

PathMD™: Board Review Letter

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Clinical Chemistry - Thyroid

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1. A 34 year old female with history of hypothyroidism controlled with l-thyroxine comes to the office for her 8-week prenatal check-up. Her vital signs and physical examination are non-contributory. What is the appropriate management of the hypothyroidism in this patient?
 - a. Decrease the dose of L-thyroxine
 - b. Discontinue L-thyroxine
 - c. Measure the T4 concentration
 - d. Increase the dose of L-thyroxine
 - e. Observation and thyroid studies at 24 weeks

Answer: The correct answer is D. Pregnancy is characterized by normal tsh and free t3 and t4 levels; total t3 and 4 elevated due to increased thyroid binding globulin (TBG). The hypothyroid patient can not compensate the increased level in Thyroid Binding Globulin through the production of thyroid hormone. Therefore an increase in thyroxine administration is needed . Other conditions where TBG is increased include oral contraceptives, estrogen therapy, cirrhosis and hypothyroidism.

2. Which of the following statements regarding the management of hypothyroid patients during pregnancy is correct?
 - a. Thyroxine therapy needs to be discontinued
 - b. Thyroid hormone free levels increase during pregnancy
 - c. Continue the same dose of L-thyroxine
 - d. Thyroxine requirements decrease due to transient hyperthyroidism of pregnancy
 - e. None of the above statements is correct

Answer: The correct answer is E, none of the above statements is correct. Thyroxine requirements increase during pregnancy in the hypothyroid patient due to an increase in Thyroid Binding Globulin.

3. Which of the following statements regarding the biological effects of thyroid hormone is correct?
 - a. Their biological effects are mediated by interactions between the hormone and cell membrane receptors
 - b. The thyroid hormone water solubility allows to permeate through the cell membrane and bind intranuclear protein receptors
 - c. The thyroid hormone receptors are free intracellular proteins with high specificity and affinity for thyroid hormone binding sites
 - d. A cellular transmembrane tyrosine kinase receptor mediates the biological effects of thyroid hormone
 - e. None of the above statements is correct

Answer: The correct answer is C. The effect of thyroid hormones is mediated by the interaction with free intracellular proteins with high affinity for the thyroid hormone binding sites.

4. Which of the following is not a feature of Autoimmune Hashimoto thyroiditis
- Antibodies to the TSH receptor
 - Anti-thyroglobulin antibodies
 - Anti-thyroid peroxidase antibodies
 - It may present as an enlarging thyroid gland

Answer: The correct answer is A. Hashimoto's thyroiditis is often characterized by the presence of anti-microsomal (thyroid peroxidase antibodies) and anti-thyroglobulin antibodies. It may be associated with an enlarged thyroid gland during the early course of the disease. Stimulatory antibodies to the TSH receptor are a feature of Graves disease.

5. In Grave's disease
- The radioiodine uptake is low
 - Thyroid Stimulating Immunoglobulins (TSI) are present in serum
 - The free thyroid is low
 - The thyroid gland shows nodular "hot" nodule

Answer: The correct answer is B. Graves Disease is characterized by diffuse, high radioiodine uptake of the thyroid gland, elevated free thyroid levels, and elevated Thyroid Stimulating Immunoglobulins (TSI).

6. Which of the following statements regarding Euthyroid sick syndrome is correct
- Anti-thyroglobulin is present in high concentrations
 - Results in an increase in the peripheral conversion of T4 to T3
 - Causes a marked elevation of TSH levels
 - The levels of Free T4 are normal in moderate illness

Answer: The correct answer is D. The euthyroid sick syndrome (low t3 syndrome) is associated with low t3 with normal t4 and tsh. It usually occurs in hospitalized patients with symptoms of hypothyroidism (fatigue) but euthyroid serology.

7. Which is the best indicator of thyroxine abuse?
- Thyroglobulin level
 - Radioactive Iodine uptake
 - Anti-thyroid peroxidase level
 - Ultrasound of the thyroid
 - TSH level

Answer: The correct answer is A. The best marker of thyroxine abuse is thyroglobulin level. Patients with thyrotoxicosis factitia have undetectable thyroglobulin levels, in contrast to elevated levels found in patients with hyperthyroidism caused by a wide variety of disorders.

8. Which of the following conditions will present with a reduced radioactive iodine uptake
- Painless thyroiditis
 - Post-partum thyroiditis
 - Iodine-induced thyrotoxicosis
 - Amiodarone-induced thyrotoxicosis
 - All of the above will result in a reduced uptake of radioactive iodine

Answers: The correct answer is E, All of the above will result in a reduced uptake of radioactive iodine. Conditions associated with a low radioiodine uptake include subacute thyroiditis (tender thyroid, fever, sweating, heat intolerance, and SOB), painless thyroiditis, postpartum thyroiditis, thyroid hormone administration, iodine-induced thyroiditis, and amiodarone induced thyrotoxicosis. A High radioiodine uptake is associated with Graves' disease and toxic multi-nodular goiter, and toxic adenoma.

9. In the presence of a TSH secreting pituitary tumor
- Hypothyroidism results due to hypothalamic suppression effect
 - Thyroglobulin decreases
 - Free T3 increases
 - Free T4 decreases
 - The radioactive iodine uptake decreases

Answer: The correct answer is C. A TSH secreting pituitary tumor results in elevated thyroglobulin levels, and increased levels of thyroid hormones (T4 and T3). In addition, the radioactive iodine uptake increases.

10. Which of the following conditions does not usually result in hypothyroidism?
- Autoimmune thyroiditis
 - Postpartum thyroiditis
 - Use of radioactive iodine for the treatment of Grave's disease
 - Subacute granulomatous thyroiditis
 - All of the above conditions may result in hypothyroidism

Answer: The correct answer is E. All the conditions stated may result in hypothyroidism.

Notes for question set:¹

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