

*Abstract*

## Anatomical Variations of Hepatic Arteries: Insights from Advanced Imaging Techniques

Sorin Lucian Bolintineanu <sup>1\*</sup>, Laura Andreea Ghenciu <sup>2</sup>

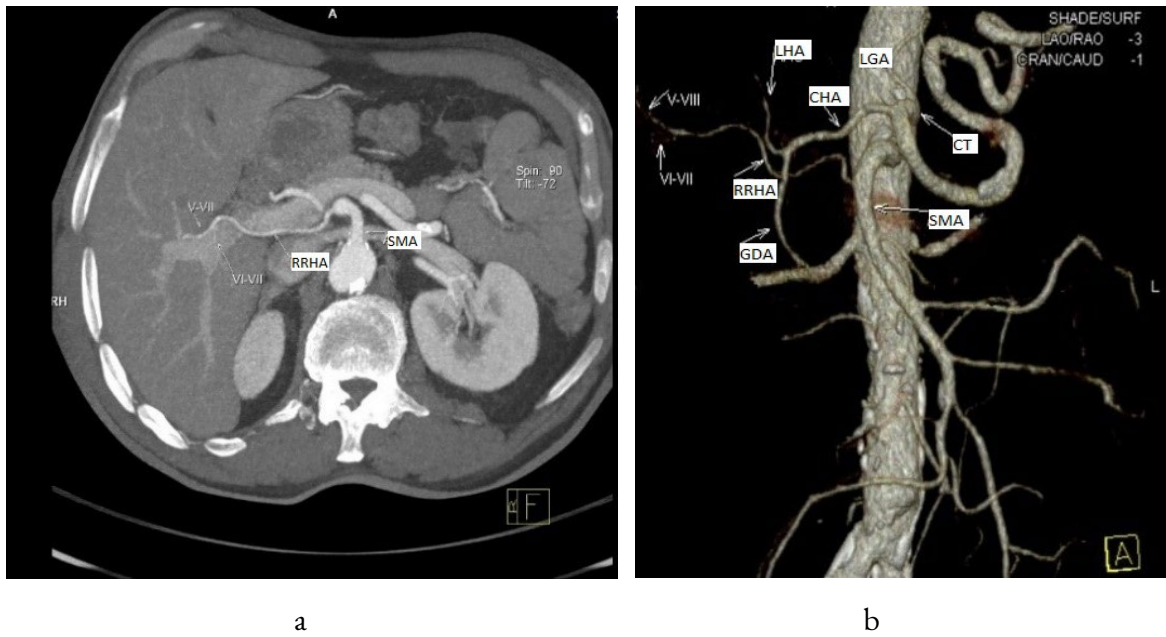
<sup>1</sup> Department of Anatomy and Embryology, "Victor Babes" University of Medicine and Pharmacy Timisoara, Romania

<sup>2</sup> Discipline of Pathophysiology, Department III, Department of Anatomy and Embryology, "Victor Babes" University of Medicine and Pharmacy Timisoara, Romania

\* Correspondence: [s.bolintineanu@umft.ro](mailto:s.bolintineanu@umft.ro)

**Abstract: Introduction:** Understanding the morphological variations in hepatic vascularization is crucial for successful hepatic transplantation, resection, and abdominal surgeries. While standard hepatic arterial anatomy is observed in 50-80% of cases, a significant portion presents with variations that can complicate surgical procedures if not identified preoperatively. Advanced imaging techniques, such as three-dimensional imaging and multiplanar reconstruction, are essential for detecting these variations. The celiac trunk was first described by Haller in 1756 as supplying the upper abdomen through the left gastric artery, splenic artery, and common hepatic artery. Although this is considered the standard anatomy, various classifications, including those by Morita and Michels, highlight the importance of recognizing and understanding the less common variants. **Materials and Methods:** The study was conducted on 800 patients identified with abnormal hepatic vascularization through MDCT angiography. The images were reviewed by an anatomist and a radiologist, and variations were classified according to Michels' and Hiatt's classifications. **Results:** Using Michels' classification, the variations were distributed as follows: type II in 40 cases (5%), type III in 442 cases (55.25%), type IV in 13 cases (1.63%), type V in 285 cases (35.63%), type VI in 12 cases (1.5%), type VII in 3 cases (0.38%), type VIII in 108 cases (13.5%), type IX in 6 cases (0.75%), and type X in one case (0.13%). According to Hiatt's classification, the variations were: type II in 325 cases (40.63%), type III in 454 cases (56.75%), type IV in 124 cases (15.5%), type V in 6 cases (0.75%), and type VI in 69 cases (8.63%). **Conclusions:** The prevalence and distribution of hepatic arterial variants observed in this study are consistent with findings from other specialized studies using MDCT angiography. Knowledge of these variations is vital for effective surgical planning, particularly for liver transplantation, liver resection, and other upper abdominal procedures.

**Keywords:** MDCT; hepatic artery; anatomical variations; liver



**Figure 1.** MDCT angiography. (a) superior incidence ;(b) anterior incidence. Replaced right hepatic artery originating in the superior mesenteric artery. Female patient, 83 years old, with a diagnosis of PAD. Abbreviations: LHA-left hepatic artery, PAD-peripheral arterial disease, RRHA-replaced right hepatic artery.