

TED Talks

An Update on Thyroid Eye Disease

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Course Description;

This lecture will outline and describe the current understanding of thyroid eye disease (TED) and its interrelation with Graves' Disease. It will describe incidence, risk factors, and associated systemic signs, symptoms, and pathophysiology including Rundle's curve. We will discuss treatment options for TED including the recent FDA approval of Teprotumumab, its clinical trials, study endpoints, and adverse reactions. Masquerading ocular findings that may be early signs of TED will be described as well as lab testing that can help with the early detection of TED will be discussed. Doctors have a knowledge need for this practice gap which means having the knowledge of how to detect, diagnose, and treat TED in an integrated, multidisciplinary method.

Learning Objectives;

1. To better understand TED and Graves Disease's interrelation and differences.
2. To improve the understanding of incidence and epidemiology of TED and Graves' Disease.
3. To describe Teprotumumab's recent FDA approval, it's trial data endpoints, the mechanism of action, indications, contraindications, potential adverse events, and effectiveness of the newest thyroid eye disease therapies.
4. To better understand early ocular manifestations of TED that may be missed or mistaken for dry eye or other forms of OSD.
5. To understand serum testing in regards to thyroid disorders and especially TED.
6. To discuss best practices in regard to co-management with an interdisciplinary team of providers.

1. Review Thyroid Dysfunction
 - a. Hyperthyroidism
 - i. Grave's Disease
 1. Review pathophysiology

2. Role of orbital fibroblasts by autoantibodies, which leads to orbital inflammation early on in the disease and subsequent fibrosis.

b. Hypothyroidism

- i. Hashimoto's

c. TED

- i. Associated but SEPERATE
- ii. Pathophysiology
- iii. Incidence
- iv. Signs and Symptoms
 1. Dry Eye
 2. Exposure /Proptosis
 3. Lid Retraction/Lagophthalmos
 4. Blink Dynamics/Frictional Forces
 5. Ocular Inflammation
 6. Autoimmune Conditions
 7. Optic Nerve Compression
 8. Inflammation and fibrosis inside a confined space
 9. Diplopia
 10. EOM infiltration, Inflammation, and Fibrosis
 11. Emotional and QOL implications
- v. Current Clinical Outcomes
 1. Rundle's Curve
 - a. Active Phase
 - b. Inactive Phase
- vi. Historic Treatments
 1. RAI Therapy
 2. Medications
 - a. Steroids
 - b. Selenium
 - c. Other immunologics
 3. Surgery
 - a. Orbital decompression
 - b. Lid retraction
 4. Thyroid supplementation
 5. Orbital Radiation
- vii. Smoking
 1. Vaping?

2. Case Presentations

- a. Photos, MRI, CT's and other supporting documentation
- b. Current treatment for TED focuses primarily on supportive and palliative care and includes ocular lubrication, prism glasses for diplopia and lifestyle modifications, such as smoking cessation, selenium and vitamin D supplementation and systemic thyroid disease control.
- c. Once a patient is in the stable phase, some undergo surgical intervention,

- i. orbital decompression
 - ii. strabismus surgery
 - iii. eyelid reconstruction
 - iv. Staged procedures with healing “lag” inbetween
 - d. Urgent surgery is reserved for severe situations involving compressive optic neuropathy or extensive corneal exposure.
- 3. New Treatment Options
 - a. Research revealed a signaling pathway that involves activation of insulin-like growth factor 1 receptors (IGF-1R) in patients with Graves’ disease.
 - b. This pathway acts synergistically with thyroid-stimulating hormone receptors
 - i. Enhances the mechanism of action, increasing orbital tissue inflammation.
 - c. By blocking the IGF-1R, the actions of IGF-1 are inhibited and the inflammatory and proliferative process associated with Graves’ ophthalmopathy may be diminished.
 - d. Blood tests to order
- 4. Teprotumumab Side Effects
 - a. Hearing impairment in five patients (two had hypoacusis, one had deafness, one had autophony and one had mild patulous eustachian tube) in the teprotumumab group, all of which resolved without treatment.
 - b. Hypoacusis is defined as a functional deficit that arises when a person loses some degree of their auditory capacity.
 - c. Deafness a more complete impairment that inhibits linguistics.
 - d. Autophony is the unusually loud hearing of a person's own voice.
 - e. With patulous (think open) Eustachian tube, variations in upper airway pressure associated with respiration are transmitted to the middle ear through the Eustachian tube. This causes an unpleasant fullness feeling in the middle ear and alters the auditory perception.
 - f. Complaints seem to include muffled hearing and autophony. In addition, patulous Eustachian tube generally feels dry with no clogged feeling or sinus pressure.
- 5. Labs for TED and eyecare
 - a. TSI, not T3,T4, TSH
- 6. Developing Interdisciplinary Relationships and Bridging Patient Care with Co-management of patients with TED