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Caring Thyroid Eyes: Preventing Blindness

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Every day a big number of patients attend the thyroid section of the Nuclear Medicine (NM) centers of the district towns, divisional cities, and capitals of Bangladesh with thyroid dysfunction. How many patients have the risk factors or high antibody titer of thyroid eye disease? Who knows!

Thyroid eye disease (TED), or Graves' orbitopathy, is the most common autoimmune disorder affecting the orbit, primarily involving orbital fat and extraocular muscles, and linked to thyroid dysfunction. It is mainly associated with hyperthyroidism but can also appear in euthyroid or hypothyroid patients. TED leads to proptosis and progressive orbital inflammation, resulting in significant ocular morbidity (1). There is a female predominance, and most affected individuals fall within the age range of 30 to 60 years (2). Severe cases can cause debilitating symptoms and facial disfigurement, severely affecting quality of life through pain, anxiety, depression, and vision problems, which in turn lowers self-confidence and reduces social and work engagement (3).

Bone marrow-derived fibrocytes play a central role in TED pathogenesis. These orbital fibroblasts express considerable levels of TSH receptors (4). TSH receptor antibodies target orbital fibroblasts and stimulate them to produce excess hydrophilic glycosaminoglycans, mainly hyaluronan. This leads to tissue edema and also promotes differentiation of fibroblasts into myofibroblasts and adipocytes. As a result, there is enlargement of extraocular muscles due to edema, expansion of orbital fat from adipogenesis, and eventual fibrosis of the orbital connective tissue (5). Serum TSH receptor antibody concentrations directly correlate with clinical activity and severity of TED, which strongly suggests that the TSH receptor is the primary autoantigen in TED (6).

Risk factors for thyroid eye disease (TED) include smoking, thyroid dysfunction, TSH-receptor antibodies, stress, radioactive iodine treatment, and hypercholesterolemia (2). Preventing the clinical progression of thyroid eye disease requires a multidisciplinary approach for precise diagnosis and personalized treatment, especially starting from primary care. Early detection and management of Graves' orbitopathy (GO) are crucial, as timely correction of thyroid dysfunction is linked to lower progression risk, and successful treatment outcomes are correlated with shorter disease duration. Ocular surface complications in thyroid eye disease occur mainly due to exposure of the cornea from lagophthalmos and proptosis. This leads to exposure keratopathy. Patients commonly develop dry eye syndrome as a result of tear film instability and increased evaporation. In severe or untreated cases, these changes may progress to corneal ulceration and even corneal perforation (7).

The diagnosis of thyroid eye disease is primarily based on clinical evaluation, including assessment of disease activity using the Clinical Activity Score (CAS). Thyroid function tests such as TSH, free T4, and free T3 are performed to evaluate associated thyroid dysfunction. Measurement of autoantibodies, particularly TSH receptor antibodies (TRAb), supports the diagnosis and helps confirm autoimmune activity (8).

Imaging studies play an important role in confirming and assessing disease severity. CT of the orbit typically shows enlargement of the extraocular muscles with characteristic sparing of the tendons. MRI of the orbit is useful for demonstrating soft tissue involvement and inflammatory changes. In selected cases, nuclear medicine imaging may also be used to assess disease activity and inflammatory burden (9).

The management of thyroid eye disease begins with general measures, which include achieving and maintaining a euthyroid state, encouraging smoking

cessation, and using lubricating eye drops to protect the ocular surface. Medical treatment primarily involves corticosteroids, with intravenous methylprednisolone being the preferred regimen in active disease. Immunosuppressive agents such as mycophenolate may also be used as steroid-sparing therapy. Biologic agents can be considered in selected cases, although their availability is limited in settings such as Bangladesh (10). Orbital radiotherapy may be used in selected patients with moderate to severe active disease to reduce inflammation and disease progression. Surgical management is reserved for inactive or stable disease and includes orbital decompression to relieve proptosis or compressive optic neuropathy, strabismus surgery to correct diplopia caused by restrictive myopathy, and eyelid surgery to address eyelid retraction and improve both function and cosmesis (11).

A structured rapid assessment protocol for Thyroid Eye Disease (TED) involves five steps. Step 1 entails a quick subjective assessment using a five-question survey to evaluate activity, symptoms, red flags, laboratory test analysis, and risk factors. Step 2 focuses on a thorough examination, looking for signs of periorbital edema, conducting the lid gap test, and assessing eye muscle motility. Step 3 stratifies risk by identifying high-risk patients for urgent referral or low-risk patients who require follow-up and lifestyle advice. Step 4 outlines immediate management, emphasizing smoking cessation, euthyroidism maintenance, referral for significant signs, a lubrication plan, and consideration of selenium for mild disease. Finally, Step 5 covers patient education, advising on head elevation, use of sunglasses, precautions regarding radioactive iodine, expectation setting about the chronic nature of TED, documentation, and scheduling follow-ups (12).

A good understanding of the disease process along with following the recommended protocols of different professional authorities enhances the early detection and timely management of Graves' orbitopathy to halt the progression of orbitopathy, thus preventing the devastating, sight-threatening complications and saving the vision with good quality of life.

Thyroid eye disease management in Bangladesh faces several challenges. Access to specialized multidisciplinary care is limited, which affects comprehensive evaluation and treatment. Advanced therapies such as biologics are often costly and not widely available. Diagnosis is frequently delayed due to low awareness among patients and primary healthcare providers. In addition, inconsistent follow-up further compromises long-term disease monitoring and outcomes. Availability of nuclear medicine services and advanced orbital imaging is also limited outside major cities, restricting optimal assessment and management of complex cases.

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