กล้ามเนื้อ cleidohyoid ในมนุษย์ : กรณีศึกษา

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Cleidohyoid Muscle in Human: A Case Report

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หลักการและวัตถุประสงค์: การทำหัตถการทางการผ่าตัดบริเวณคอนั้นพบได้บ่อย เช่น การตัดต่อมไทรอยด์ การเจาะคอ และการตัดเลาะก้อนเนื้อรวมทั้งต่อมน้ำเหลืองออก ดังนั้นศัลยแพทย์จึงควรตระหนักถึงความผันแปรทางกายวิภาคศาสตร์บริเวณคอที่ยังไม่เคยพบหรือไม่เคยมีรายงานมาก่อนเพื่อศึกษาการเจริญผิดปกติของกล้ามเนื้อที่เรียกว่า cleidohyoid ในศพดองคนไทย

วิธีการศึกษา: ทำการชำแหละศพดองของผู้บริจาคร่างกายตั้งแต่ปี พ.ศ. 2517-2551

ผลการศึกษา: พบการเจริญผิดปกติของกล้ามเนื้อที่เรียกว่า cleidohyoid ในร่างศพดอง 1 ร่าง จาก 939 ร่าง กล้ามเนื้อนี้เป็นกล้ามเนื้อที่พบในสัตว์ตระกูลนก ซึ่งหายไปในระหว่างวิวัฒนาการ กล้ามเนื้อนี้ทำหน้าที่ในกลไกการกินอาหารเพื่อการดำรงชีวิต เพื่อให้ทำกิจกรรมดังกล่าวได้ กล้ามเนื้อนี้ยึดรยางค์ปีก โดยเฉพาะอย่างยิ่งคือ กระดูกไหปลาร้ากับกระดูก hyoid ของลิ้น ทำให้สามารถกลืนอาหารได้ โอกาสการเกิดการผันแปรเช่นนี้ พบได้น้อยมากประมาณ 0.01%

สรุป: การพบกล้ามเนื้อ cleidohyoid ช่วยให้ศัลยแพทย์เพิ่มความระมัดระวังในการทำหัตถการในบริเวณคอเพิ่มมากขึ้น

คำสำคัญ: ความผันแปรทางกายวิภาคศาสตร์, กล้ามเนื้อ cleidohyoid, กลไกการให้อาหาร, การเจริญ, วิวัฒนาการ

Background and Objective: The surgical approaches of the neck region are very frequent. The examples are thyroidectomy, tracheotomy, and removal masses including lymph nodes. Therefore, the surgeons have to be aware of anatomical variations in the neck including the unseen and unreported ones. The present study was to report the cleidohyoid muscle in Thai cadavers as a first case in the Northeast Thailand.

Methods: Re-dissection surveys had been performed on the embalmed, legally donated cadavers to Department of Anatomy, Faculty of Medicine, Khon Kaen University from 1974 to 2008.

Results: The cleidohyoid muscle was observed in one male out off 939 cadavers. This muscle is present in birds and disappears somewhere along the course of evolution. The muscle helps in the process of feeding. It connects the pectoral girdle, specifically the clavicle, to the tongue skeleton especially the hyoid bone, so that the swallowing of food is possible. The incidence of this variation is very rare. It is 0.01% in this study. The developmental history and the surgical aspect of the muscle were presented.

Conclusion: The occurrence of the cleidohyoid muscle in the densely packed region as in the neck requires an extremely careful procedure of the surgeons.

Keywords: Gross anatomy variation, cleidohyoid muscle, mechanism of feeding, developmental history, evolution

ศรีนครินทร์เวชสาร 2552; 24(3): 265-7 • Srinagarind Med J 2009; 24(3): 265-7

Background

A variety of surgical interventions is the neck region are very frequent. The example are, removal of food from pharyngeal pouch, thyroidectomy, tracheotomy, and removal of masses including lymph nodes. The neck is important both by itself and as a passage between the head being the highest control center and the rest of the body for various physiological activities. All body systems directly traverse the neck except the reproductive system. The surgeons have to take the utmost precaution of anatomical variations in the neck including the unseen and unreported ones. The present case report concerns the unheard-of-muscle in the neck. The occurrence of this muscle in the densely packed region as in the neck requires an extremely careful maneuver of the surgeons.

Materials and Methods

The total number of 939 cadavers dissected in KKU Medical School form 1974 to 2008 were cumulatively kept in the record through the dissected survey by close supervision of the medical students in the dissecting laboratory. The authors have applied the standard dissection technique throughout the study period of 34 years.

Results

The authors discovered an extramuscle lying superficial to sternohyoid muscle on the right side of the neck (Figure 1). It was a flat muscle of 7 cm. long and 2 cm. wide and well ensheathed with definitely well-developed fascia. Its shape and size were comparable to those of sternohyoid muscle. It originated from the middle one third of the posterior surface of the right clavicle by a narrow strip of aponeurosis (Figure 2). The muscle inserted to the body and greater cornu of hyoid bone. It had no symmetrical muscle on the left side of the neck. The cleidohyoid muscle reported here was ipsilateral and asymmetrical variation. Its nerve supply was from the ansa cervicalis. Its arterial supply was from the thyrocervical trunk of the subclavian artery. There was no omohyoid muscle on this side of the neck.

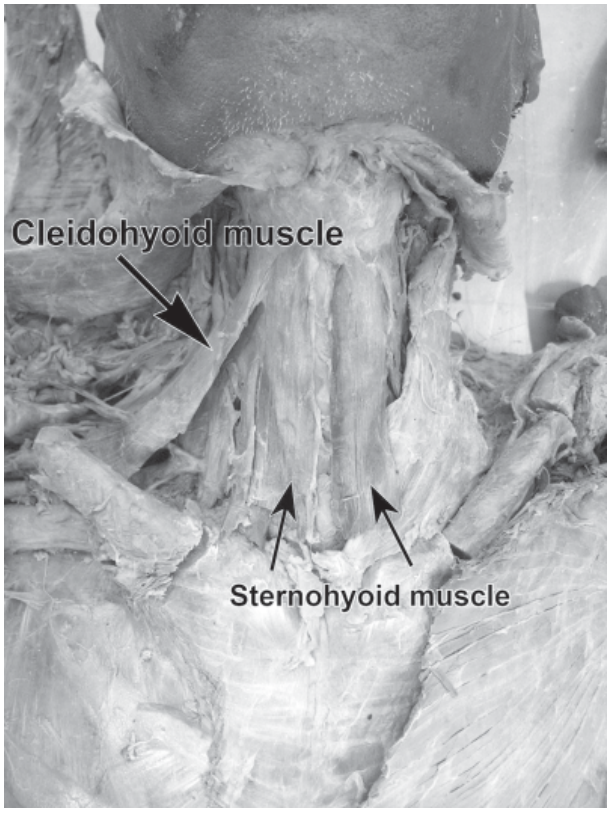

Figure 1 Cleidohyoid lying lateral to sternohyoid muscle on the right side of the neck.

Figure 2 Cleidohyoid muscle originated from the middle one third of the posterior surface of the right clavicle. (4 arrow heads)

Discussion

It is well established that ontogeny recapitulates phylogeny. The developmental processes of embryos of the mammals repeat those of animals in lower phyla such as fishes and amphibians of the evolutionary ladders. Scientists in the field of biology have long been regarded that the fish is an evolution ancestor of amphibians, an amphibian is the ancestor of reptilies, bird, and mammal including primate and human. The variation in the present case could be categorized into the evolutionary gross anomaly. In the scientific viewpoint, it is extremely rare as in the KKU Medical School, Department of Anatomy series, it is only 0.01% or out off 939. Ontogenically this muscle could be the modification of the superior belly of omohyoid muscle as the insertion is at that of the omohyoid fascial sling attaching it to the clavicle which is absent.

In the process of evolution, actually, the natural selection is taking place in the extraordinary long course of time. The cleidohyoid muscle of the avian found here in human neck has not been previously reported in Thailand. The advancement of experimental embryology contributed to the understanding of the possible mechanism which partly was responsible for this variation[1]. They worked out the molecular morphogenesis and found that the cranial neural crest cells migrated caudally from the level of rhombomeres 6 and 7 going around the cephalic end of otic vesicle of the chick embryo to assume the lateral position and migrated caudally. These neural crest cells traveled as far as the level of the anterior limb buds from which the wings developed. The cells migrated and differentiated into the bones and muscle through the complicated processes to keep the tongue skeleton (hyoid) and the pectoral girdle connected. This is to facilitate the swallowing, as a part of feeding mechanism, and the independent movements of the head, neck, and limbs suitable for (compatible with) life on land. There is still a need to stabilize the larynx during swallowing provided by the cleidohyoid muscle. In human evolution, they are the highly effective infrahyoid muscle group and the mylohyoid muscle to serve such purpose. The human cleidohyoid muscle is concluded to be the evolutionary remain from/or heritage of the vertebrate class of birds.

It is important, in the evolution point of view, to note that the pectoral girdle which includes the clavicle arises in primitive bony fish[2]. This girdle provided the protection for the heart and formed the posterior wall of an internal gill chamber[3]. The girdle underwent a series of changes during the evolution of tetrapods (4 footed animals) which used the paired appendages for locomotion. The evolution in the amphibians is evidenced by the loss of dorsal dermal elements connecting the pectoral girdle to the head. The head is free to move while maintaining stability. The cervical vertebrae are added to the trunk and caudal vertebrae[4]. The evolution of the reptilian and the avian results in the remaining of the clavicle. These changes free the clavicle from the head to the mesodermal elements and facilitated the movement of head independently from the limbs. The anatomical mechanism for feeding (swallowing) must be maintained so that the species would not be extinct. The cleidohyoid muscle thus developed in the avian from the mesenchyme that differentiated from the cranial neural crests previously migrated from the otic vesicle.

It is interestingly exciting for the anatomists and medical students to witness any rare abnormal occurrence of the gross structure since it is convincingly visible. Even though the gross anatomy variations are compatible with the functions and life process, they could affect the rate of success of surgery. There will be times when greater areas of the neck must be surgically dissected and removed. The awareness of variations in human body would be the utmost importance to undergo a safe surgical operation.

Acknowledgement

The authors acknowledge all the personnel who have contributed to the success of this study. Special thanks are due to Emeritus Prof. Dr. Somboon SrungBoonmee for helping in the preparation of English manuscript.

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