



Age-related changes in the aryepiglottic muscle

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ABSTRACT

Objective: Information on the histological components of the aryepiglottic fold is controversial. To identify age-related changes in the aryepiglottic muscle associated with function of the epiglottis during swallowing.

Study Design: A comparative morphologic study.

Subjects and Methods: Normal postmortem laryngeal tissue samples were obtained at autopsy from 10 individuals with no history of laryngeal disease. The subjects were divided into two groups: those aged 75- 86 years (elderly group, n=5) and those aged 30- 46 years (non-elderly group, n=5). Specimens were subjected to Elastica Van Gieson and Hematoxylin-Eosin staining, and characteristics of the aryepiglottic muscle were compared between groups.

Results: The aryepiglottic muscle extended from epiglottis to arytenoid cartilage in the non-elderly group, however the muscle cannot be observed in the elderly group. The numbers of collagenous fibers, and elastic fibers were significantly decreased in the elderly group in comparison to those in the non-elderly group.

Conclusion: Our study suggests that the aryepiglottic muscle acts as a constrictor of the laryngeal orifice during swallowing, and it will disappear in the aryepiglottic fold with the aging process. Age-related changes in the aryepiglottic muscle appear to be associated with the risk of aspiration in the elderly.

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INTRODUCTION

The Epiglottis plays an important role in protecting the lower airway during the pharyngeal stage of swallowing. Epiglottic dysfunction leads to aspiration and other airway troubles.

The aryepiglottic muscle is Located in the upper part of the aryepiglottic fold. It is attached to the lateral border of the epiglottis and becomes the oblique arytenoid which then attaches into the arytenoid cartilage. This muscle works as a purse string to close the opening of the larynx when swallowing, protecting the larynx. In the Nomina Anatomica (IANC, 1989), the aryepiglottic muscle is listed as a part of the oblique arytenoid muscle.

However, relations between mobility of the epiglottis and the aryepiglottic muscle are not fully understood. And also, information on the histological components of the aryepiglottic fold is controversial [1,2].

The purpose of this study was to clarify whether age-related changes in the aryepiglottic muscle are associated with function of the epiglottis during swallowing.

Study Design: A comparative morphologic study.

METHODS AND SUBJECTS

Normal postmortem laryngeal tissue samples were obtained at autopsy from 10 individuals with no history of laryngeal disease. The subjects were divided into two groups: those aged 75- 86 years (elderly group, n=5) and those aged 30- 46 years (non-elderly group, n=5).

The specimens generally consisted of the epiglottis, aryepiglottic fold, and arytenoid cartilage with associated laryngeal musculature.

Histologic examination.

Hematoxylin-eosin staining and Elastica van Gieson (EVG) staining were performed and fixed in 10% formalin and embedded in paraffin.

The morphologic structures of the aryepiglottic fold were compared between the elderly group and the non-elderly group. Histologic examination of the aryepiglottic muscle was performed in horizontal and sagittal sections.

Analysis of staining patterns

The distribution of collagen, elastic, and muscle fibers in the hyoepiglottic ligament was classified as dense, moderate, or sparse according to staining intensity in a ×200 microscopic field (0.723 mm² per field), as reported previously [3]. The distribution of these was compared between the elderly group and the non-elderly group.

RESULTS

The aryepiglottic muscle extended from epiglottis to arytenoid cartilage in the non-elderly group, however the muscle cannot be observed in the elderly group (Figure 1, 2, Table1). The numbers of collagenous fibers, and elastic fibers were significantly decreased in the elderly group in comparison to those in the non-elderly group (Table 2, $P < 0.01$, *Mann-Whitney's U tests*).

Group	Age	Sex	Muscle Fiber distribution pattern
Non-elderly group	46	F	Moderate
	30	M	Dense
	28	M	Dense
	42	F	Dense
	45	F	Moderate
Elderly group	86	M	Lack
	82	M	Lack
	74	F	Lack
	82	M	Lack
	78	M	Lack

Table 1. Muscle fiber distribution pattern.

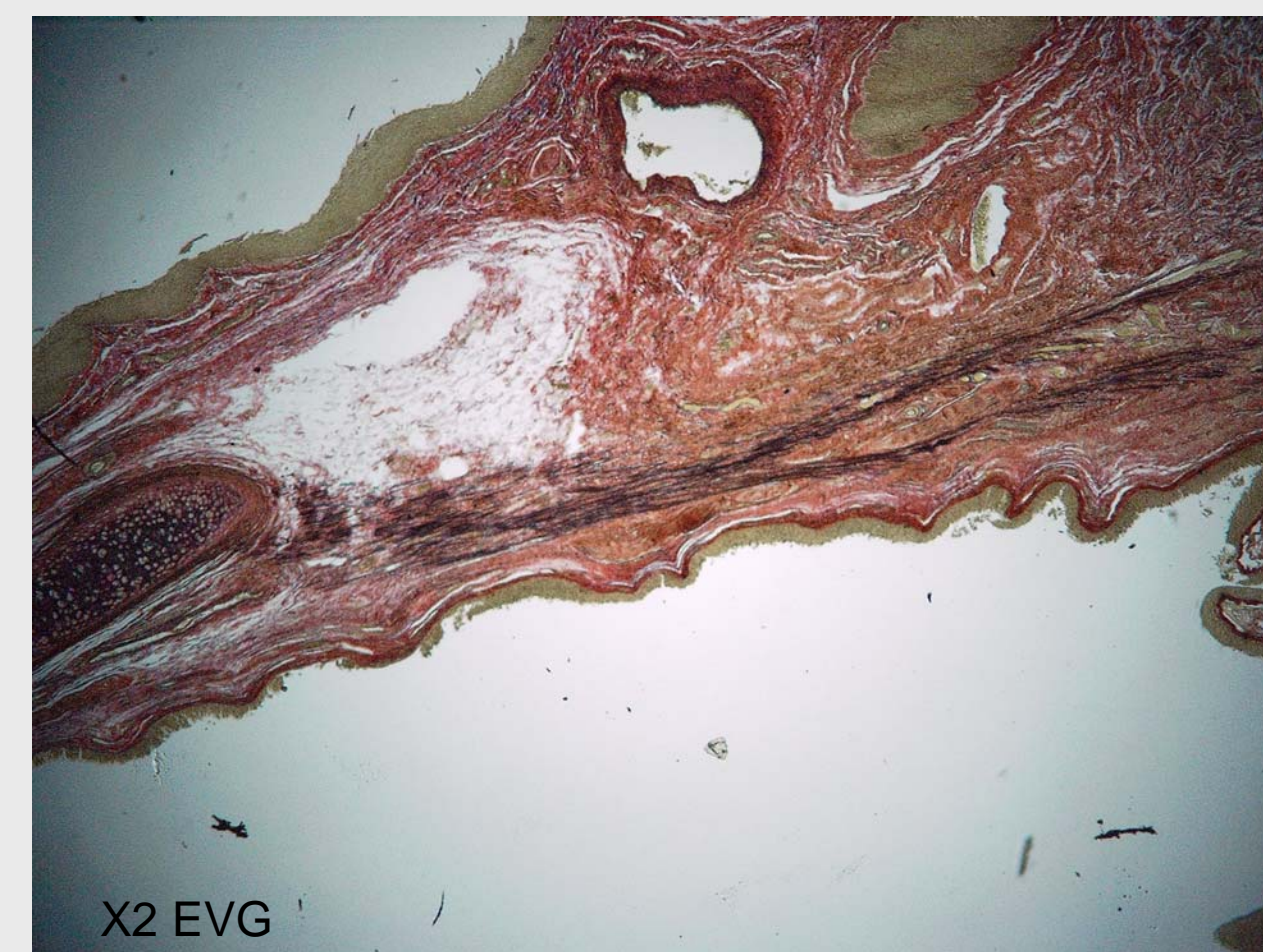


Figure 1. Median sagittal section (non-elderly group).

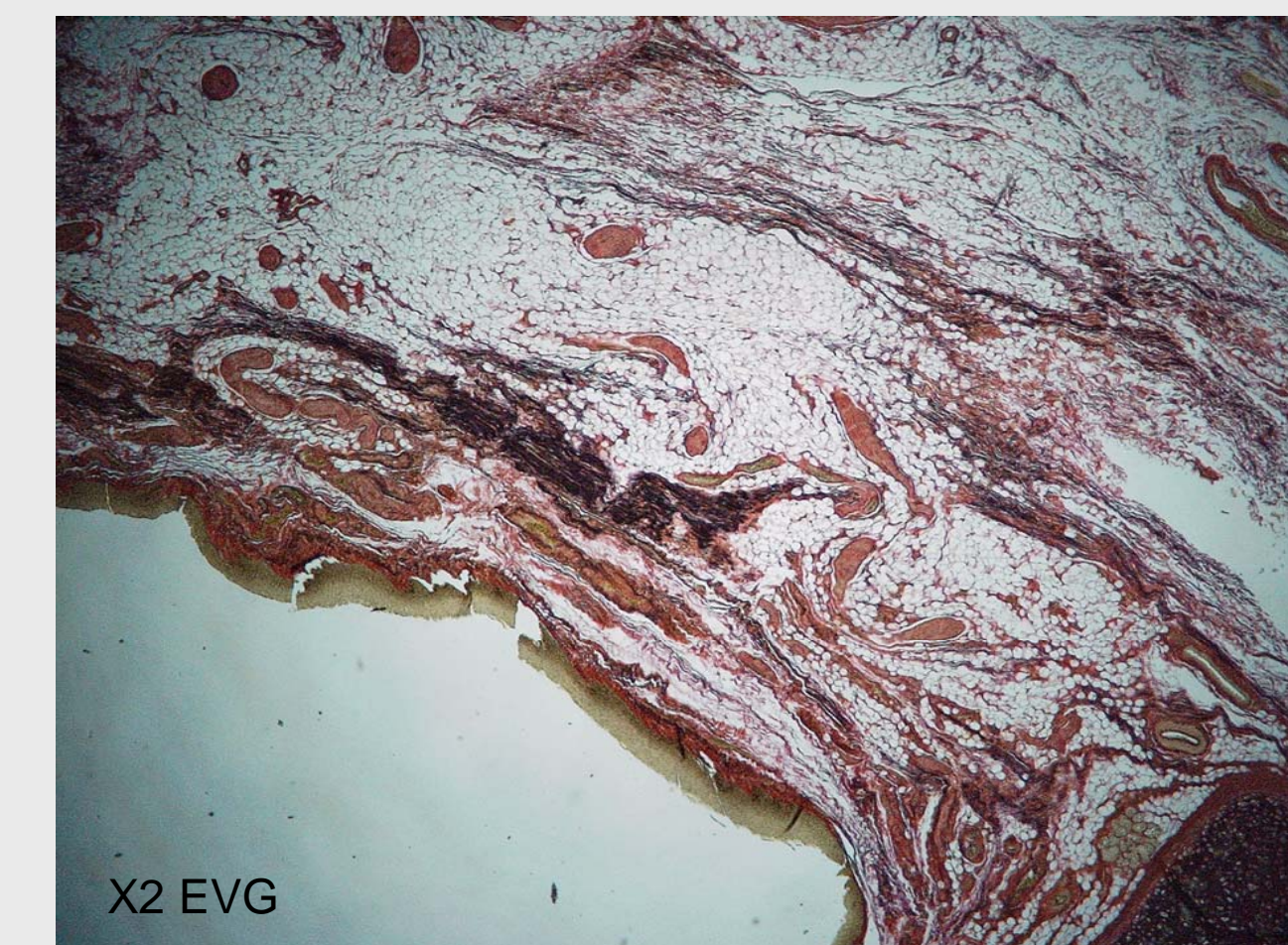


Figure 2. Median sagittal section (elderly group).

Group	Fiber distribution pattern		
	Dense	Moderate	Sparse
Elderly group	0	0	5
Non-elderly group	3	2	0

Table 2. Collagen and elastic fibers distribution patterns. No. of person is shown.

DISCUSSION and CONCLUSIONS

Aryepiglottic muscle is originating from the apex of the arytenoid cartilage and inserting on the lateral margin of the epiglottis[4]. However, some reports showed absence of the muscle in the aryepiglottic fold [1,2]. Our study shows that muscle fibers are found within the aryepiglottic fold in the non-elder group, but not in the elderly group.

Our study suggests that the aryepiglottic muscle will disappear in the aryepiglottic fold with the aging process.

We suggest that the aryepiglottic muscles acts as depressor muscle of the epiglottis, pulling it caudally during deglutition to cover the laryngeal inlet.

Age-related changes in the aryepiglottic muscle appear to be associated with the risk of aspiration in the elderly.

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