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# ANOMALOUS FORMATION OF THE PORTAL VEIN – A CASE REPORT

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### ABSTRACT

The knowledge about the formation and relation of the portal vein is important for surgeons. The variation in the level of formation and the pattern of formation of portal vein is a cause of concern during surgical procedures. An abnormal formation of portal vein that was encountered during routine dissection is reported. The portal vein was formed by the union of splenic vein, superior mesenteric vein and inferior mesenteric veins. Identification of these variations is useful in managing traumatic rupture of the mesentery.

**Keywords :** variations, portal vein, obstruction.

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## Introduction:

The portal vein is normally formed by union of the splenic and superior mesenteric veins, around the level of L2, posterior to the neck of pancreas. It has supra duodenal course. At the porta hepatis it divides into a left and right branch. Areas of drainage by portal vein are the pancreas, spleen and gallbladder in addition to most of gastrointestinal tract. Variant portal architecture has been found in 20-35% of individuals (Covey, 2004 and Atri, 1992). Two common variations include (a) trifurcation of the portal vein, where there is (Atri, 1992) absence of the right trunk proper, such that the right anterior and posterior branches stem from the portal trunk at the same point as the left portal vein; and (b) right posterior branch coming off the main portal vein rather than from the right portal vein. Individual segmental branches arising away from their usual point of origin is

another commonly reported variation (Covey 2014). Preoperative assessment should include evaluation of portal anatomy prior to hepatic surgery. This will minimize postoperative complication like liver ischemia. Role of intervention radiologist is crucial in this regard.

There are reports on variations of the termination of portal vein in the porta hepatis, but there are few reported cases on the formation of portal vein and its anomalous course.

## Case Report:

During routine dissection for undergraduate medical students in Department of Anatomy, in a private medical college at Chennai, a male cadaver over 50 years showed a variation in the formation of the portal vein. The formative tributaries were superior mesenteric vein, splenic vein and inferior mesenteric vein. All the formative tributaries were carefully dissected and photograph was taken (fig.1)



**Fig1: Formative tributaries of portal vein. SMV – Superior Mesenteric Vein, IMV- Inferior Mesenteric Vein, SV – Splenic Vein**

**Discussion:** Before taking patients for hepatobiliary surgery, it is desirable to identify any abnormal formation or termination of portal vein. Variations seem to be prevalent at the porta hepatis rather than in the formation as per literatures. Bergman et. al. have reported the absence of portal vein and opening of superior

mesenteric and splenic veins into the vein (Bergman, 1988). Doubling of the portal vein has been reported by Shan et al. There have been incidences of portal vein being found anterior to the duodenum (Zhang, 1996, Stevens, 1978 and Yi SQ, 2004). The main clinical significance of a preduodenal portal vein is its association with

intestinal obstruction. This can be due to extrinsic compression of the duodenum or associated intestinal malformations. 80% of the obstructions are due to intrinsic lesion of the duodenum or malrotation (fernandes et al., 1990). Two - thirds of children with a preduodenal portal vein present in the first week of life. (fernandes et al., 1990). Other associations include biliary atresia, annular pancreas, situs inversus, preduodenal common bile duct and cardiovascular malformations. (Choi and park 1995 and fernandes, 1990). Inoue et al. 2003 have reported a prepancreatic postduodenal portal vein.

Paired vitelline veins develop anastomosis at three sites between them during the fourth to fifth weeks of embryonic life (sadler, 2000). From the formation of these anastomoses to the third month of development, there is selective involution of the venous network that eventually produces the portal vein. It has been proposed that aberrations in this process of involution can result in anatomical variations within the portal venous system (Niwa, 2002).

**Conclusion:** Knowledge of variations in the formation and course of the portal vein is mandatory before surgeries of pancreas and duodenum. It is also useful in managing the traumatic rupture of the mesentery. Since there are not many studies on variations in the formation of the portal vein, this study might contribute useful data to the literature regarding the same.

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