AN ANOMALOUS PORTAL VEIN WITH ITS SURGICAL DANGERS

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Anomalous vessels are not uncommon but the vein herein described I think to be of such exceptional rarity as to warrant reporting. The condition recorded in this short communication was discovered in the body of a male dissecting-room subject, aged sixty, in the Laboratory of the Anatomical Department of the University of Texas. It has proven to be a remarkably interesting case of anomalous portal vein. A search through the files of the *British Journal of Anatomy and Physiology* and of the *American*

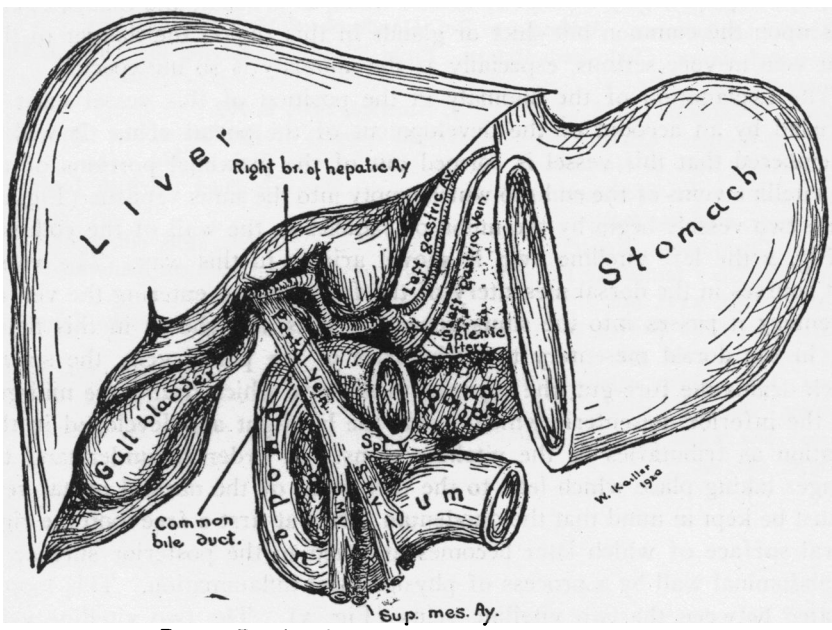

Fig. 1.—Drawing of case described from tracing made on glass.

Journal of Anatomy for the last five years did not reveal notice of an abnormal vessel like the present specimen. This anomaly is of special interest to surgeons because of its unusual and exposed position in connection with operations upon the common bile-duct.

The abnormality is formed as follows (Fig. 1): A number of tributaries issue from the hilum of the spleen which unite to form the splenic vein. The vessel then runs from the left toward the right, passing obliquely posterior to the middle portion of the body of the pancreas. It emerges from underneath the body of the pancreas just below the neck of the organ,

continuing along the summit of the duodeno-jejunal flexure. A little beyond the point immediately anterior to the head of the pancreas it is joined by two rather large veins coming upward from below in the root of the mesentery of the small intestine. These two veins, which represent the superior mesenteric vein, pass upward anterior to the horizontal portion of the duodenum and are returning the blood from the small intestines, receiving all the tributaries from this portion of the gut which correspond to the rami intestinales of the superior mesenteric artery. The portal vein formed in this manner anterior to the head of the pancreas then courses upward anterior to the upper flexure of the duodenum. At the upper border of the duodenum the vessel enters the right free border of the gastro-hepatic omentum (lesser omentum) and passes thence to the right extremity of the porta hepatic antero-lateral to the common bile-duct, and the hepatic artery. It will thus be seen that the vein lies in front of the duodenum, common bile-duct, and hepatic artery instead of behind them, as is usual, and that in operations upon the common bile-duct or glands in this region the danger to this great vein in very serious, especially as the anomaly is so unexpected.

The explanation of the anomaly in the position of this vessel must be preceded by an account of the development of the portal vein. It will be remembered that this vessel is formed out of the proximal portions of the two vitelline veins of the embryo which empty into the sinus venosus (Fig. 2). These two vessels begin by the union of radicles in the wall of the yolk-sac. In Fig. 2 the left vitelline vein is shown arising in this way. The vessel next courses in the dorsal mesentery of the fore-gut and entering the ventral mesentery it passes into the sinus venosus. It is also shown in this figure that in the dorsal mesentery the tributaries of the portal vein, the splenic which drains the fore-gut, the superior mesenteric which drains the mid-gut, and the inferior mesenteric which drains the hind-gut are developed in this situation as tributaries of the vitelline veins. In order to understand the changes taking place which lead to the formation of the normal portal vein, it must be kept in mind that the duodenum forms at first a free loop the right lateral surface of which later becomes attached to the posterior surface of the abdominal wall by a process of physiological inflammation. This loop is situated between the two vitelline veins (Fig. 3). The two vitelline veins have become united by three cross anastomoses with each other in such a manner that there is formed about the gut a cephalic and a caudal venous ring. These connections have the following positions: one transverse connection (*a*) in the liver; a middle one (*b*) behind the duodenum; and the third (*c*) caudal to the duodenum.

The development of the normal portal vein from the sides of these two venous loops with their cross anastomoses takes place in this manner: the portal sinus, which occupies the transverse fissure of the liver, is formed out of the cranial transverse anastomosis (*a*); the part of the vein in the right free margin of the gastro-hepatic omentum (lesser omentum) and behind the first portion of the duodenum is formed from the right side of the cephalic

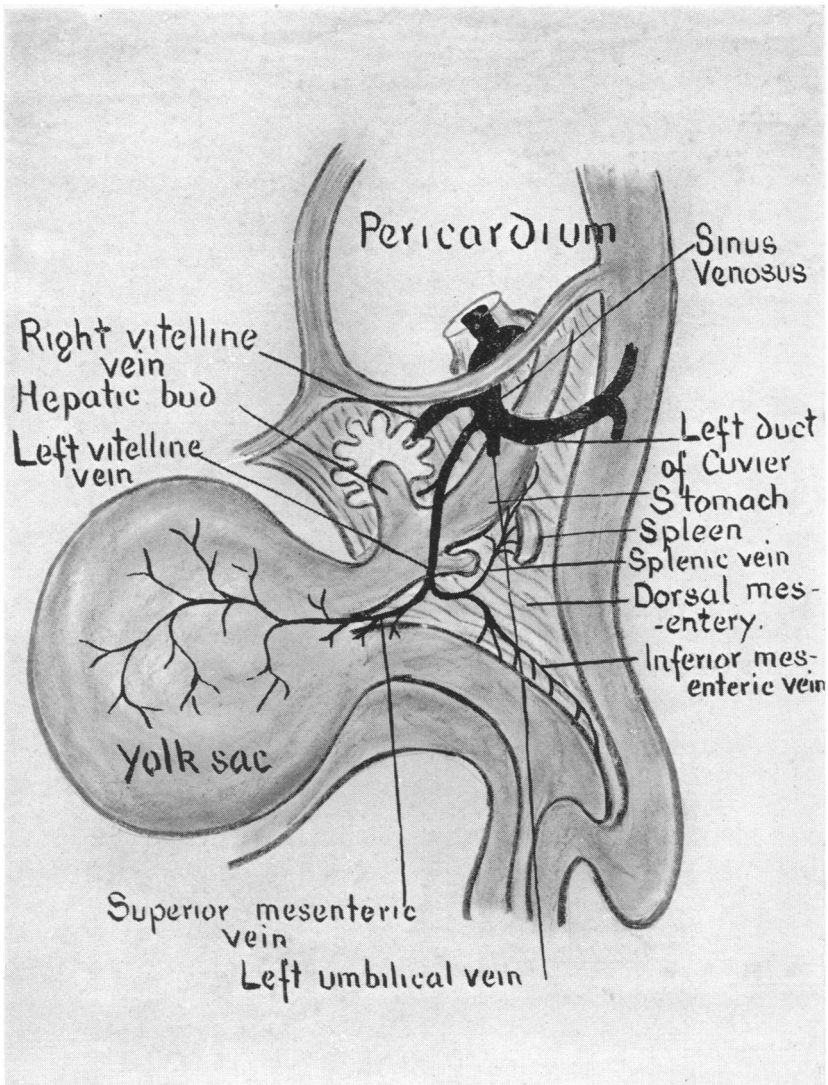

FIG. 2.—The left vitelline vein of an embryo of the fourth week. (After Keith.)

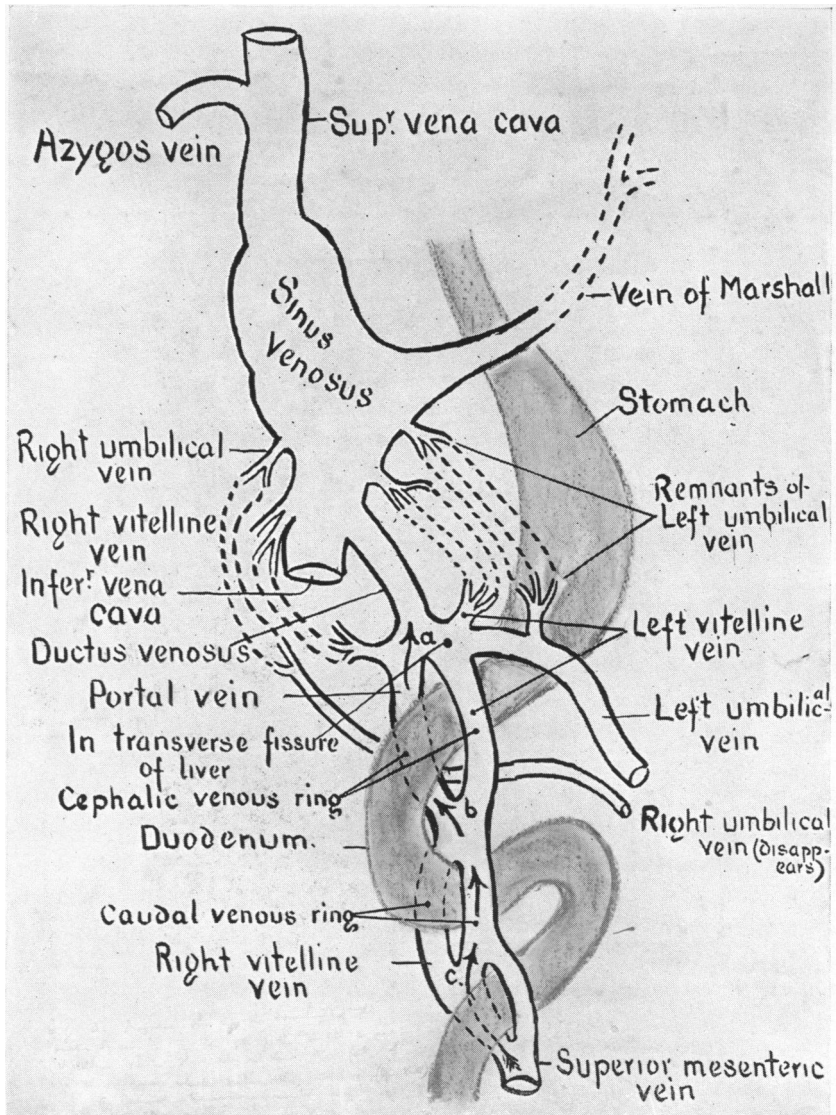

FIG. 3.—Diagram showing the formation of the ductus venosus and the fate of the umbilical and vitelline veins. The arrows show the parts of vitelline veins which become the portal vein (after Keith). (a) Cranial transverse anastomosis. (b) Middle transverse anastomosis. (c) Caudal transverse anastomosis.

loop (right vitelline vein), while the left limb of this loop atrophies and disappears; the middle anastomosis (*b*) represents the commencement of the portal vein immediately posterior to the neck of the pancreas; finally, the left limb of the caudal loop persists as the terminal part of the superior mesenteric vein, which lies anterior to the horizontal portion of the duodenum, and the right limb of this loop disappears.

In our specimen the right limb of the cephalic venous loop which surrounds the first portion of the duodenum degenerated, contrary to the rule, while the left limb persisted, with the result that the vein in this part of its course is lying directly anterior to this stage of the doudenum.