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BIFID XIPHOID PROCESS: A CADAVERIC CASE REPORT

Dr. Puneetha S[1], Dr. Monika Singh J G [2]
[1]*Associate Professor, Department of Rachana Sharira, Rajeev Institute of Ayurvedic Medical Science and Research Centre, Hassan, Karnataka, India,*
[2]*Assistant Professor, Department of Rachana Sharira, Rajeev Institute of Ayurvedic Medical Science and Research Centre, Hassan, Karnataka, India.*

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ABSTRACT
Background: The xiphoid process is the smallest and most variable part of the sternum. Anatomical variations of the xiphoid process are common and may lead to diagnostic confusion during clinical examination or radiological interpretation.
Case Presentation: During routine cadaveric dissection in the Department of Rachana sharira, RIAMS, Hassan,Karnataka, a bifid xiphoid process was observed in an adult cadaver. The xiphoid process showed a distinct bifurcation at its distal end, giving a Y-shaped appearance.
Conclusion: Bifid xiphoid process represents a normal developmental variation. Awareness of such variations is important for anatomists, surgeons, and radiologists to avoid misdiagnosis and prevent procedural complications.
KEYWORDS: *Xiphoid process, Bifid xiphoid, Sternum, Anatomical variation, Cadaveric study*

INTRODUCTION
The sternum forms the anterior component of the thoracic cage and consists of the manubrium, body, and xiphoid process[1]. The xiphoid process is the most variable segment of the sternum in terms of size, shape, and direction[2]. It is cartilaginous at birth and undergoes ossification in adulthood[1].

Various morphological variations of the xiphoid process such as bifid, elongated, perforated, and curved forms have been described in anatomical literature[3]. Although these variants are usually asymptomatic, they may be mistaken for pathological conditions such as epigastric masses, fractures, or tumors[2]. Hence, documentation of such variations is clinically relevant[3].

Case Presentation
During routine undergraduate dissection in the Department of Rachana Sharira, RIAMS, Hassan, Karnataka, the sternum of an adult cadaver was exposed following standard dissection protocols. On examination, the xiphoid process was found to be bifid at its distal end. The bifurcation resulted in two well-formed limbs, giving the xiphoid process a Y-shaped appearance. Both limbs appeared symmetrical and ossified. No other abnormalities of the sternum or thoracic cage were observed.

MATERIALS AND METHODS
The observation was made during routine cadaveric dissection. The sternum was carefully dissected and examined. Morphological features of the xiphoid process were studied, and measurements were taken using a measuring scale. Photographic documentation was obtained for academic and research purposes.

Observation
On detailed examination of the dissected sternum with attached costal cartilages, the xiphoid process was found to be **bifid at its inferior end**. The xiphoid process showed a **distinct midline division forming two elongated limbs**, giving a characteristic **Y-shaped appearance**.

Both limbs were **well formed, symmetrical, and directed inferolaterally**. The bifurcation extended from the distal part of the xiphoid process, while the proximal part remained continuous with the body of the sternum. The xiphoid process appeared **partially ossified**, consistent with adult morphology.

No evidence of fracture, perforation, abnormal curvature, or pathological erosion was observed. The adjacent costal cartilages and lower part of the sternal body appeared normal. No other congenital or acquired anomalies of the thoracic cage were noted.

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Fig: 1
Anterior view of the sternum showing the manubrium (yellow), body (green), and bifid xiphoid process (blue), highlighting the morphological variation of the xiphoid.



Fig: 2
Posterior view of the sternum with color differentiation showing the manubrium (yellow), body (green), and bifid xiphoid process (blue).

DISCUSSION

The xiphoid process develops from mesenchymal tissue and may show one or more ossification centers[1]. Failure of complete fusion of these centers can result in bifid or perforated xiphoid processes[3]. Several cadaveric and radiological studies have reported bifid xiphoid processes as one of the commonly observed anatomical variations[2],[3].

Clinically, a bifid xiphoid process may be misinterpreted as an epigastric mass or a fracture on radiological imaging[2]. During cardiopulmonary resuscitation, improper hand placement over an abnormal xiphoid process may lead to liver injury[1]. Awareness of such variations is also essential during laparoscopic and thoracic surgical procedures[3].

Clinical Significance

- Prevents misdiagnosis on radiological imaging
- Important during cardiopulmonary resuscitation
- Relevant in thoracic and upper abdominal surgeries
- Enhances anatomical knowledge for clinicians and students

CONCLUSION

The bifid xiphoid process is a normal anatomical variation resulting from developmental factors. Recognition of such variations is essential to avoid diagnostic errors and procedural complications. Reporting cadaveric variations contributes to a better understanding of human anatomy and its clinical implications.

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