

Multidetector-Row CT Findings of a Preduodenal Portal Vein Associated with Polysplenic Syndrome in an Adult: A Case Report

다비장 증후군과 관련된 십이지장 전방문맥(Preduodenal Portal Vein)의 다중검출기 CT 소견: 증례 보고

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Predudodenal portal vein (PDPV) is a rare developmental anomaly in which the portal vein runs at the ventral side of the duodenum instead of at an intrapancreatic location. Understanding of this anomaly is of considerable surgical importance, because it may cause unintended portal vein injury during operations involving the gall bladder or duodenum. We recently experienced PDPV associated with polysplenia syndrome in a 49-year-old male patient who complained of persistent epigastric pain. CT portal venography with thin slab maximal intensity projection and volume rendering demonstrated the unique feature of convex anastomosis between the L-shaped mesenterico-portal vein and mesenterico-splenic vein in the mid abdomen. We report here the Multidetector-row CT findings of a rare case of PDPV.

Index terms

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INTRODUCTION

Predudodenal portal vein (PDPV) is a rare developmental anomaly that involves the portal vein passing in front of the duodenum, which was first reported by Knight (1) in 1921. Understanding this anomaly is of considerable surgical importance, because the vein lies in the most superficial position ventral to the duodenum and is easily damaged during operations involving the biliary tract and duodenum (2). Some patients with predudodenal portal vein may harbor anomalies in abdominal organs and the cardiovascular system, such as polysplenia, which is also a rare developmental anomaly characterized by the abnormal arrangement of the solid organs, bowel and spleen (3). We recently experienced one case of PDPV combined with polysplenia, agenesis of the pancreatic tail, and azygos continuation of the right inferior vena cava (IVC). There are several reports about PDPV associated with polysplenia syndrome in adult patients, but the detailed Multidetector-row CT (MDCT) find-

ings of these anomalies in the adults are not well identified (4, 5). We report here the MDCT findings of PDPV associated with polysplenia syndrome in an adult patient.

CASE REPORT

A 49-year-old man visited the outpatient department of our hospital with complaints of persistent and vague epigastric pain. He was initially diagnosed with gastritis and was treated as such. However, his abdominal pain did not completely resolve.

Using a 128-row detector CT scanner (definition AS+, Siemens Medical Solutions, Forchheim, Germany), CT scans of the abdomen and pelvis were obtained in the arterial and portal venous phases after intravenous injection of contrast agent (Ultravist 300, Bayer Schering Pharma, Berlin, Germany). The contrast-enhanced CT scan demonstrated an unusual appearance of the portal vein located ventrally to the duodenum, mesenterico-portal vein and mesenterico-splenic vein anastomosed

caudally in the lower abdomen (Fig. 1A, B). In addition, the spleen was multilobulated and bizarre in appearance and the IVC was interrupted with an azygos continuation and absence of the intrahepatic portion of the IVC (Fig. 1C). The pancreas was truncated, with only the pancreatic head and small portion of the pancreatic body remaining (Fig. 1D).

There was no evidence of duodenal obstruction, biliary atresia or intestinal malformation.

CT portal venography with maximal intensity projection (MIP) and volume rendering clearly depicted an unusual and characteristic appearance of the portal vein, which was L-shaped and convex caudally, and deviated to the right from the course of the superior mesenteric artery (Fig. 1E, F).

DISCUSSION

In early embryonic life, the venous blood from the primitive

gut consists of two vitelline veins of the yolk sac. Three interconnecting veins (cranial, middle, caudal) connect the two vitelline veins. With further development, caudal and cephalad interconnecting veins, along with the caudal segment of the right and cephalic segment of the left vitelline veins, atrophied. Only the middle interconnecting vein remained at the dorsal aspect of the duodenum, and formed an S-shaped PV with leaving cephalad segment of the right and caudal segment of the left vitelline veins (6). The preduodenal portal vein consisted of an anomalous regression of the cranial and middle interconnecting veins, which connected the two vitelline veins that run on either side of the duodenum in a 5-mm embryo. The remaining caudal interconnecting vein runs ventral to the duodenum and results in an anomalous position of the portal vein (7).

In the pediatric population, PDPV is usually detected with another condition that needs clinical attention and urgent surgical operation, such as duodenal obstruction, intestinal malfor-

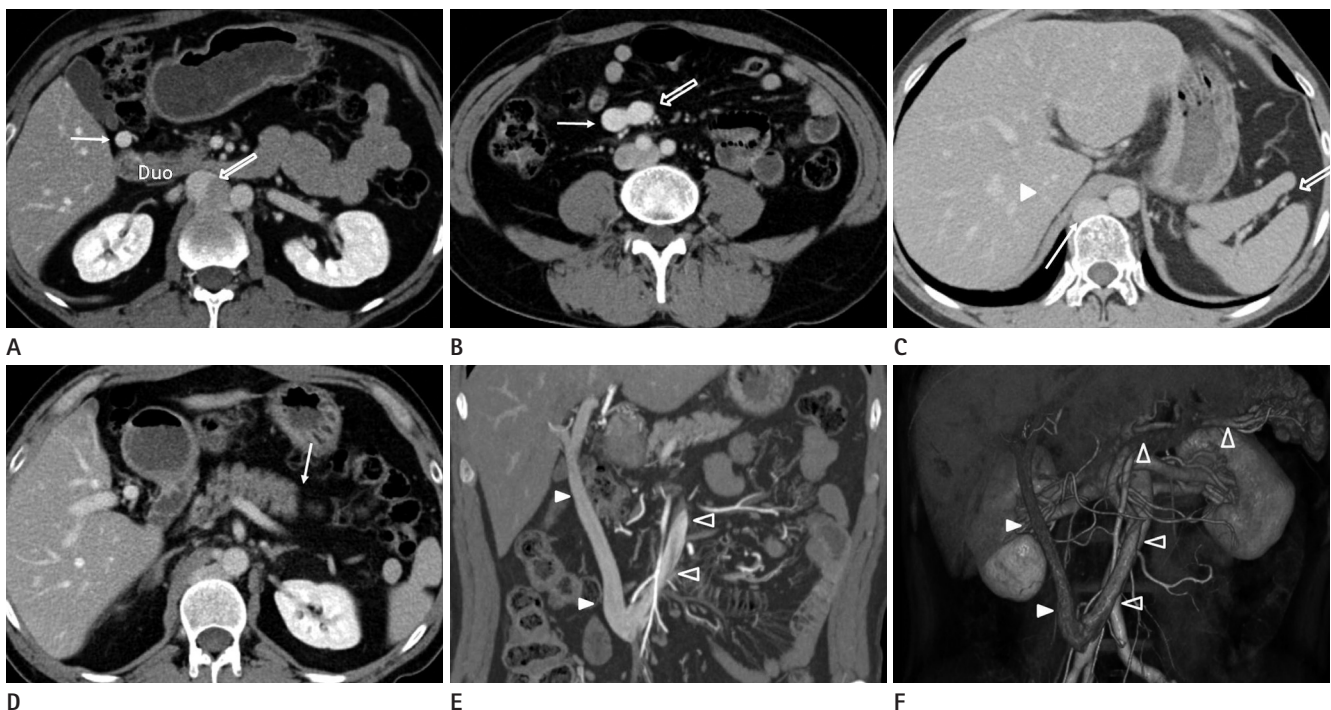


Fig. 1. A 49-year-old man with PDPV combined with polysplenic syndrome.

A. Axial images of contrast-enhanced CT scan shows that the main portal vein (thin arrow) is located ventral to the duodenum (Duo) without the formation of retropancreatic portal confluence. Azygos continuation of the IVC is also noted (open arrow).

B. Lower location of anastomosis of mesenterico-portal vein (thin arrow) and mesenterico-splenic vein (open arrow).

C. Axial images of contrast-enhanced CT scan demonstrates that the intrahepatic IVC is absent (arrowhead) along with the dilated azygos vein in the retrocrural region (thin arrow). The spleen was multilobulated and bizarre in appearance (open arrow).

D. The pancreas is truncated, with only the pancreatic head and a small portion of the pancreatic body remaining (thin arrow).

E, F. CT portal venography, with MIP (**E**) and volume rendering (**F**), clearly depict the characteristic L-shaped anastomosis of the mesenterico-portal vein (solid arrowheads) and mesenterico-splenic vein (open arrowheads).

Note.—IVC = inferior vena cava, MIP = maximal intensity projection, PDPV = preduodenal portal vein

mation or congenital heart disease (2, 5). Patients without cardiac anomalies may reach adulthood, and account for 10-15% of cases of polysplenia (4). In most adult cases, the diagnosis of the anomalies is made preoperatively or incidentally. In our case, the preduodenal portal vein and polysplenia syndrome was diagnosed incidentally while examining a complaint of persistent and vague epigastric pain that was relieved after administering another medication for gastritis. It has been reported that PDPV increases risk to the patient during surgery, especially when involving the biliary tract. Tearing of the vein could result in serious hemorrhage (7). Despite the well known unique conventional angiographic features of PDPV, L-shaped and caudal mesenterico-portal veins, for the most part, are not diagnosed preoperatively (8).

CT or MRI imaging of the abdomen may be the first modality used to detect these anomalies in adults, preoperatively or incidentally (4, 9). In comparison, MDCT with three-dimensional reconstructions including MIP and volume rendering are much more reliable in demonstrating the various venous and organic anomalies. In our case, PDPV with polysplenic syndrome was diagnosed incidentally with the characteristic L-shaped and convexly caudal mesenterico-portal vein findings typically found as the angiographic features of PDPV on CT portography. Conventional axial and reconstruction images more clearly demonstrated other manifestations of polysplenic syndrome such as a bizarre-shaped spleen, truncated pancreas and azygos continuation of the IVC.

Our literature review disclosed variable rate of azygos continuation of IVC accompanied with PDPV ranging from 8% and 15% (10). Some radiologic reports revealed that abnormalities of the continuity of the IVC-azygos system were more frequently associated with PDPV than previously thought. The advent of MDCT with reconstruction and MRI seems to improve the detection rate of the association between PDPV and IVC anomaly (9, 10).

Based on this case, we concluded that MDCT with reconstruction images is a useful and noninvasive diagnostic method

for depicting PDPV. Knowledge of MDCT findings of PDPV is critical to avoid confusion with acquired disease and to decrease the risk of preventable vascular injury during surgery.

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다비장 증후군과 관련된 십이지장 전방문맥 (Preduodenal Portal Vein)의 다중검출기 CT 소견: 증례 보고

송 현 · 이수림 · 구영미 · 전장우

십이지장 전방문맥(preduodenal portal vein)은 문맥이 십이지장 전방을 지나는 드문 선천성 기형이다. 이러한 기형을 이해하는 것은 담낭 또는 십이지장 수술 중 의도하지 않은 문맥 손상을 막는 데 있어서 중요하다. 지속되는 상복부 통증을 주소로 내원한 49세 여자 환자에서 시행한 다중검출기 CT 영상에서 다비장 증후군을 동반한 십이지장 전방문맥을 경험하였기에 그 소견을 보고하고자 한다.

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