Surgical Atlas of Biliary Tract and Biliary-pancreatic-duodenal Region

胆道与胆胰十二指肠区域外科手术图谱

主编 王钦尧
Edited by Wang Qinyao

科学出版社

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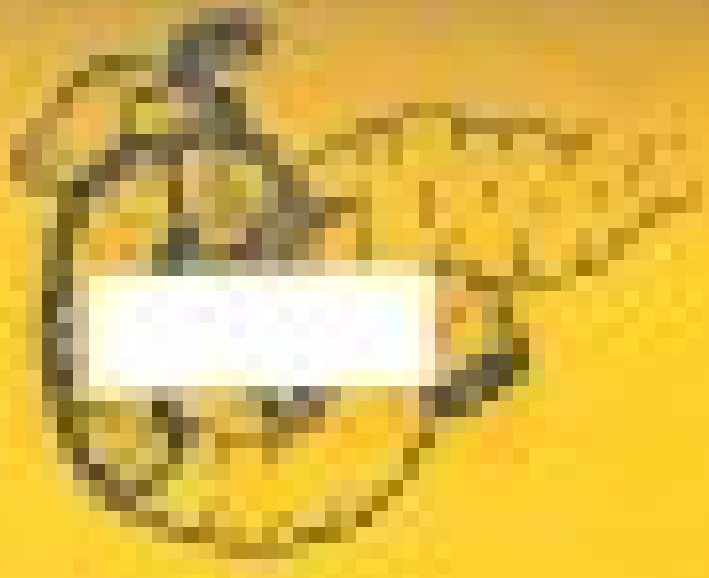

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第一篇

外科解剖学

Chapter One

Surgical Anatomy

1 胆胰十二指肠区域外科解剖

Surgical Anatomy of the Biliary-pancreatic-duodenal Region

王钦尧 Wang Qinyao

区域解剖结构及其胚胎发生

胆胰十二指肠区域位于上腹部腹膜后，由十二指肠、胰腺及远段胆道相互禁锢、沟通组成，笔者称其为“胆胰十二指肠区域”（简称：区域）（图1-1A）。

在区域中，十二指肠呈“C”字形包绕胰头部；胆总管下段走行于十二指肠上部后侧与胰头后方、在十二指肠降部壁内与主胰管汇合成壶腹后，开口于十二指肠大乳头；门静脉-肠系膜上静脉轴贯穿该区域。在胰腺颈部后方，起自腹主动脉的肠系膜上动脉，向下跨越十二指肠横部前方。

区域内脏器有着共同的胚胎发生起源，共同的动脉血供、静脉回流与淋巴引流网络。

十二指肠发育于原始前肠的尾段与中肠的头段（图1-1B）。在胚胎发生的第4周起，从原始十二指肠上生长出肝憩室和背胰芽，在前者邻近前肠的基底部又生长出腹胰芽（图1-1B_1）。在肝憩室的发育过程中形成了肝脏、胆囊管和胆囊，以及肝总管和胆总管（图1-1B_2），包括腹胰在内的上述结构与背胰，随着十二指肠进行旋转（图1-1B_2），当腹胰与背胰完成旋转后，相互靠拢、融合，腹胰管与背胰管也相互沟通形成主胰管，主胰管与胆总管汇合成壶腹后，开口于十二指肠大乳头，而背胰的近肠侧的胰管段则形成副胰管，副胰管开口于大乳头近侧的十二指肠小乳头（图1-1$B_{3、4}$）。

另外，随着中肠的发育，卵黄囊血管经历了血管生成、吸收与再造的复杂过程，形成了门静脉-肠系膜上静脉轴，该静脉轴向上贯穿区域后引向肝脏。从胰颈后方由腹主动脉分出的肠系膜上动脉下行。至此，胚胎期生成的“区域“解剖结构已完整地形成。

临床上，常将区域中的十二指肠、远侧胆道与胰腺的三者交接部位称为：“胆胰肠结合部”（图1-1A）。

Regional anatomical structures and embryogenesis

The biliary-pancreatic-duodenal region is located in the retroperitoneum in the upper abdomen, composed of the duodenum, pancreas, and distal bile duct (referred to as: Region) (Fig. 1-1A).

In the region, the part of duodenum presents a "C" shape surrounding the head of the pancreas; The common bile duct travels behind the upper part of duodenum and the rear of the pancreas head, and after convergence with the main pancreatic duct within the wall of the descending part of duodenum, then forms the ampulla and opens in the major papilla; The portal vein-superior mesenteric vein axis travels through the region. Behind the pancreatic neck, the superior mesenteric artery, starting from the abdominal aorta, goes down across the front of the of transverse part of duodenum.

In this region, the organs have a common embryonic origin, common arterial supply and venous return and lymphatic drainage network.

The duodenum originates from the tail section of the primitive foregut and the head segment of the midgut (Fig. 1-1B). Starting from the fourth week of embryogenesis, the hepatic diverticulum and the dorsal pancreatic bud grow from the primitive duodenum, then the ventral pancreatic bud grows from the former base near the foregut (Fig. 1-1B_1). During the formation of hepatic diverticulum, the liver, cystic duct and gallbladder, and hepatic duct and common bile duct develop

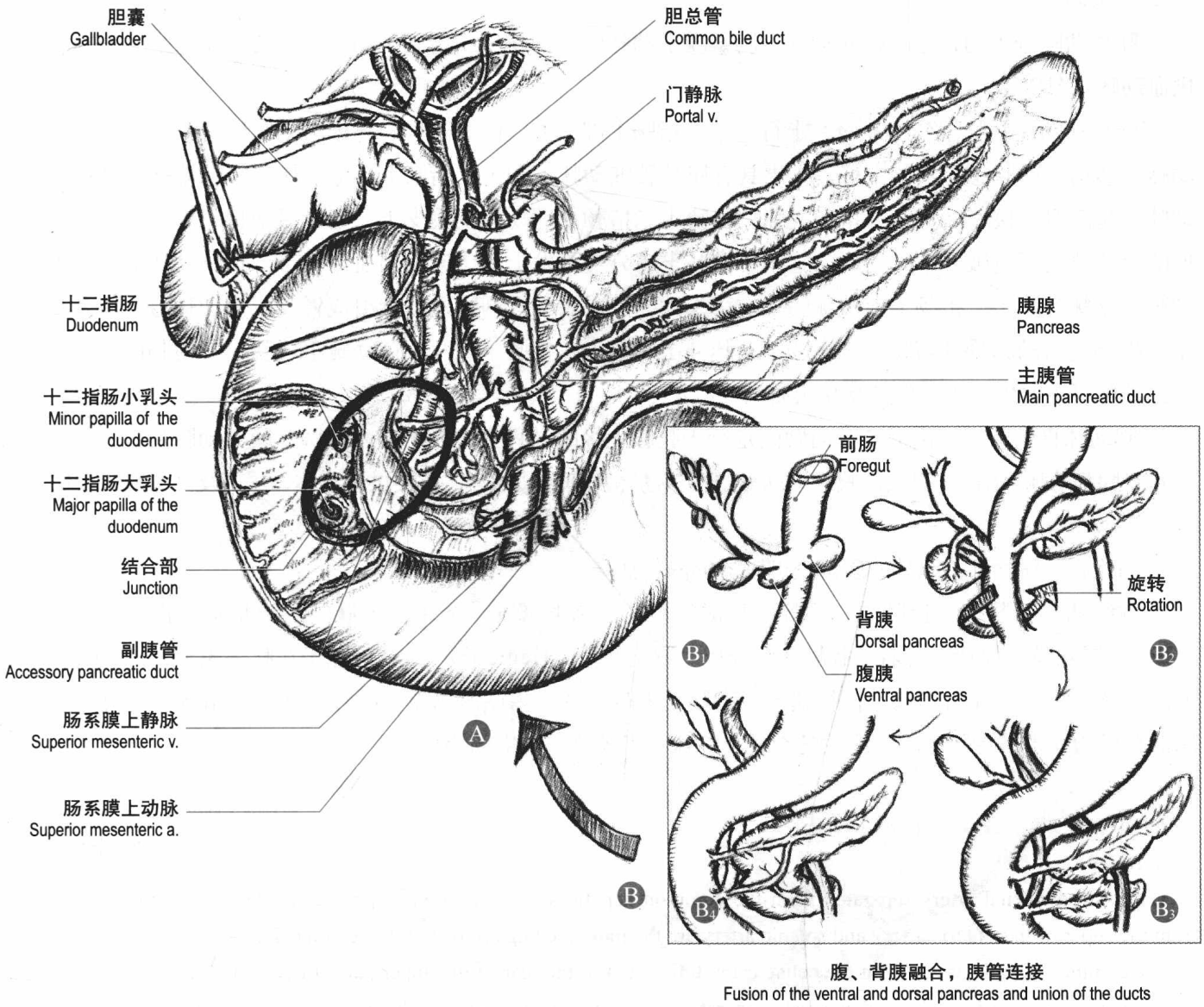

图1−1 胆胰十二指肠区域解剖结构及其胚胎发生

Fig. 1-1 Anatomic structures of the bilary-pancreatic-duodenal region and its embryogenesis

(Fig. 1-1B_2). The ventral pancreas, including the dorsal pancreas and the above structures, rotates with the duodenum (Fig. 1-1B_2). After the completion of rotation, the ventral and dorsal pancreas move closer to each other and fuse together. The ventral and dorsal pancreatic ducts communicate with each other to form the main pancreatic duct, which converges with the common bile duct. The above two form the ampulla and open in the major papilla. The dorsal pancreatic duct's segment near the intestine forms the accessory pancreatic duct, which opens in the small papilla proximal to the major duodenal papilla (Fig. 1-1$B_{3,4}$).

In addition, with the development of the midgut, the yolk sac vessels complete a series of complex processes including angiogenesis, absorption and reconstruction, ultimately forming the portal-superior mesenteric venous axis, which throughout the region goes toward the liver. The superior mesenteric arteries originating from the abdominal aorta travels downward behind the pancreatic neck. At this point, the anatomical structure of the region generating in the embryonic period has been fully formed. In clinics, the junction of the duodenum, distal bile duct and pancreas in this region, is usually called the "biliary-pancreatic-duodenal junction" (BPDJ) (Fig. 1-1A).

区域的动、静脉

区域动脉

肝总动脉分出的胃十二指肠动脉、肠系膜上动脉分出的胰十二指肠下动脉，以及脾动脉是区域的主要供血动脉（图1-2A）。

肝总动脉自腹腔干分出，向右走行至十二指肠上部后方，向上延伸为肝固有动脉处，分出胃十二指肠动脉，该动脉沿胆总管左侧下行，分出具有胆总管细动脉支的十二指肠上动脉，切开胆总管壁时可损伤该动脉引起出血。接着，胃十二指肠动脉分出胰十二指肠上后动脉及数支十二指肠后动脉。十二指肠球部后壁的穿透溃疡可溃破胃十二指肠动脉本干或其上述分支引发上消化道大出血。胃十二指肠动脉最后分出胃网膜右动脉与胰十二指肠上前动脉的二支终末动脉，前者与胃网膜左动脉组成胃大弯侧动脉弓，后者及胰十二指肠上后动脉分别与胰十二指肠下动脉分出的胰十二指肠下后及下前动脉组成胰十二指肠前、后动脉弓，动脉弓主要供应十二指肠及胰头血供。

脾动脉自腹腔干分出后，在向脾门走行于胰腺上缘的过程中，分出胰背动脉、胰大动脉及多支细动脉（可自胰横动脉分出），以及从胰背动脉分出胰横动脉及胰尾动脉等，主要供应胰体、尾部及部分胰头血供。

区域静脉

门静脉受纳除肝脏以外的腹部全部脏器的静脉血流。

围绕胰头由胰十二指肠前、后静脉形成的静脉网络的属支，分别引入肝门静脉及肠系膜上静脉（图1-2B）。胃网膜右静脉常与右结肠静脉汇合成“胃结肠干（Henle干）”，该静脉干在胰头或十二指肠横部前方汇入肠系膜上静脉右侧壁，在行胰十二指肠切术时，该干需谨慎离断、结扎。胰十二指肠下前及下后静脉汇合成的胰十二指肠下静脉汇入肠系膜上静脉本干或第一支空肠静脉。

Arteries and veins in the Region

Arteries

The gastroduodenal artery separated from the common hepatic artery, the inferior pancreaticoduodenal artery separated from the superior mesenteric artery and splenic artery are the main feeding arteries of the region (Fig. 1-2A).

The common hepatic artery from the celiac trunk turns right to the rear of the upper part of duodenum, extends upward as the proper hepatic artery, and simultaneously separates the gastroduodenal artery. The latter travels downward along the left side of the common bile duct, and separates the superior duodenal artery which has thin branches for nourishing the common bile duct. When you cut the common bile duct wall, these thin branches can be damaged leading to bleeding. Then, the gastroduodenal artery separates the superior posterior pancreaticoduodenal artery and several branches named duodenal posterior arteries. The penetrating ulcers in the duodenal posterior wall can corrode the gastroduodenal artery stem, or the above branches leading to massive upper gastrointestinal hemorrhage. Finally the gastroduodenal artery separates two terminal arteries, the right gastroepiploic artery and the superior anterior pancreaticoduodenal artery, the former forming the arterial arch of greater curvature of stomach with the left gastroepiploic artery, the latter and the superior posterior pancreaticoduodenal artery forming the anterior and posterior arterial arches separately with the anterior and posterior arteries from the inferior pancreaticoduodenal artery. The arterial arches mainly supply blood for the duodenum and the head of the pancreas.

After separation from the celiac trunk, the splenic artery, while traveling to the splenic hilum on the upper edge of the pancreas, separates the dorsal pancreatic artery, the great pancreatic artery, multi-branches (which might be separated from the transverse pancreatic artery), and the transverse pancreatic artery (from the dorsal pancreatic artery) and tail artery. The arteries mentioned above mainly supply blood for the pancreatic body, tail and part of the head.

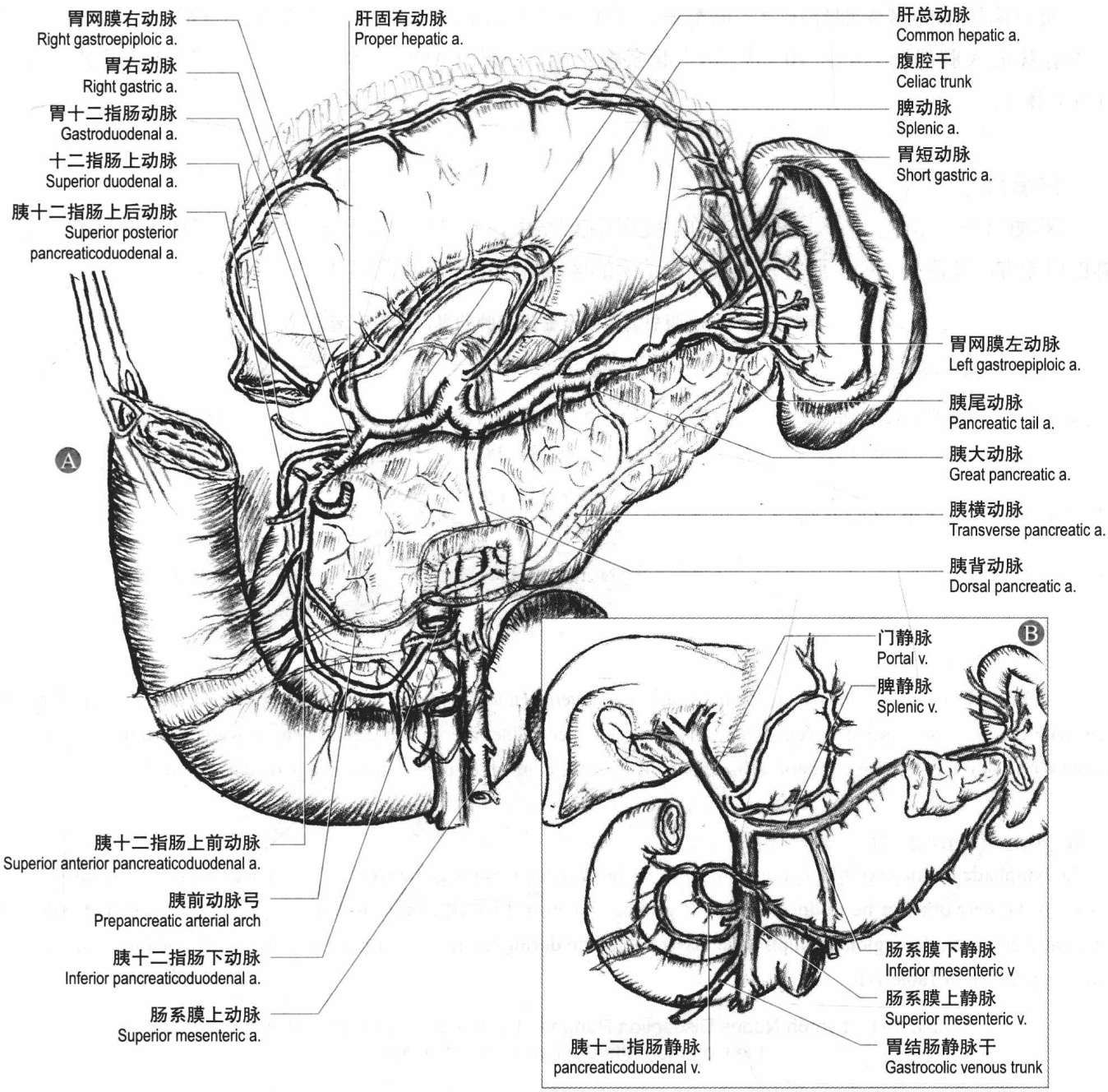

图1–2 胆胰十二指肠区域内的动、静脉

Fig. 1-2 Arteries and veins in the biliary-pancreatic-duodenal region

Veins

The portal vein receivs all the abdominal organs' venous flow outside the liver.

The vein network branches from the anterior and posterior pancreaticoduodenal vein around the pancreatic head flow into the hepatic portal vein and superior mesenteric vein (Fig. 1-2B). The right gastroepiploic vein and the right colic vein often converge into the gastrocolic trunk (Henle's trunk). The trunk converges into the right side wall of superior mesenteric vein in front of the pancreatic head or the duodenal horizontal part. The trunk must be transected and ligated carefully during pancreaticoduodenectomy. The confluence of the inferior anterior and inferior posterior pancreaticoduodenal veins forms the inferior pancreaticoduodenal vein, which converges into the stem of the superior mesenteric vein or the first jejunal vein.

胰腺体尾部的多支细静脉引入脾静脉，脾静脉在胰颈后侧与肠系膜上静脉汇合成肝门静脉；肠系膜下静脉汇入脾静脉（约占40%人体）、肠系膜上静脉（约占40%人体），或上述二静脉交汇处（约占20%人体）。

区域的淋巴

区域的淋巴引流包含于上腹部脏器的淋巴引流网络中，网络中的淋巴结可分为图1-3所示的18组。按照淋巴引流方向及范围，胰、胆管及壶腹癌根治术的区域淋巴结应廓清范围见表1-1。

表1-1 胰头、胆总管下端及壶腹癌肿的淋巴结应廓清范围

	第一站	第二站	第三站
胰头	6,8,12a_2,12b_2,12p_2,13, 14b,14c 14d,14v,17	9,11,12a_1,12b_1,12p_1,12c 14a,15,16a_2,16b_1,18	1,2,3,4,5,7,10,12b,16a_1, 16b_2
胆总管下端	12a_2,12p_2,12b_2,13a	8,12a_1,12p_1,12b_1,12c,12h 13b,17	5,6,7,9,14
壶腹	13,17	8,12a_2,12b_2,12p_2,14	5,6,7,9,12h,12a_1,12p_1 12b_1,12c

The multi-tiny branches in the pancreatic body and tail converges into the splenic vein, which converges into the hepatic portal vein with the superior mesenteric vein behind the pancreatic neck. The inferior mesenteric vein converges into the splenic vein (about 40%), or the superior mesenteric vein (about 40%), or the confluence part of the above two veins (about 20%).

Regional lymphatic system

The lymphatic drainage of the region is included in the lymphatic drainage network of the upper abdominal organs. Lymph nodes in the network can be divided as the 18 groups shown in Fig. 1-3. In accordance with the direction and range of lymphatic drainage, the regional lymph node dissection range during the radical surgery for pancreatic, bile duct and ampulla cancers is shown in Table 1-1.

Table 1–1 Lymph Nodes Dissection Range of the Pancreatic Head, Lower Segment of the Common Bile Duct and Ampulla Cancers

	The First Station	The Second Station	The Third Station
Pancreatic head	6,8,12a_2,12b_2,12p_2,13 14b,14c,14d,14v,17	9,11,12a_1,12b_1,12p_1,12c 14a,15,16a_2,16b_1,18	1,2,3,4,5,7,10,12b,16a_1, 16b_2
Lower segment of common bile duct	12a_2,12p_2,12b_2,13a	8,12a_1,12p1,12b_1,12c,12h,13b,17	5,6,7,9,14
Ampulla	13,17	8,12a_2,12b_2,12p_2,14	5,6,7,9,12h,12a_1,12p_1, 12b_1,12c