

Researchers shed light on vascular growth factors in thyroid eye disease

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Researchers from the Schepens Eye Research Institute of Massachusetts Eye and Ear have identified new underlying mechanisms of proptosis, or bulging of the eyes, in patients with acute thyroid eye disease. In a report published online in the journal *Ophthalmology*, the researchers describe vascular growth factors causing an abnormal proliferation of blood vessels, as well as the rare formation of lymphatic vessels, that may contribute to the dangerous swelling and inflammation that occurs in the orbits of these patients. The findings point to new potential targets for non-surgical therapies to decompress the eye in the acute phase of thyroid eye disease.

"We've found that there is a proliferation of [blood vessels](#), and, to our surprise, in some of those acute cases, lymphatic vessels do form where there normally aren't any," said corresponding author Leo A. Kim, M.D., Ph.D., a retina surgeon at Mass. Eye and Ear and an Assistant Professor of Ophthalmology at Harvard Medical School. "Our results suggest that it might be possible to treat the inflammation and swelling by stopping the blood vessels from forming and leaking fluid, or, alternatively, by finding a way to promote lymphatic vessel formation and enhance drainage of fluid. This study opens a path to exploring non-surgical treatments."

A potentially sight-threatening condition, thyroid eye disease is associated with Graves' disease, an autoimmune disorder causing excessive production of hormones by the thyroid gland. Approximately 10 to 20 percent of patients with Graves' disease experience severe

inflammation of the eyes and surrounding tissues that can cause disabling double vision or permanent vision loss. Current treatment strategies for these patients rely on managing the swelling through systemic steroids—and sometimes, through invasive surgical techniques to realign the eyes or decompress the orbits by breaking bones.

With the hope of finding markers that may enable more targeted therapy, the researchers studied samples obtained from 15 patients with thyroid [eye disease](#) undergoing orbital decompression. In samples from the acute, inflammatory stage of the disease, they found that both rare lymphatic vessels and robust blood vessels had formed.

While more studies are needed, the proliferation of leaky blood vessels not only offers an underlying mechanism for the swelling, but also offers the potential to be controlled with local administration of angiogenesis inhibitors (such as anti-VEGF). Moreover, by determining the mechanisms underlying lymphatic vessel formation in the acute stage of the disease, the creation of functional [lymphatic vessels](#) may be utilized as a therapeutic option to better drain fluid from the orbit.

"This exciting study gives us some new insights into how we might get to the root cause of this devastating disease and better manage it through less invasive treatments that will improve quality of care for our patients," said Dr. Kim.

More information: Lindsay L. Wong et al, Orbital Angiogenesis and Lymphangiogenesis in Thyroid Eye Disease, *Ophthalmology* (2016).
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