

Azygous Venous System - Anatomical Variation and Its Clinical Significance

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ABSTRACT

Introduction: Azygous venous system is the system of unpaired veins comprising of the azygous vein, the hemiazygous vein and accessory hemiazygous vein¹. They are para vertebral in position, provided with valves and drain most of the blood from the thoracic and posterior abdominal walls. They communicate with the venacaval system in front and vertebral plexus behind. It connects the superior vena cava with the inferior vena cava. The azygous vein is inconstant in the mode of origin.

Aim: To explore the anatomical variations in the course of azygous system of veins.

Material and methods: The present study was done in the Department of Anatomy, Apollo institute of Medical sciences and Research, Hyderabad over a period of 2 years. The present study was conducted on 12 cadavers (irrespective of age and sex). The course of the azygos venous system in these 12 cadavers was carefully observed and documented.

Results: Anatomical variation was found in two cadavers.

Discussion: The azygous system of veins arises from a pair of longitudinal venous lines called right and left azygous venous lines on each side of the aorta¹. On each side of the azygous venous lines lies two parallel primitive lines called right and left sub cardinal and posterior cardinal veins. It forms an important route for collateral circulation in venacaval occlusion such as in portal hypertension. It serves as the main collateral channel to shunt the blood from the upper half of the body to the inferior venacaval in case of superior vena caval obstruction.

Conclusion: Identification and understanding of these variations are important during preoperative radiological investigations and

surgical procedures especially spinal surgery between T7 and T12 to avoid injury which may lead to postoperative haematomas.

Keywords: Azygous venous system, azygous vein, venacaval system

INTRODUCTION

Azygous venous system is the system of unpaired veins comprising of the azygous vein, the hemiazygous vein and accessory hemiazygous vein¹. They are para vertebral in position, provided with valves and drain most of the blood from the thoracic and posterior abdominal walls. They communicate with the venacaval system in front and vertebral plexus behind. The Azygous vein is present only on the right side in the upper part of the posterior abdominal wall and the posterior mediastinum. It connects the superior vena cava with the inferior vena cava. The azygous vein is inconstant in the mode of origin.

It is formed by the union of right subcostal and right ascending lumbar vein at the level of T12 vertebrae. It may arise from the posterior aspect of inferior vena cava near the renal veins. Right subcostal vein may continue as azygous vein². The azygous vein after formation ascends up and leaves the abdomen by passing through the aortic opening of the diaphragm and enters the posterior mediastinum. It then ascends vertically lying in front of the vertebral column up to the level of T4 vertebra where it arches forwards above the hilum of the

right lung to terminate in the superior vena cava at the level of 2nd costal cartilage. The Hemi azygous vein usually begins by the union of the left ascending lumbar and left subcostal vein. It enters the thorax by piercing the left crus receives lower three or four posterior intercostal veins and ends in the azygous vein opposite T8. The accessory azygous vein begins as a continuation of the left fourth posterior intercostal vein and receives blood from the left fifth, sixth, seventh intercostal veins as it descends. It terminates in the azygous vein opposite T7.

Aim: To explore the anatomical variations in the course of azygous system of veins.

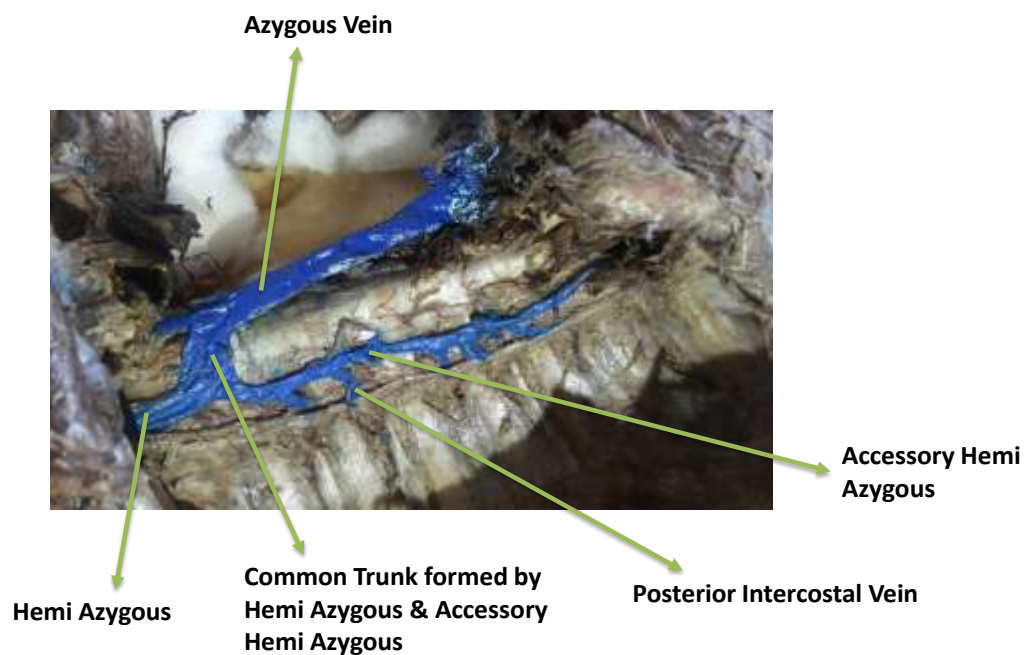
MATERIAL AND METHODS

The present study was done in the Department of Anatomy, Apollo institute of Medical sciences and Research, Hyderabad over a period of 2 years. The present study was conducted on 12 cadavers (irrespective of age and sex). The course of the azygous venous system in these 12 cadavers was carefully observed and documented.

RESULTS

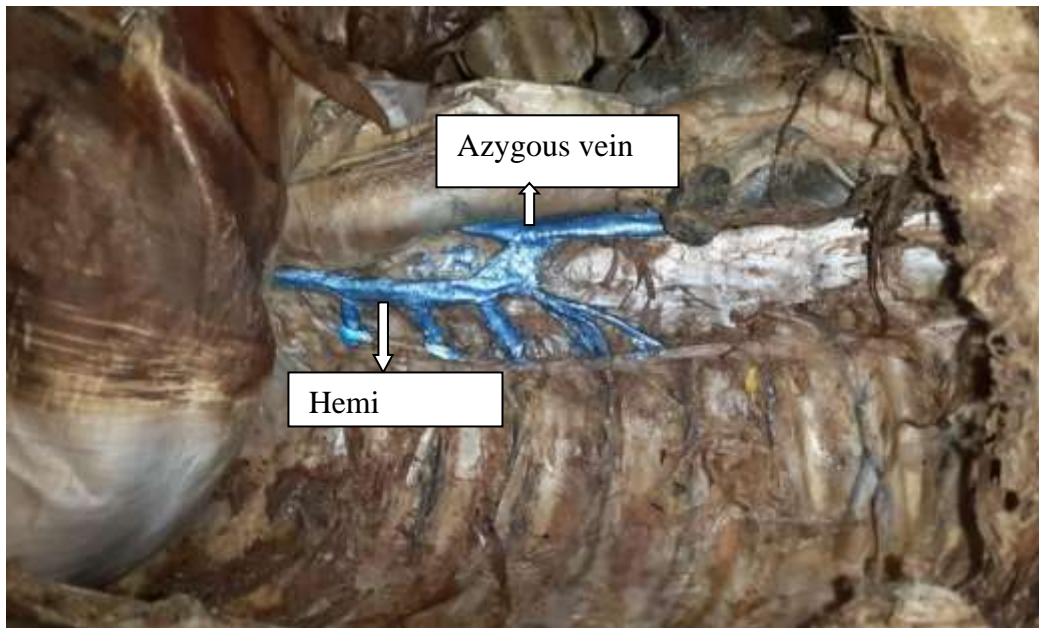
Out of 12 cadavers, variation was found in two cadavers.

Anatomical variant



- Accessory hemiazygous vein and hemiazygous vein forms a common channel and drains into azygous vein below in this variant at the level of T8.

Fig -2



Accessory hemiazygous vein is absent on left side.

DISCUSSION

The azygous system of veins arises from a pair of longitudinal venous lines called right and left azygous venous lines on each side of the aorta. On each side of the azygous venous lines lies two parallel primitive lines called right and left subcardinal and posterior cardinal veins. The right subcardinal vein forms azygous vein and the left subcardinal vein forms hemiazygous vein. The left superior intercostal vein and accessory hemiazygous vein are derived from the left posterior cardinal vein and this vein simultaneously forms the upper part of the azygous vein. The common single venous trunk found between accessory hemiazygous and hemiazygous vein is due to persistent additional anastomotic channels between the left supracardinal vein and persistent intermediate supracardinal veins. Knowledge of development of azygous system of veins is necessary to understand the variations of azygous, hemiazygous and accessory hemiazygous veins. Azygous system of veins develops on the basis of various modifications of veins occurring in subcardinal veins. Azygous vein is an important junction between

venacaval and portocaval systems. It forms an important route for collateral circulation in venacaval occlusion such as in portal hypertension. It serves as the main collateral channel to shunt the blood from the upper half of the body to the inferior venacaval in case of superior vena caval obstruction.

CONCLUSION

Identification and understanding of these variations are important during preoperative radiological investigations and surgical procedures especially spinal surgery between T7 and T12 to avoid injury which may lead to postoperative haematomas. The anomalous azygous venous system may be easily confused with aneurysm, lymphadenopathy and other anomalies like tumor.

Declaration by Authors

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Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Standring S, Gatzoulis MA. Mediastinum. In: Gray's anatomy. The anatomical basis of

- clinical practice. 40th edn. New York, Churchill Livingstone 2008:939- 940.
2. Datta AK. Thorax and abdomen. In: Datta AK, eds. Essentials of Human Anatomy. 9th ed. Kolkata: Current Books International; 2010;100-102.
 3. Rao MS, Banerjee A. The azygos venous system and its anatomical variations. J. Evid. Based Med. Healthc. 2016; 3(50), 2550-2552. DOI: 10.18410/jebmh/2016/561
 4. M Shilpa, K R Dakshayani. A Cadaveric Study Of Azygos Venous System. Int J Anat Res 2017;5(3.2):4299-4302. DOI: 10.16965/ijar.2017.31
 5. Shivanal U, Geethanjali HT. Anomalous azygos veins - its embryological basis and clinical significance. Int J Res Med Sci 2015;3:2323-6.
 6. Özdemir, B., Aldur, M. & Çelik, H. Multiple variations in the azygos venous system: a preaortic interazygos vein and the absence of hemiazygos vein. Surg Radiol Anat 24, 68–70 (2002). <https://doi.org/10.1007/s00276-002-0008-7>
 7. Piciucchi S, Barone D, Sanna S., et al. The Azygos Vein Pathway: An Overview From Anatomical Variations To Pathological Changes. Insights Imaging [online] 2014; 5 (05) 619-628.

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