lab values for GTT:**
 - 70 – 110 mg/dL or 3.9 – 6.1 mmol/L is (Baseline fasting)
 - 110 – 170 mg/dL or 6.1 – 9.4 mmol/L is (30 minutes fasting)
 - 120 – 170 mg/dL or 6.7 – 9.4 mmol/L is (60 minutes fasting)
 - 100 – 140 mg/dL or 5.6 – 7.8 mmol/L is (90 minutes fasting)
 - 70 – 120 mg/dL or 3.9 – 6.7 mmol/L is (120 minutes fasting)
- **After results type 2 diabetes:**
 - Lower than 140mg/dL (7.8 mmol/L) – Indicates normal blood glucose level
 - Levels between 140 – 199mg/dL (7.8 – 11 mmol/L) – indicates impaired glucose tolerance or prediabetes
 - Levels of 200mg/dL (11.1 mmol/L) or higher – indicates diabetes
- **Nursing Considerations:**
 - Instruct the client to eat a high-carbohydrate (150 to 300g) diet for 3 days before the test
 - Instruct the client to fast for 10 – 14 hours before the test

- Instruct the client to avoid alcohol, coffee, and smoking for 36 hours before the test
- Instruct the client to avoid strenuous activities pre and post the test
- Instruct the client with diabetes mellitus to skip anti-diabetic medications (insulin or oral medication)
- Give client high-glucose drink after removal of sample to determine fasting blood glucose level
- Instruct the client that the test may take 3 to 5 hours, taking of multiple samples, also with the use of IV or oral administration of glucose

h) Glycosylated hemoglobin (A1C or HbA1C)

- Is a form of hemoglobin that is chemically linked to glucose
- It indicates how well the blood glucose levels have been controlled for the prior 3 to 4 months
- Values are expressed as a percentage of the total hemoglobin
- For diabetes mellitus, the goal is below 7%
- for clients without diabetes mellitus, the normal range is 4% to 6%

Endocrine Disorders

Pituitary Gland Disorders

Anterior Pituitary Disorder

1. Hypopituitarism

Overview

Hypopituitarism is the failure or decreases to secrete one or more of the eight pituitary hormones normally produced by the pituitary gland. Selective hypopituitarism is when there is a decrease in one specific pituitary hormone.

Causes

- Tumors – brain tumors and pituitary adenomas
- Infections and inflammations – meningitis, encephalitis, and brain abscess.
- Radiations – radiation-induced hypopituitarism mainly affects growth hormones and gonadal hormones.
- Traumatic brain injury.
- Stroke – causing lack of blood flow to the gland or bleeding into the brain or gland
- Brain Surgery
- Medications - Narcotics, high-dose corticosteroids
- Neurosurgery.

- Autoimmune hypophysitis

Assessment

- Headaches and visual defects caused by tumors

Table 1 Showing the assessment of Hypopituitarism

Pituitary Hormone Deficiency	Assessment
Growth Hormone (GH)	• Fatigue and muscle weakness • Mild to moderate obesity - changes in body fat composition • Low BP • Reduced cardiac output
Luteinizing Hormone (LH) and Follicle-Stimulating Hormone (FSH)	• Changes in the menstrual cycle • Hot flashes • Loss of pubic hair in female • Reduced breast milk • Erectile dysfunction • Decreased facial or body hair in male
Thyroid-Stimulating Hormone (TSH)	• Mild to moderate obesity • Fatigue • Dry skin • Weight gain • Constipation • Sensitivity to cold • Low BP
Adrenocorticotrophic Hormone (ACTH)	• Infertility • Sexual dysfunction • Frequent and prolonged infections • Severe fatigue • Low BP may lead to fainting
Anti-Diuretic Hormone (ADH)	• Reduced cardiac output • Fatigue • Excessive urination • Extreme thirst

Diagnostic Tests

- Water deprivation test – stopped drinking fluids for several hours to make ADH allow kidneys to decrease the amount of fluid lost in the urine
- MRI – to check for abnormality near the pituitary gland

Interventions

a) Nursing Interventions

- Monitor vital signs and cardiovascular status
- Monitor for dehydration and regularly check for electrolyte imbalances
- Monitor fluid intake and output, weight gain, and characteristics of the urine
- Instruct the client to limit or avoid diuretic foods, and medications
- Administer vasopressin or desmopressin in severe or chronic ADH deficiency as prescribed
- Instruct the client to always wear a medic-alert tag or bracelet
- Desmopressin as prescribed – in central and gestational diabetes insipidus to replace the missing ADH and decrease urination
- Hydrochlorothiazide – used in some people with nephrogenic diabetes insipidus

4. Syndrome of Inappropriate Antidiuretic Hormone Secretion (SIADH)

Overview

SIADH occurs when there is excessive release of ADH without the response to the bodies need.

Causes

- Trauma – subarachnoid hemorrhage and subdural hematoma
- Infections such as meningitis and encephalitis
- Stroke
- Malignancies such as prostate and bladder cancers
- Medication such as carbamazepine, valproic acid vincristine
- Stress
- Sarcoidosis

Assessment

- Anorexia, nausea, and vomiting
- Muscle weakness and pain

- Fluid volume overload and weight gain
- Confusion and lethargy
- Tremors and decreased reflexes
- Hypertension
- Tachycardia
- Hyponatremia

Diagnostic Tests

- Laboratory tests – to determine serum osmolality and serum sodium

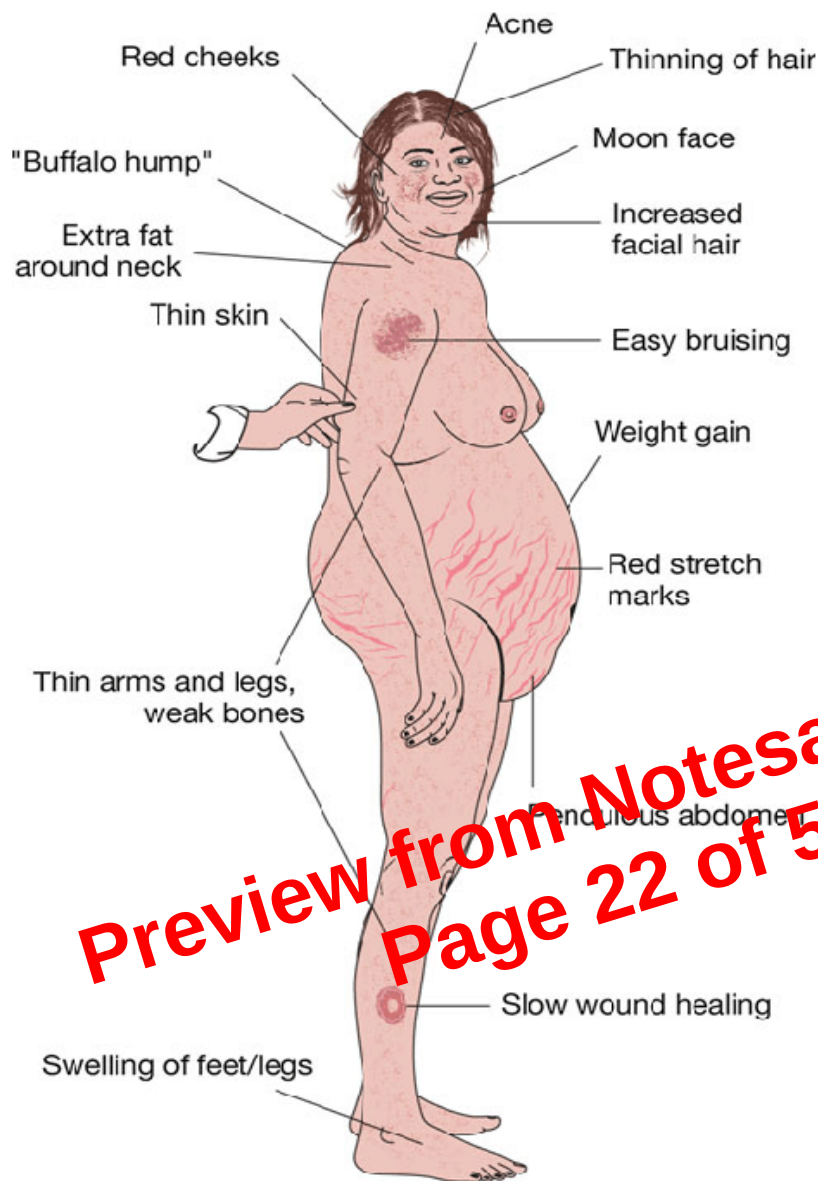
Interventions

a) Nursing Interventions

- Monitor vital signs and cardiovascular and neurological status
- Monitor regularly for electrolyte imbalances
- Monitor fluid intake and output, weight gain, and characteristics of the urine
- Monitor serum and urine osmolality
- Instruct the client to limit or avoid diuretic foods, and medications
- Administer diuretics and hypertonic saline as prescribed
- Restrict fluid intake as prescribed to avoid fluid volume overload and water intoxication
- Give antidiuretics as prescribed
- Inhibitors of ADH-water induced reabsorption

Difference Between Diabetes Insipidus and SIADH

	Diabetes Insipidus, DI	SIADH
Definition	• A disorder of water and salt metabolism marked by heavy urination and intense thirst.	• A disorder in which increased levels of a hormone causes the body to retain water.
ADH	• Inadequate ADH	• Excess ADH
Types	• 2 forms of DI include Cranial Diabetes Insipidus (CDI) and	• 4 forms include Type A SIADH, Type B SIADH, Type C SIADH, and Type D SIADH.



Causes

- Pituitary gland tumor (pituitary adenoma)
- An ACTH-secreting tumor
- A primary adrenal gland disease
- Familial Cushing's syndrome

Assessment

- Moon face and buffalo hump due to fatty tissue deposits
- Thinning, and fragile skin that bruises easily
- Hyperglycemia
- Hypernatremia

- Slow healing of cuts, insect bites, and infections
- Generalized muscle wasting and weakness
- Masculine characteristics in females (hirsutism)
- Hypertension
- Bone loss, leading to fractures over time
- Acne
- Purple striae, muscle atrophy, osteoporosis, and kidney stones in males
- Irregular or absent menstrual periods in females
- Decreased sex drive and erectile dysfunction in males

Diagnostic Tests

- ACTH blood test
- Dexamethasone suppression test
- ACTH stimulation test
- Urinary free cortisol test
- Imaging tests – CT and MRI scans
- Petrosal sinus sampling

Interventions

a) Surgical Interventions

- Surgery (hypophysectomy or transsphenoidal adenectomy) if the cause is the tumor

b) Pre-operative Nursing Interventions

- Monitor blood pressure
- Closely monitor weight, intake, and output
- Inform and prepare the client well for radiation therapy
- Monitor white blood cell count, serum glucose, potassium, sodium, and calcium levels
- Prepare the client for the removal of the pituitary tumor (hypophysectomy) if it is due to hypersecretion of ACTH. And prepare the client for adrenalectomy if the condition results from adrenal adenoma.

c) Pre-operative Nursing Interventions

- After transsphenoidal hypophysectomy, check for postnasal drip or nasal drainage which is an indication of cerebrospinal fluid leakage.

Difference Between Cushing's Disease and Cushing's Syndrome

• Cushing's Disease	• Cushing's Syndrome
• More serious	• Less serious
• Caused by a pituitary tumor that secretes ACTH	• Characterized by excessive levels of cortisol in the blood
• Less common	• More common
• Develops due to abnormal tumor growth	• Develops most often from taking medications that increase cortisol

- Give beta-blockers as prescribed
- Give sedatives as prescribed
- Give radioactive iodine – taken by mouth and absorbed by the thyroid gland to shrink the gland

b) Surgical Interventions

- Thyroidectomy
 - a) Partial thyroidectomy - whereby a part of the thyroid is removed, and the remaining part typically takes over the function of the entire thyroid gland.
 - b) Complete thyroidectomy – entire thyroid is removed, body cannot produce thyroid hormone, then signs of hypothyroidism develops, hence need to take synthetic thyroid hormone levothyroxine pills daily.

Pre-operative Interventions

- Monitor vital signs and weight
- Assess electrolyte levels and hyperglycaemic levels
- Give antithyroid medications, iodides, and glucocorticoids as prescribed to prevent thyroid storm
- Instruct the client on coughing and deep breathing exercises.

Post-operative Interventions

- Monitor for respiratory distress
- Check for laryngeal damage – high pitched voice, stridor, dysphagia, and dysphonia.
- Set up tracheostomy set, oxygen, and suction equipment
- Prepare to give calcium gluconate for tetany as prescribed
- Monitor for signs of thyroid storm.

4. Thyroid Storm Overview

It is a rare but severe complication of hyperthyroidism where the thyroid gland becomes overactive.

Causes

- Thyroid gland surgery and release of thyroid hormone into the blood-stream
- Severe infections
- Stress
- Myocardial infarction

Assessment

- GI disturbance
- High fevers – above 40 degrees centigrade or above 104-degree Fahrenheit
- Restlessness and irritability
- Tachycardia
- Tremors and anxiety
- Systolic hypertension
- Mental status changes

Foot Care Instructions

- Inspect foot and monitor for redness, swelling, and skin integrity
- Hygienic measures of the skin and foot
- Notify HCP if redness or break in the skin occurs
- Avoid thermal surfaces, hot water baths, and heating surfaces
- Avoid closing legs and tight garments
- Prevent moisture accumulation between the toes and avoid barefoot
- Avoid wearing the same pair of shoes on consecutive days
- Check shoes for cracks and tears and foreign objects inside
- Cut toe nails straight across and smooth nails with an emery board
- Restrict or avoid cigarette smoking.

D. Diabetic Client Undergoing Surgery

Pre-operative care

- Monitor blood glucose levels and give IV fluids as prescribed
- Confirm from HCP and discontinue long-acting antidiabetic medications 24 to 48 hours before surgery
- Discontinue metformin (Glucophage) 48 hours before surgery and restart it when renal function is normal after surgery
- Withhold all other oral antidiabetic medication on the day of surgery

Post-operative care

- Monitor blood glucose levels in clients receiving parenteral nutrition
- Give IV insulin as prescribed
- Give supplemental short-acting insulin as prescribed
- Give enough carbohydrates daily to prevent hypoglycemia

Insulin Therapy

- Insulin is prescribed for clients with type 1 and type 2 diabetes mellitus clients whose blood glucose level is not controlled with oral hypoglycemic medications.
- The onset, peak, and duration of action depend on the insulin type.

Preparation		Brand
Rapid – Acting Insulin	Insulin Aspart	Novolog
	Insulin glulisine	Apidra
	Human lispro injection	Humalog