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Bifid Xiphoid Process - A Cadaveric study

Rahul Kumar Gupta

Associate Professor, Department of Rachna Sharir, Government Ayurvedic Medical College, Akhnoor, Jammu and Kashmir, India.

ABSTRACT

The xiphoid process is a small bony feature of the anterior thoracic wall just inferior to the sternum corpus. Although the xiphoid process is commonly represented as a straight, fully ossified bone in educational textbooks, reports of anomalous processes flood the literature. The xiphoid process can be broad, thin, monofid, bifid, trifid, curved, or deflected and contain foramina. Variations can be mistaken for epigastric masses. Herein, we report an extremely unusual bifid xiphoid process that is deflected anteriorly. This case is discussed in the context of the misdiagnosis of xiphoid process variations and its importance to the clinician.

Key words: *Bifid xiphoid process, variation, sternum*

INTRODUCTION

The sternum is a flat bone forming the anterior median wall of the thoracic skeleton. In shape, it resembles a short sword, made of three parts. The upper part corresponding to the handle is called the manubrium, middle part resembling the blade is called the body and the lowest tapering part forming the point of sword is the process or xiphisternum.

The xiphoid process (also known as the xiphisternum) is located in the epigastrium region of the anterior thoracic wall. The xiphoid process articulates with the superiorly located sternum corpus at the xiphisternal joint. During the first half of life, this joint is categorized as a symphysis but eventually becomes a synostosis at ~40 years.[1]

Address for correspondence:
Dr. Rahul Kumar Gupta
Associate Professor, Department of Rachna Sharir, Government Ayurvedic Medical College, Akhnoor, Jammu and Kashmir, India.
E-mail: rahulguptasdm@gmail.com

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The xiphoid process, which is the smallest and most variable part of the sternum, is thin and elongated. It lies at the level of T10 vertebra. Although often pointed, the process may be blunt, bifid, curved or deflected to one side or anteriorly. It is cartilaginous in young people but more or less ossified in adults, older than the age of 40 years. In elderly people, the xiphoid process may fuse with the sternal body.

Its junction with the sternal body at the xiphisternal joint indicates the inferior limit of the central part of the thoracic cavity projected onto the anterior body wall; this joint is also the site of the infrasternal angle (subcostal angle) of the inferior thoracic aperture.

It is a midline marker for the superior limit of liver, the central tendon of the diaphragm, and the inferior border of the heart.

Attachments: to its anterior surface are attached the most medial fibres of Rectus abdominis and aponeuroses of External and Internal obliques, to its lower end the linea Alba and to its border the aponeuroses of internal oblique and Transversus abdominis. To its posterior aspect slips of diaphragm and origin to sternocostalis muscles are attached and it is here related to liver.

CASE REPORT

During the routine dissection of pectoral region in Department of Rachna Sharir (Anatomy) of Jammu

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Institutute of Ayurveda and Research Nardani Jammu, a bifid xiphoid process was observed in an approximately 60 year old male cadaver. The cadaver was without any deformity and well preserved. The dissection was carried out according to cunningham's manual of practical anatomy as follows-

A vertical incision over the skin of thorax was given extending from the suprasternal notch to the tip of xiphoid process. The skin was reflected following which the muscles were exposed. The pectoralis major and pectoralis minor muscles were reflected. The complete sternum was visualized along with the xiphoid process.

Following observations were noted;

- Bifid xiphoid process was observed, which was deflected from median plane towards either side
- The process was continuous with the sternum and the xiphisternal joint was found ossified
- It was observed to be 10 degrees everted anteriorly

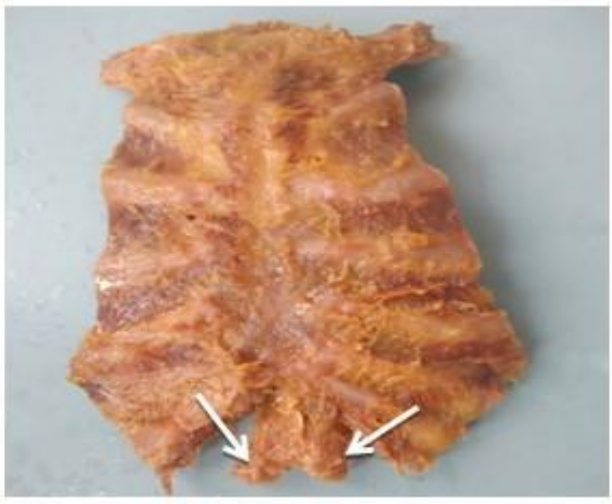

Fig 1: Bifid xiphoid process

Discussion

Somatic mesoderm (paraxial mesoderm) in the ventral body wall gives rise to the sternum and the stages of formation of sternum are;

- Sternal bars or plates develop on either sides of the midline during 6th to 7th week of development
- Fusion of the sternal bars starts during 8th week at the cranial end and proceeds caudally towards body of sternum and xiphoid process by 9th week.
- Ossification of the manubrium and body of sternum occurs by separate ossification centres. The xiphoid process ossifies only late in life. The centre for xiphoid process appears during the age of three years or later. It fuses with the body at about 40 years.

Variations of sternal development includes;

- Cleft sternum
- Perforated sternum
- Bifid xiphoid process

Conclusion

There are limited reports on variations of xiphoid process, but it has to be considered. The xiphoid process is variable in its morphology. It may be perforated, bifid, or deflected. Many people in their early 40's suddenly become aware of their partly ossified xiphoid process and consult their physician about the hard lump in the pit of their stomach (epigastric fossa). Never having been aware of their xiphopid process before they fear they have developed a tumor such as stomach cancer. Hence a thorough knowledge of the embryology and anatomy of the xiphoid process is important in clinical and surgical practice to make differential diagnosis in case of a suspected mass in epigastric fossa. Since xiphoid process is a highly variable part of the sternum normal variations are to be understood to plan accordingly during various surgical interventions of thoracic region

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