

Anatomical Variation of the Azygos System of Veins - Case Report

Josikwylkson Costa Brito¹ Vlademir Lourenço Falcão Júnior¹ Ana Luisa Castelo Branco Gomes¹
 Deyvsom Felipe de Sousa Queiroga¹ Luciana Karla Viana Barroso^{1,2}

¹ Department of Morphology, Faculdade de Ciências Médicas de Campina Grande, Centro de Ensino Superior e Desenvolvimento, Campina Grande, PB, Brazil

² Center for Biological and Health Sciences, Universidade Federal de Campina Grande, Campina Grande, PB, Brazil

Address for correspondence Josikwylkson Costa Brito, Departamento de Morfologia, Faculdade de Ciências Médicas de Campina Grande, Centro de Ensino Superior e Desenvolvimento, Av. Sen. Argemiro de Figueiredo, 1901-Sandra Cavalcante, Campina Grande - PB, 58411-020, PB, Brazil (e-mail: josikwylkson99@gmail.com).

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Abstract

Keywords

- ▶ azygos system
- ▶ anatomic variation
- ▶ thorax drainage
- ▶ vascular variation and macroscopic human anatomy.

Introduction The azygos system of veins (ASV) is a very variable structure characterized as a communication between the inferior and superior vena cava, having the azygos vein (AV), the hemiazygos vein (HV), and the accessory hemiazygos vein (HAV) as its main components, which are responsible for the mediastinal viscera and for the thoracoabdominal wall drainage. The aim of the present study is to report an anatomical variation found in a male cadaver at the Laboratory of Anatomy of the University Center of UNIFACISA, Campina Grande, PB, Brazil.

Case Report In the posterior mediastinum, the union of the HV, of the HAV, and of the 8th left posterior intercostal vein formed a common trunk at the level of the left 8th intercostal space, crossing the mediastinum posterior to the aorta artery, ending up in the AV, in the right hemithorax.

Conclusion The study of the anatomical variations of the ASV is important and will provide knowledge for physicians not to confuse them with pathological processes in imaging exams. Moreover, it can provide safety in surgical approaches of the thorax.

Introduction

The azygos system of veins (ASV) is a pathway of collateral circulation between the superior and the inferior vena cava.¹ It drains blood from the mediastinal viscera and from the thoracoabdominal wall,² being even more relevant when a flow deficiency is present in the main veins that drain to the right atrium.¹

Its basic constituents are the azygos vein (AV), the hemiazygos vein (HV), and the accessory hemiazygos vein (AHV). The system is found parallel to the vertebral column and is not followed by correspondent arteries.³

The AV and the HV are generally formed by the union of posterior branches of the inferior cava and/or renal veins with the ascending lumbar veins. The AV goes up at the right side of the vertebral column, finishing in the superior vena cava. The HV goes up at the left side of the vertebral column,

crossing the mediastinum and going to the AV. The HAV starts in the left 4th or 5th intercostal space, going to the AV or to the HV.²

The ASV has been extensively studied, and anatomical variations on its constituents are not so rare.^{2,3} These variations differ from each other according to their origin, caliber, course, and termination.^{4,5} This fact can explain why there are so many attempts to classify the ASV,^{4,6–8} but there still is no consensus about these classifications.

The knowledge of the ASV is important to the medical practice because alterations on its structure can be confused with aneurysms, with mediastinal tumors, or with infarcted lymph nodes,⁹ leading to wrong interpretations of imaging exams. The present study reports an anatomical variation of the ASV found in a human male cadaver at the Laboratory of Anatomy of the University Center of UNIFACISA, Campina Grande, PB, Brazil.

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Case Report

During the study of a previously dissected human male cadaver, the anatomical variation found in the posterior mediastinum was the union of the HV, of the HAV, and of the 8th posterior intercostal veins, forming a common trunk situated in the left 8th intercostal space. This trunk went from the left side across the posterior mediastinum to the right hemithorax, passing posterior to the thoracic aorta and communicating with the AV at the level of the right 8th intercostal space. The other veins maintained their usual path, without any variations (► **Figure 1**).

Discussion

In the intrauterine life, the ASV develops from the subcardinal veins. The right subcardinal vein forms the AV, and the left subcardinal vein forms the HV. The HAV, as well as the superior part of the AV, originates from the left posterior cardinal vein. The connection between the HV and the AV originates from the anastomosis between the right and the left posterior cardinal veins.¹⁰

The HV and the HAV can form common channels that cross the posterior mediastinum.¹¹ In our study, the HV and the HAV form a common trunk with the 8th left posterior intercostal vein. A similar variant was already described, with only the HV and HAV veins forming a common trunk, without any participation of other veins.¹²

Also, it was found an “interazygos” vein originating from the HV, crossing the mediastinum anteriorly to the aorta artery and draining blood from the 7th, 8th, 9th, 10th and 11th posterior intercostal veins.¹³ Another description is for an incomplete accessory HV with the posterior intercostal veins draining directly to the AV.¹⁴

A large number of studies show the absence of one or more components of the ASV,^{5,14–16} although no study has found any variation similar to the one presented in the present article. The HAV is the most variable component of the ASV in terms of absence, number of branches, communications, and level of termination.⁴ This is an important fact to take into



Fig. 1 1 hemiazygos vein; 2, left 8th posterior intercostal vein; 3, accessory hemiazygos vein; 4, common trunk; 5, aorta artery; and 6, diaphragm.

consideration when accessing the vertebral column in surgical approaches, as the ability of recognizing the structures adjacent to the thoracic vertebral column, as well as their variations, is essential to a favorable outcome in these procedures.¹⁷

Conclusion

There are many variations in the ASV, and new ones must be reported and documented, since some of them can be misinterpreted as pathological processes such as aneurysms, enlarged lymph nodes, or tumors. Moreover, it is important for surgeons to have these variations in mind when surgically accessing the mediastinal region, preventing unforeseen scenarios.

Conflicts of Interests

The authors have no conflicts of interests to declare.

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