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Conjunctiva Histology in Long-standing Esotropia

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Authors' contributions

This work was carried out in collaboration between all authors. Author MPB designed the study, wrote the protocol and wrote the first draft of the manuscript. Authors VHGA, MRB, RP and HQM managed the literature searches and author MPB carried out microbiological studies. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Background: Conjunctiva can be restrictive in long-standing strabismus. To date, there are no reports in the literature describing the histology of the conjunctiva in these patients.
Methods: Conjunctiva biopsies over the medial and lateral rectus were taken at the time of strabismus surgery in 3 patients with restrictive large angle long-standing esotropia.
Results: The conjunctiva overlying the medial rectus has a much more condensed, organized lamina propria compared to the conjunctiva of the contralateral lateral rectus. The medial conjunctiva has scattered small-diameter vessels and numerous clusters of plasmatic cells. The lateral conjunctiva has large blood vessels with occasional scattered plasmatic cells and the lamina propria present a lax structure.
Conclusions: These new findings reinforce the clinical understanding that conjunctiva can become more restrictive over the medial rectus in long-standing esotropia.

Keywords: Strabismus; esotropia; conjunctiva; histology.

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1. INTRODUCTION

It has long been recognized that the conjunctiva can be restrictive in long-standing strabismus [1,2]. Recessing the conjunctiva in such situations increases the amount of prismatic diopters corrected postoperatively [3,4].

The microscopic structure of the restrictive conjunctiva has not been described. We present the conjunctiva histology findings on 3 patients with large angle long-standing esotropia.

2. MATERIALS AND METHODS

In this case series, we look at the histologic aspect of the conjunctiva of 3 patients that have had long-standing horizontal strabismus, specifically, esotropia. For this study, we define large angle long-standing esotropia as esotropia of 50 prismatic diopters (PD) or more and esotropia that has been persistent for more than 20 years. We excluded patients with previous strabismus surgery or conjunctiva pathology. Every patient included in the case series tested positive on forced duction test on attempted abduction. All the patients were male and Hispanic. Patient 1, 58 year old, with esotropia of 60 PD on left eye. Visual acuity 20/20 OD, 20/100 OS. Patient 2, 45 year old, alternating esotropia of 50 PD. Patient 3, 27 year old with alternating esotropia of 50 PD. The two patients that presented alternating esotropia had uncorrected visual acuity of 20/30 in both eyes.

The surgical technique utilized was a conjunctiva limbal approach. Recession of the medial rectus with recession of the conjunctiva allowing a forced duction test on abduction to be negative and resection of the opposite lateral rectus. Biopsies of conjunctiva overlying the medial and lateral rectus muscles from the operated eye were taken at the time of surgery.

Informed consent was obtained from all individual participants included in the study. All procedures performed were in accordance with the ethical standards of the institutional national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

3. RESULTS

The changes found on histology were consistent among all patients. On H&E staining, we found that the conjunctiva overlying the medial rectus have a much more condensed organized lamina propria compared to the conjunctiva of the contralateral lateral rectus muscle. The medial conjunctiva has scattered small-diameter vessels and numerous clusters of plasmatic cells (Fig. 1). In contrast, the lateral conjunctiva has large, abundant blood vessels with occasional scattered plasmatic cells. The lamina propria itself is poorly organized in a lax structure (Fig. 2). The conjunctiva epithelium overlying the lateral rectus muscle has fewer cells in comparison to the normal looking epithelium of the medial conjunctiva.

4. DISCUSSION

Several studies have addressed the role of recessing the conjunctiva to increase success rate in strabismus surgery [2-4]. Although fornix conjunctiva incision is favored by most surgeons for primary horizontal rectus muscle surgery [5], a limbal approach has been shown to allow recession of restrictive conjunctiva along with medial rectus muscle recession. Studies have shown that recessing conjunctiva along with the medial rectus results in consistently increased correction of diopters postoperatively compared to recession of rectus alone [4]. The conjunctiva over the opposite resected rectus muscle is often loose and sometimes needs to be trimmed in order to have a good cosmetic appearance. Clinically, the medial conjunctiva is different from the lateral conjunctiva in large angle long-standing esotropia. The question is: are there histologic differences between the medial and lateral conjunctiva in large angle long-standing strabismus? Yes, they are.

The main histologic findings are on the lamina propria. The “increased density” of the lamina propria over the medial rectus could explain the small- diameter vessels as well as the increased relative number of plasmatic cells. The “tight” lamina propria could make the plasmatic cells to be close to one another, not necessarily increasing the absolute number of cells. The dense lamina propria could “compress” the vessels making them look smaller in diameter. In practice, a tight conjunctiva is able to restrict a muscle recession, and that could explain why recessing the conjunctiva consistently increased correction of diopters postoperatively compared to recession of rectus alone [4]. There have been no studies to date that look at the histologic changes on the overlying conjunctiva in strabismus. Our study is limited by our small cohort, but the histologic findings were consistent among all our patients.

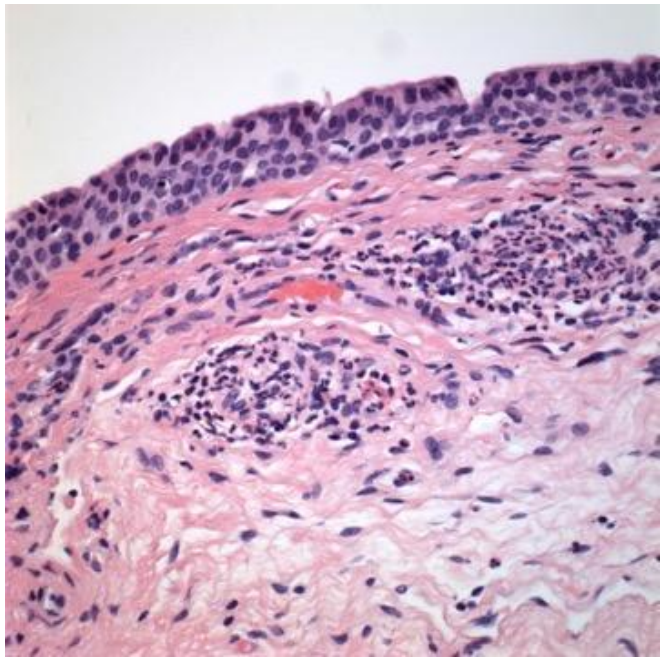

Fig. 1. H & E 40X the conjunctiva over medial rectus in large angle long-standing Esotropia. Condensed organized lamina propria. Scattered small-diameter vessels and numerous clusters of plasmatic cells

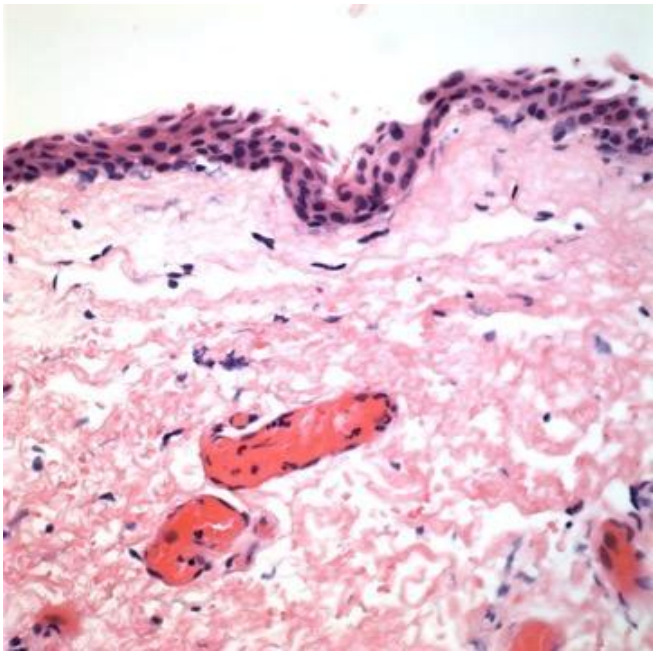

Fig. 2. H & E 40X large blood vessels with occasional scattered plasmatic cells. The lamina propria itself is poorly organized in a lax structure. The conjunctiva epithelium overlying the lateral rectus muscle has fewer cells in comparison to the normal looking epithelium of the medial conjunctiva

5. CONCLUSION

This is the first study to look at the histologic changes in the conjunctiva overlying the rectus muscles of patients with long-standing large angle esotropia. Conjunctiva overlying the medial and lateral rectus muscles in long-standing esotropia undergo histologic changes that may affect the structure of the conjunctiva. These new findings reinforce the clinical understanding that conjunctiva can become more restrictive over the medial rectus in long-standing esotropia. This description warrants further studies regarding the role of the conjunctiva in long-standing strabismus.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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