

Variation of the Inferior Mesenteric Vein's Drainage Pattern and its Clinical Significance

Vena Mesenterica Inferior'un Derenaj Şeklinin Varyasyonu ve Klinik Önemi

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ABSTRACT

The anatomical joining and drainage of the inferior mesenteric vein (IMV) into the splenic vein are usually reported in the anatomical literature. Nevertheless, the joining and drainage of IMV into the superior mesenteric vein or the junction between the splenic vein and the superior mesenteric vein are also possible. During routine dissections of the abdomen for anatomy education in the Department of Anatomy Laboratory in the Faculty of Medicine at the Gazi University, a variation of IMV was observed in a 66-year-old male cadaver. It is certainly useful for surgeons, as well as interventional radiologists, to be informed about mesenteric venous variations.

Keywords: Inferior mesenteric vein, splenic vein, venous variation

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ÖZET

V. mesentericainferior'un v. splenica'ya anatomik olarak katılımı ve drenajı çoğunlukla anatomi ile ilgili literatürde bildirilmiştir. Bununla birlikte, v. mesentericainferior'un v. mesentericasuperior'a veya v. splenica ile v. mesentericasuperior arasındaki birleşme yerine katılması ve drenajı da mümkündür. Anatomi eğitimi için Gazi Üniversitesi Tıp Fakültesi Anatomi Anabilim Dalı laboratuvarında rutin karın diseksiyonları gerçekleştirirken 66 yaşındaki bir erkek kadavrada v. mesentericainferior'un varyasyonu saptanmıştır. Girişimsel radyologların yanı sıra cerrahların da mezenterikvenöz varyasyonları hakkında bilgilendirilmesi kesinlikle faydalıdır.

Anahtar Sözcükler: Vena mesenterica inferior, vena splenica, venöz varyasyon

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INTRODUCTION

The inferior mesenteric vein (IMV) has a number of functions. For instance, it performs the venous drainage of the rectum, sigmoid and descending colon segments(1-4). In the embryological period, the portal vein occurs in the second month of pregnancy. The right and left vitelline veins develop as parts of the hepatic veins, inferior vena cava, ductus venosus, sinusoids, superior mesenteric vein, inferior mesenteric vein, and also the splenic vein. Eventually, the inferior mesenteric vein may participate the superior mesenteric vein, splenic vein, or splenomesenteric junction(5). Significant anastomoses from left side to right side, between vitelline veins and caudal to the liver are reconstitute to the distal point of the PV by way of two veins: IMV and SV(6, 7).

The origin of the IMV is located at the level of the anal canal in the form the superior rectal vein with the junction to inferior and middle rectal veins surrounding the rectal plexus (1, 2). As the superior rectal vein exits the pelvis, it continues adjacent to the superior rectal artery medial to the left ureter and crosses the left common iliac vessels then extends as IMV cranially.

It crosses superiorly on the anterior aspect of the psoas major muscle which is situated laterally to the neighboring artery. It may cross the testicular or ovarian arteries or continue medial to them. Moreover, its joining the splenic vein back to the body of the pancreas higher than the level of the duodenojejunal junction is possible in almost all of the cases (1, 2, 8). The pattern of the IMV venous drainage may vary (4, 9, 10). The joining and drainage of the IMV into the splenic vein were traditionally reported in the anatomy textbooks (4,11-14). In this study, we aimed to draw attention to the IMV variation we encounter during routine cadaver dissection and the clinical importance of this variation.

CASE REPORT

A variation of IMV was detected in a 66-year-old male cadaver while performing routine dissections of the abdomen in the laboratory of the Department of Anatomy, Faculty of Medicine at Gazi University for the purpose of anatomical education. As seen in figure 1, IMV drained into the superior mesenteric vein instead of splenic vein.

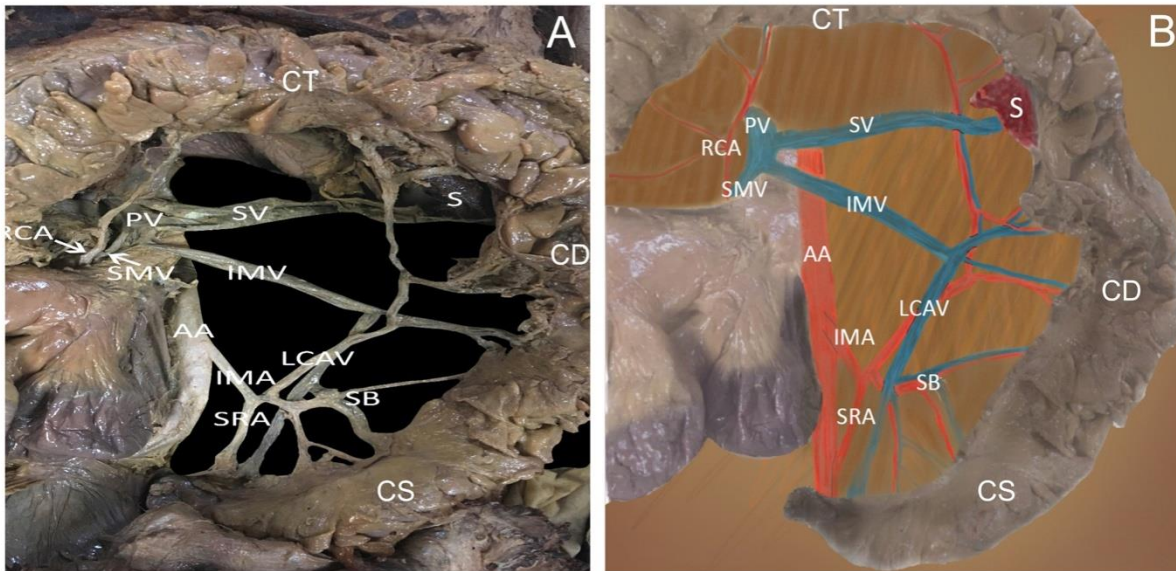


Figure 1 A and B.View of the variation of inferior mesenteric vein. RCA: Right colic artery; PV: Portal vein; SV: Splenic vein; IMV: Inferior mesenteric vein; SMV: Superior mesenteric vein; AA: Abdominal aorta; IMA: Inferior mesenteric artery; SB: Sigmoid branches; LCAV: Left colic artery and vein; S: Spleen; TC: Transverse colon; DC: Descending colon; SC: Sigmoid colon.

DISCUSSION

The joining and drainage of the IMV into the splenic vein were traditionally reported in the anatomy textbooks (4,11-14). The termination of the IMV may vary depending on autopsy series. For instance, its termination at the junction of the splenic and the superior mesenteric veins or its drainage into the superior mesenteric vein are possible(1,14). In the study conducted by Krumm et al., 916 computed tomography scans of the abdomen were examined in order to record anatomical variations of the IMV. In this study, the drainage of the IMV into the splenic vein was reported in about 40% of the cases, into the portal confluence in about 30% of the cases, and into the superior mesenteric vein in about 20% of the cases(15). Graf et al. Stated that 54 cases who have undergone helical computed tomography venography of the pancreas for mesenteric anatomical variants, and the drainage of the IMV into the splenic vein was detected in 56% of the patients, into the superior mesenteric vein in 26% of the patients, and the splenomesenteric angle in 18% of the patients(1). In a study conducted in order to assess mesenteric venous patterns in 102 cases who have undergone multidetector row computed tomography, the IMV's joining the splenic vein was reported in 68.5% of the patients, the superior mesenteric vein in 18.5% of the patients, and the splenoportal confluence in 7.6% of the patients(16). In the present study, IMV drained into the superior mesenteric vein.

Drainage of the inferior mesenteric vein to superior mesenteric vein near to the formation of portal vein decrease the blood content of splenic vein and therefore possibly a healthier condition for the formation of portal vein from the point of portal blood pressure. Bleeding is periodically detected by surgeons during the Access to the peripancreatic head region. The cut of small portal veins caused by incorrect traction is the reason for this. However, it would be possible to eliminate these problems in case the anatomical structure of the portal venous tributaries was studied better(17, 18).

The inferior mesenteric vein (IMV) represents an essential branch of the portal venous system and it has a number of important functions. It is periodically used for the purpose of portal decompression in portosystemic shunt operation or venovenous bypass when orthotopic hepatic transplantation is performed(20-22). Previous studies have reported that the IMV has been occasionally used for the purpose of portal decompression(22). Furthermore, it was reported that inferior mesenteric vein ligation mitigated intractable bleeding from anorectal varices(23).

CONCLUSION

In open surgery and laparoscopic surgery to the liver, pancreas, intestines and other abdominal organs, surgeons should be aware of such variations for safer surgical manipulations. Therefore, the existence of such variations should always be taken into account.

Conflict of interest

No conflict of interest was declared by the authors.

REFERENCES

1. Graf O, Boland GW, Kaufman JA, Warshaw AL, Fernandez Del Castillo C, Mueller PR. Anatomic variants of mesenteric veins: depiction with helical CT venography. *AJR Am J Roentgenol* 1997; 168(5): 1209-13.
2. Wachsberg RH. Inferior mesenteric vein: gray-scale and doppler sonographic findings in normal subjects and in patients with portal hypertension. *AJR Am J Roentgenol* 2005; 184(2): 481-86.
3. Standring S, editors. *Gray's Anatomy: The Anatomical Basis of Clinical Practice*. 41st ed. Elsevier; 2016.
4. Agur AM, Dalley AF, Moore KL, editors. *Clinically Oriented Anatomy*. 8th ed. Canada: Wolters Kluwer; 2018.
5. Walsh G, Williams MP. Congenital anomalies of the portal venous system: CT appearances with embryological considerations. *ClinRadiol* 1995; 50(3): 174-6.
6. Hamilton WJ, Mossman HW. Hamilton, Boyd and Mossman's *Human Embryology: Prenatal Development of Form and Function*. 4th ed. Cambridge: W. Heffer & Sons Ltd; 1972. p.291-377.
7. Moore KL, Persaud TVN, Torchia MG. *The Developing Human: Clinically Oriented Embryology*. 9th ed. Saunders: Elsevier; 2013. p.290-3.
8. Marks C. Developmental basis of the portal venous system. *Am J Surg* 1969; 117(5): 671-81.
9. Zhang XM, Zhong TL, Zhai ZH, Zeng NL. MR venography of the inferior mesenteric vein. *Eur J Radiol* 2007; 64(1):147-51.
10. Falconer CWA, Griffiths E. The anatomy of the blood-vessels in the region of the pancreas. *Br J Surg* 1950; 37(147): 334-44.
11. Yıldırım M. *Resimli Sistemantik Anatomi*. 1st ed. İstanbul: Nobel Tıp Kitabevi; 2013.
12. Chaurasia BD. Spleen, Pancreas and Liver. In: B D Chaurasia's *Human Anatomy*. 4th ed. New Delhi: CBS; 2010. p.301-17.
13. Ozan H. *Ozan Anatomi*. 3th ed. Ankara: Klinisyen Tıp Kitabevleri; 2014.
14. Horton KM, Fishman EK. Multidetector row and 3D CT of the mesenteric vasculature: normal anatomy and pathology. *Semin Ultrasound CT MR* 2003; 24: 353-63.
15. Krumm P, Schraml C, Bretschneider C, Seeger A, Klumpp B, Kramer U, et al. Depiction of variants of the portal confluence venous system using multidetector row CT: analysis of 916 cases. *Rofo* 2011; 183(12): 1123-9.
16. Sakaguchi T, Suzuki S, Morita Y, Oishi K, Suzuki A, Fukumoto K, et al. Analysis of anatomic variants of mesenteric veins by 3-dimensional portography using multidetector-row computed tomography. *Am J Surg* 2010; 200(1): 15-22.
17. Jin G, Tuo H, Sugiyama M, Oki A, Abe N, Mori T, et al. Anatomic study of the superior right colic vein: Its relevance to pancreatic and colonic surgery. *Am J Surg* 2006; 191: 100-3.
18. Kimura W. Surgical anatomy of the pancreas for limited resection. *J HepatobiliaryPancreatSurg* 2000; 7: 473-9.
19. Wolff M, Hirner A. Current state of portosystemic shunt surgery. *LangenbecksArchSurg* 2003; 388: 141-9.
20. Gorini P, Johansen K. Portal decompression using the inferior mesenteric vein. *HPB Surg* 1998; 10(6): 365-70.
21. Jabbour N, Todo S, Selby R, Starzl TE. Venovenous bypass using inferior mesenteric vein for portal decompression during orthotopic hepatic transplantation. *J AmCollSurg* 1995; 180(1): 100.
22. Mozes M, Tzur N, Bogokowsky H. Mesenterorenal shunt for decompression of portal hypertension. *Surgery* 1967; 62(5): 884-7.
23. Yeh TJ, McGuire HHJ. Intractable bleeding from anorectal varices relieved by inferior mesenteric vein ligation. *Gastroenterology* 1994; 107: 1165-7.