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

Zafer Kutay Coskun¹, Kerem Atalar¹, Ece Alim¹, Ayşe Erkaya²

¹Gazi University, Faculty of Medicine, Department of Anatomy, Ankara, Turkey
²Lokman Hekim University, Faculty of Medicine, Department of Anatomy, Ankara, Turkey

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

Received: 11.06.2020 Accepted: 06.18.2021

ÖZET

V. mesentericainferior ‘un v. splenica’ya anatomik olarak katılması ve drenaji çoğunlukla anatomi ile ilgili literatürde bildirilmiştir. Bunun birlikte, v. mesentericainferior’un v. mesentericasuperior’a veya v. splenica ile v. mesentericasuperior arasındaki birleşme yerine katılması ve drenaji da mümkündür. Anatomı eğitimi için Gazi Üniversitesi Tip Fakültesi Anatomi Anabilim Dalı laboratuvarında rutin karın diseksiyonları gerçekleştirirken 66 yaşındaki bir erkek kadavra v. mesentericainferior’un varyasyonu saptanmıştır. Girişimsel radyologların yanı sıra cerrahların da mezenterikvenöz varyasyonları hakkında bilgilendirilmiş kesinlikle faydalıdır.

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

Geliş Tarihi: 06.11.2020 Kabul Tarihi: 18.06.2021

ORCID IDs: N.I.0000-0003-4479-7706, J.S.0000-0003-1974-4379, N.A.G.0000-0002-4725-6666

Address for Correspondence / Yazışma Adresi: Zafer Kutay Coskun, Gazi University Faculty of Medicine Department of Anatomy, Besevler, Ankara, Turkey E-mail: zcoskun@gazi.edu.tr

©Telif Hakki 2021 Gazi Üniversitesi Tip Fakültesi - Makale metnine http://medicaljournal.gazi.edu.tr/ web adresinden ulaşılabilir.

©Copyright 2021 by Gazi University Medical Faculty - Available on-line at web site http://medicaljournal.gazi.edu.tr/ doi:http://dx.doi.org/10.12996/gmj.2021.98
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 vitellin 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.

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 mesenterical 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 mesenterical 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 splenomesenteric confluence in 7.6% of the patients(16). In the present study, IMV drained into the superior mesenteric 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; SMA: Superior mesenteric artery; IMA: Inferior mesenteric artery; SB: Sigmoid branches; LCAV: Left colic artery and vein; S: Spleen; TC: Transverse colon; DC: Descending colon; SC: Sigmoid colon.

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 orthotropic 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. Standing 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 WI, 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 mesentery 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 Sistematik Anatomi. 1st ed. İstanbul: Nobel Tip 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 Tip 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. Mozès 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.