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Orbicularis Oculi Muscle Histopathological Findings in Essential Blepharospasm

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INTRODUCTION

Benign essential blepharospasm (BEB) is a focal dystonia affecting the periocular area. In the literature, there is a lack of studies that analyzed untreated orbicularis oculi muscles in BEB patients.

PURPOSE

This study aims to evaluate and compare pre-septal orbicularis oculi muscle samples from treatment-naïve BEB patients and control individuals.

METHODS

Seven orbicularis oculi muscle (OOM) samples from four control subjects and six OOM specimens from five untreated BEB patients were quantified.
Muscle specimens were processed with hematoxylin and eosin and Gomori stainings, and objective analyses were conducted by two investigators using digital image analysis software (Image J).
Morphological analysis included fiber count, connective tissue measurement, and muscle fiber area. Intraclass correlation coefficients (ICC) assessed reliability. Statistical analysis employed Mann-Whitney tests.

RESULTS

Mean age in the BEB group was 61.0 ± 7.9 years and 69.7 ± 6.4 years in the control group.
BEB patients exhibited reduced fiber count, increased fiber area, and increased mean connective tissue rate compared to controls (p=0.008, p=0.025, p<0.001, respectively).

Table 1. Average muscle fiber number, mean connective tissue percentage and fiber area in normal controls and in BEB patients.

Case	Muscle Fiber Number (N) Mean ± SD	Mean Connective Tissue (%) Mean ± SD	Fiber Area (mm^2) Mean ± SD
Controls	70.50 ± 12.91	10.04 ± 3.60	8.91 ± 1.46
Blepharospasm	59.04 ± 20.80	20.31 ± 9.03	10.48 ± 2.12
Mann-Whitney test (Controls vs. BE)	p=0.008	p<0.001	p=0.025

P-values of non-parametric comparisons between groups are presented. OOM: orbicularis oculi muscle. BEB: blepharospasm, SD: standard deviation.

Table 1 and Figure 1 summarize the results. Reliability was excellent (ICC=0.989).

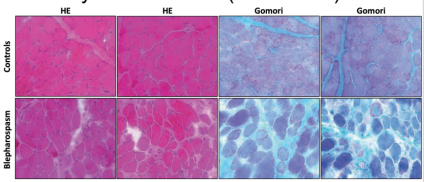

Figure 1. Orbicularis oculi samples from normal individuals and blepharospasm patients. A reduction in the number of cells and larger fiber diameter can be observed comparing blepharospasm to the control group. Gomori staining emphasizes the greater rate of connective tissue in the blepharospasm group. (HE: hematoxylin & eosin, Gomori: Modified Trichrome Gomori, x400).

DISCUSSION

Morphological changes in BEB patients were similar to those previously described in hemifacial spasm.[1]
The results showing OOM alterations possibly reflect the effect of repeated muscle contractions over time in BEB patients. Additionally, there was a significant higher rate of connective tissue in patients with blepharospasm as opposed to the controls. This increase in connective tissue could be due to a degenerative process involving the loss of muscle fibers.
Although the mean ages varied between BEB and control groups, it has been demonstrated that no age-related histopathological changes have been observed in OOM samples.[2]

CONCLUSION

This study provides novel insights into the untreated orbicularis oculi muscles of BEB patients, revealing significant morphological differences compared to controls.
The observed muscle alterations contribute to our understanding of BEB's histopathological characteristics. Future studies with larger samples and correlation with disease severity can enhance our comprehension of this condition.

References

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