

A Study of Azygos Veins and Circulation with its Variations**Asma Begum¹, Murtaza Husain², Roshan Z. Maniyar³**¹Assistant Professor, Department of Anatomy, Fathima Institute of Medical Sciences, Kadapa, Andhra Pradesh, India²Assistant Professor, Department of Anatomy, Osmania Medical College, Hyderabad, Telangana, India³Assistant Professor, Department of Anatomy, Bidar Institute of Medical Sciences, Bidar, Karnataka, India

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Abstract:

Introduction: The cause of venous compromise is multifactorial. The venous system variations are generally explained on the basis of their embryological basis. Variations of azygos venous system is not clearly described in the literature. Multiple variations like mode of formation of azygos vein formed mostly by the union of ascending lumbar and subcostal veins, position of azygos vein which courses normally to the right side forms in the midline and on left side in some cases. Variations in the mode of termination of Azygos vein, in formation of Hemi azygos vein, mode of termination of Hemi azygos vein are explained in view of their embryological development. Venous abnormalities often complicate mediastinal surgery with intra operative haemorrhage. Prior knowledge of possible anatomical variations may help the surgeons to reduce the risk of such events.

Material and Methods: The study was conducted in the department of Anatomy, 50 cadavers used for the study were allotted for medical undergraduates.

Results: The position of Azygos vein in on right side in 53.33%, in midline in 46.66% of subjects. In the present study the level of termination of the Azygos vein is between third and fourth thoracic vertebra. Hemiazygos, the left lower complement of the Azygos vein formed by the union of left ascending lumbar and subcostal veins usually.

Conclusion: Knowledge of the variability of the azygos venous system is an important anatomical sign post in radiological diagnosis and in the surgical treatment of thoracic aorta aneurysms and tumors of the posterior mediastinum.

Keywords: Azygos Vein (AZV), Hemiazygos Vein (HAZV), Accessory Hemiazygos Vein (AHAZV), Inferior Vena Cava (IVC).

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Introduction

The azygos venous system develops in the basis of multiple transformations of the subcardinal veins [1], which causes its great variability, especially on the left side. Azygos veins are important Cavo Caval and porto caval junctions, thus forming collateral circulation in caval vein occlusion and in portal hypertension [2]. The azygos venous system transporting deoxygenated blood from the posterior wall of the thoracic and abdomen into the superior vena cava is expected to arise from the posterior aspect of inferior vena cava at or below the level of renal veins from its development. But it is not constant. It has no symmetrically equivalent vein on the left side of the body. this system varies much in the mode of origin, course, tributaries anastomosis and termination. Azygos vein is formed by the union of the ascending lumbar veins with the right subcostal veins at the level of the 12th thoracic vertebra, ascending

in the posterior mediastinum, and arching over the right main bronchus at the root of the right lung to join the superior vena cava. Its tributaries, apart from its main tributary, the hemiazygos vein are the bronchial veins, pericardial veins, and posterior right intercostal veins. The azygos system of veins is considered to be, the azygos vein, along with its left-sided counterparts, the hemiazygos vein and the accessory hemiazygos vein. Together they form an anastomosis between the superior vena cava to the inferior vena cava. The azygos venous system is a main channel of drainage of the thoracic wall and also part of parietals of the abdomen. The large continuous channel draining the right half of the thoracic and abdominal parietals forms the azygos vein. The left complement of this venous channel which drain the upper abdominal parietals and the lower thoracic wall is named as accessory hemoazygos

vein or superior hemiazygos vein. Both of them drain into the azygos vein.

Material and Methods

The study was conducted in the department of Anatomy, 50 cadavers used for the study were allotted for medical undergraduates. The cadavers available in the department of Anatomy were injected with routine embalming fluid. In the dissection hall where the thorax remains to be dissected by the students, the exposing procedure of Azygos system was done. The whole course of the azygos vein from the level of the subcostal vein to the point of termination into the superior vena cava has been traced and cleaned. All the right posterior intercostal veins are traced to the site of their termination into the azygos vein. Communications of the hemoazygos, accessory hemiazygos veins into the azygos vein are identified and exposed by reflecting the oesophagus and aorta upwards. Azygos vein is identified and cleaned. Right and left superior intercostal veins have been traced to their points of termination into the right and left brachiocephalic veins, correspondingly the hemiazygos and the accessory hemiazygos are traced on the left side of the bodies of the thoracic vertebrae behind the descending thoracic aorta. The terminations of the right and left ascending lumbar veins

when present are traced and studied in relation to the aortic opening and the crura of the diaphragm.

Results

For the study 50 cadavers have been observed for the mode of formation of Azygos vein. In the present study different aspects of azygos venous system have been reported. Ozbek et al reported a case in which hemiazygos vein was absent.[3] A right subcostal vein joining the ascending lumbar vein formed in 70% of cases. 30% of cases it is formed from back of Inferior Vena Cava. The position of Azygos vein in on right side in 53.33%, in midline in 46.66% of subjects. In the present study the level of termination of the Azygos vein is between third and fourth thoracic vertebra. Hemiazygos, the left lower complement of the Azygos vein formed by the union of left ascending lumbar and subcostal veins usually. In the present study in one case, it arises from the back of Inferior venacava ascends up and receives the left ascending lumbar and subcostal veins before it joins the Azygos. Hemi azygos vein is crossing the midline at T8 towards the right side in 60% cases, at T7 in 26.66%, at T9 in 10%, at T10 in 3.33%.

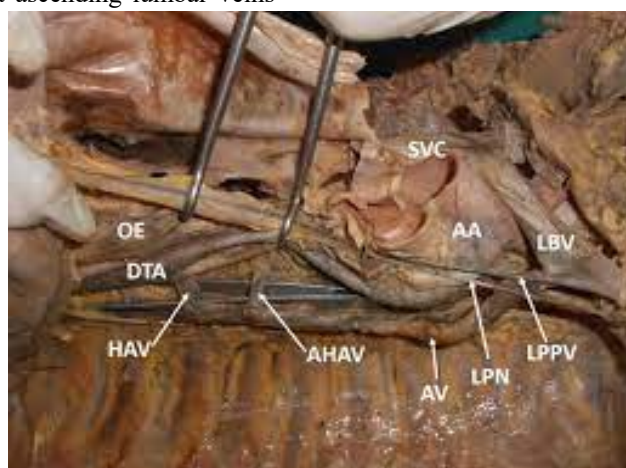


Fig 1: Variation in termination of azygos and hemi azygos vein

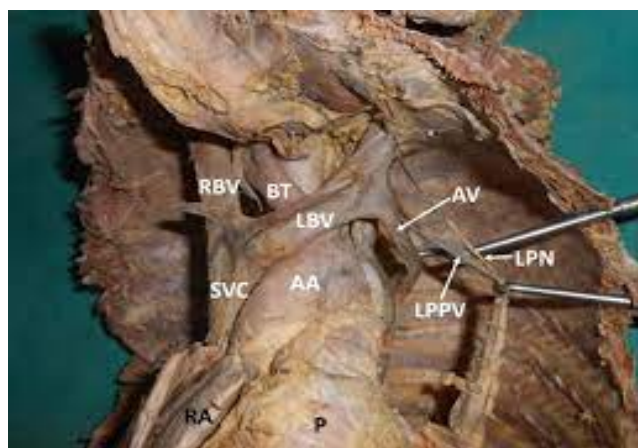


Fig 2: Transposition of azygos vein



Fig 3: Abnormal variation of interazygos vein

Discussion

The present work of the Azygos system of veins is carried out in 50 cadavers. Each part of this system of veins namely the Azygos, Hemiazygos, accessory Hemiazygos are studied. Their formation, course, relations, terminations, the tributaries and communications are explored. The Azygos system of veins show more number of variations including its origin, course, termination and its tributaries. Abnormalities related to the azygos system are not rare.⁴ These abnormalities are generally explained by the embryological development. Azygos venous system embryologically derived from subcardinal veins. The right subcardinal vein forms azygos vein and the left subcardinal vein forms hemiazygos vein. The left superior intercostal vein and accessory hemiazygos vein are derived from left posterior cardinal vein and this vein simultaneously forms upper part of azygos vein. The part that connects hemiazygos vein to azygos vein is actually reminder of the anastomosis between the left and right posterior cardinal vein. [5] The caudal part of the right supracardinal vein forms the post renal part of the IVC, while the caudal part of the left supracardinal vein and the intermediate parts of both supracardinal veins disappear

Conclusion

The variant azygos venous system may easily be confused with aneurysm, lymphadenopathy and tu-

mour [6,7]. Knowledge of the variability of the azygos venous system in an important anatomical sign post in radiological diagnosis and in the surgical treatment of thoracic aorta aneurysms and tumors of the posterior mediastinum.

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