Case Report

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# Intrapancreatic Splenic Vessels and Inferior Mesenteric Vein Variation in a Female Cadaver: A Case Report

**Mehrdad Ghorbanlou, Amirali Mehdipoor, Pourya Gholipoor Chachakloo, Saghar Shayanmehr, Fatemeh Bagheri Tadi***

*Department of Anatomy, School of Medicine, Iran University of Medical Sciences, Tehran, Iran.*

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**Running Title** Intrapancreatic Splenic Vessels and Inferior Mesenteric Vein Variation

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## ABSTRACT

The splenic vessels, including the splenic artery and vein, normally run along the superior and posterior aspects of the pancreas, but their intrapancreatic courses can vary. Such variations may pose challenges during abdominal surgeries, including distal pancreatectomy, splenectomy, and pancreatic transplantation.

A formalin-fixed female cadaver, aged 54 years at death, was examined during routine educational dissection. The upper abdominal cavity was explored, with particular attention to the pancreas, spleen, splenic artery, and splenic vein. Vascular structures were stained using acrylic-based staining agents to visualize the blood vessels. Splenomegaly was noted based on gross anatomical assessment, and findings were documented through descriptive notes and digital photography.

The cadaver exhibited a markedly enlarged spleen. The splenic artery followed an atypical intrapancreatic course, traversing the pancreatic parenchyma in a tortuous, deeper trajectory instead of the classical suprapancreatic pathway. The splenic vein was partially embedded within the posterior pancreas, deviating from its usual extrapancreatic route. Additionally, the inferior mesenteric vein drained directly into the superior mesenteric vein, contrary to its common confluence with the splenic vein.

This case highlights a rare anatomical variation of the splenic vascular pathways associated with splenomegaly. Awareness of such deviations is crucial for surgeons, anatomists, and radiologists to prevent intraoperative complications and ensure accurate imaging interpretation. Individualized anatomical assessment during clinical and educational procedures is emphasized, contributing valuable insight to anatomical and surgical literature.

*** Corresponding Author:**
***Fatemeh Bagheri Tadi***
***Address:*** *Department of Anatomy, School of Medicine, Iran University of Medical Sciences, Tehran, Iran.*
***E-mail:*** *bagheriniusha@yahoo.com*

## Introduction

The splenic artery and vein are major vascular structures of the upper abdominal cavity, commonly arising from the celiac trunk and the confluence of the superior mesenteric and portal veins. These vessels are primarily responsible for supplying and draining the spleen, while also playing key roles in pancreatic and gastric circulation [1]. Anatomically, the splenic artery is traditionally described as a tortuous vessel coursing along the superior border of the pancreas. In contrast, the splenic vein commonly runs posterior to the pancreatic body and tail before joining the portal venous system [2,3].

Although this vascular configuration is widely accepted, numerous anatomical studies have documented a spectrum of variations in the splenic vessels. These include aberrant origins, intrapancreatic courses, unusual branching patterns, and alternative relationships with adjacent organs [4–6]. Such deviations are not simply of academic interest, and they hold significant clinical relevance in hepatopancreatobiliary surgery, radiology, trauma management, and organ transplantation. Surprising vascular anatomy can lead to complications such as hemorrhage, ischemia, or inadvertent vessel ligation during procedures like distal pancreatectomy or splenectomy [7,8].

The presence of splenomegaly, an enlargement of the spleen due to a variety of pathological causes like portal hypertension or infection, can further complicate vascular anatomy. In splenomegaly, the splenic artery and vein may demonstrate dilation, elongation, or altered positional relationships due to the organ's increased size and weight [9]. However, few studies have specifically addressed the combined influence of splenic vascular variation and splenomegaly in a cadaveric setting [10]. Given the importance of detailed anatomical knowledge in surgical planning and anatomical education, this case report presents an unusual vascular pattern of the splenic vessels within the pancreas observed in a 54-year-old female cadaver with marked splenomegaly. The goal is to describe the variation in detail and discuss its potential clinical implications, particularly in the context of splenic and pancreatic surgeries. This report reinforces the value of cadaver-based investigations.

## Case Presentation

The dissection was initiated to expose the abdominal viscera and their associated vascular structures. The skin, superficial fascia, anterior abdominal wall muscles, transversalis fascia, and parietal peritoneum were carefully dissected and reflected to access the abdominal cavity. Upon visualizing the abdominal organs, particular attention was directed toward the pancreas and spleen. The dissection proceeded with vascular tracing, during which the splenic artery and splenic vein were followed from their proximal origins through the pancreatic parenchyma toward the splenic hilum. Notably, the vessels demonstrated an unusual intrapancreatic course. The following variations were noted:

Splenic artery and splenic vein: During detailed vascular dissection, a notable anatomical variation was identified in the course of the splenic artery and splenic vein. In this case, both the splenic artery and vein were observed to pass directly through the pancreatic parenchyma, rather than along their usual extrapancreatic or marginal routes. This unusual intrapancreatic and trans-pancreatic trajectory represents a rare and clinically significant vascular variation. Furthermore, the vessels perforated the pancreatic tissue, traversing the body of the pancreas before reaching the splenic hilum. No apparent signs of pancreatic pathology or fibrosis were observed during gross examination; however, definitive confirmation would require histopathological analysis (Figure 1).

Inferior mesenteric vein drainage: During the dissection of the portal venous system, a variation was noted in the drainage pattern of the inferior mesenteric vein (IMV). Under typical anatomical conditions, the IMV drains into the splenic vein, which then joins the superior mesenteric vein (SMV) to form the portal vein. However, in this case, the inferior mesenteric vein was observed to drain directly into the superior mesenteric vein, bypassing its usual confluence with the splenic vein (Figure 2).

Also, during gross examination, the spleen appeared markedly enlarged compared to standard anatomical expectations. The mean spleen length is 76.06 ± 21.38 mm in males and 77.09 ± 2.27 mm in women, 70 mm in width, and 40 mm in thickness, with a weight ranging between 150 and 200 grams correlated with age, height, and weight [11,12].

In this case, the spleen measured 130 mm in length and 70 mm in width (Figure 1), with a recorded weight of approximately 400 grams, confirming the presence of splenomegaly. These measurements were obtained using a standard ruler during dissection. The organ's external surface was smooth, with no visible pathological lesions, infarcts, or adhesions. Although the precise etiology of this unclaimed cadaver could not be determined, the observed splenomegaly may have contributed to the anatomical variation noted


**Fig. 1.** Dimensions of the spleen. (A) Length= 130 mm; (B) width: 70 mm.

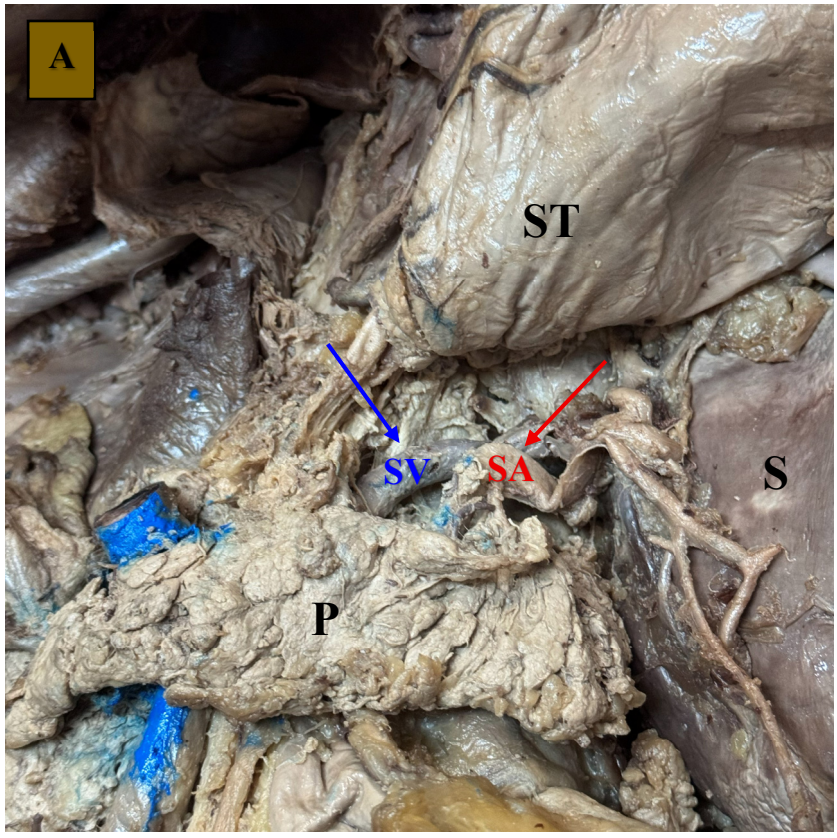
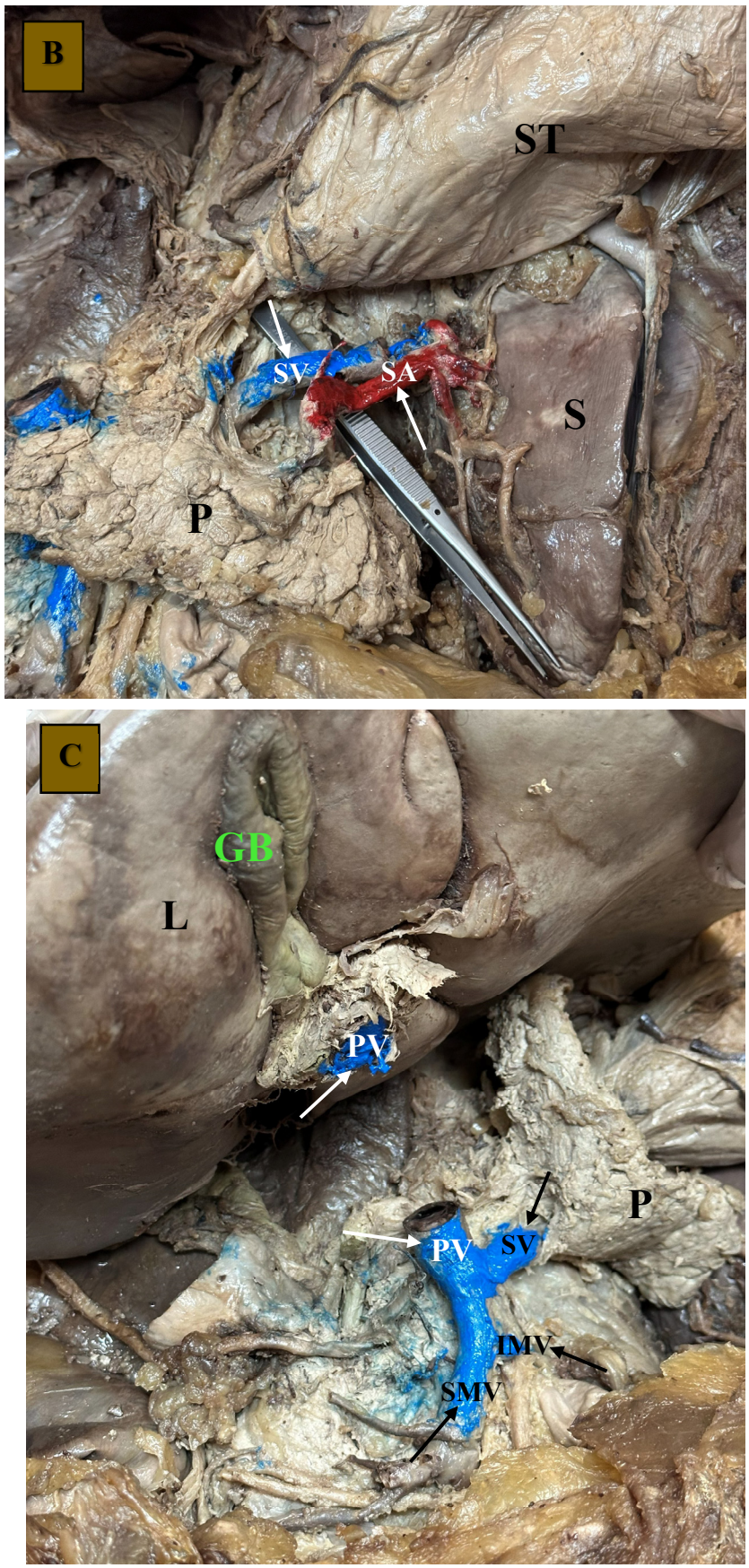



**Fig. 2.** Splenic vessels (coursing through the pancreas) and inferior mesenteric vein. (A) Uncolored splenic vessels; (B) Colored splenic vessels; (C) Inferior mesenteric vein directly connecting the superior mesenteric vein. St: stomach, SV: splenic vein, SA: splenic artery, P: pancreas, S: spleen, GB: gallbladder, L: liver, PV: portal vein, SMV: superior mesenteric vein, IMV: inferior mesenteric vein.




**Continued Fig. 2.** Splenic vessels (coursing through the pancreas) and inferior mesenteric vein. (A) Uncolored splenic vessels; (B) Colored splenic vessels; (C) Inferior mesenteric vein directly connecting the superior mesenteric vein. St: stomach, SV: splenic vein, SA: splenic artery, P: pancreas, S: spleen, GB: gallbladder, L: liver, PV: portal vein, SMV: superior mesenteric vein, IMV: inferior mesenteric vein.

in the course of the splenic vessels, particularly their partial intrapancreatic trajectory. The increased size and weight of the spleen likely imposed mechanical and spatial influences on the vascular pathways, promoting deeper integration with surrounding structures such as the pancreatic parenchyma.

## Discussion

This case report provides valuable insights into the anatomical variation of the splenic vessels in a female cadaver with splenomegaly [13]. The unusual intrapancreatic course of the splenic artery and vein, passing through the pancreatic tissue rather than along their typical extrapancreatic paths, is a significant finding that challenges the conventional understanding of splenic vessel anatomy. This variation is particularly noteworthy as it complicates abdominal surgeries such as distal pancreatectomy, splenectomy, and pancreatic transplantation or morphological analysis of the spleen and its vessels during cadaver dissection [14]. Furthermore, this case highlights the importance of considering pathological conditions, such as splenomegaly, that may modify vascular anatomy and complicate surgical procedures.

The relationship between splenomegaly and the splenic vessels is crucial, especially when considering the potential causal mechanisms behind these vascular changes. It is important to explore whether these vascular variations are congenital, originating early in development, or whether they have developed over time due to increased blood flow or pressure in the spleen. Although direct evidence linking splenomegaly to vascular changes is limited, studies have shown that splenic vessel anatomy can vary in association with splenic disease states or positional anomalies of the spleen [15].

One study described a case in which the splenic vein followed an atypical course, running along a groove on the anterior surface of the pancreas before entering the pancreas and joining the superior mesenteric vein at an unusual angle. This variation can lead to venous stagnation due to the head-on collision between blood flow in the splenic and superior mesenteric veins, which could complicate radiological interpretation and surgical procedures [16]. While splenic vein variations are rare, they can have significant clinical implications, particularly during procedures like distal pancreatectomy, splenectomy, and pancreatic transplantation.

By documenting this rare variation, this study provides an important reference for surgeons, radiologists, and anatomists to anticipate potential complications in similar cases. Although such findings are uncommon, they underscore the value of cadaveric studies in revealing anatomical deviations that may not be readily apparent through imaging alone. Furthermore, splenomegaly likely played a role in the observed vascular deviations. The increased size of the spleen likely exerted mechanical pressure on surrounding structures, including the pancreas, causing the vessels to adopt atypical pathways. This case thus contributes to our understanding of how pathological changes in organs can affect their vascular structures, which is a critical consideration for both diagnostic imaging and surgical planning.

## Conclusion

This case report underscores the importance of recognizing anatomical variations in splenic vessels, especially in the context of splenomegaly. The unusual intrapancreatic course of the splenic artery and vein observed in this case should alert clinicians and surgeons to the potential for such variations in similar patients. Awareness of these variations is essential for minimizing the risk of intraoperative complications, improving the accuracy of diagnostic imaging, and ensuring optimal surgical outcomes. Given the rarity of this vascular pattern, further studies and cadaveric dissections are warranted to deepen the understanding of how splenomegaly and other pathological conditions influence splenic vessel anatomy.

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## Ethical Considerations

### Ethical statement

The cadaver used in this study was unclaimed, and all procedures were performed with respect for the dignity and integrity of the individual.

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## Conflict of Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Consent for publication

All authors have reviewed the final version of the manuscript and consent to its publication.

## Availability of data and materials

The datasets generated during the current study are available from the corresponding author on reasonable request.

## Authors' contributions

M.GH contributed to the conception and design of the study. P.GH and F.B performed data collection. S.SH and A.M drafted the manuscript. M.GH and F.B critically revised the manuscript for important intellectual content. All authors read and approved the final version of the manuscript.

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