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# Treatment of pancreas divisum

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## INTRODUCTION

Pancreas divisum is the most common congenital pancreatic anomaly, occurring in approximately 7 percent of subjects in autopsy series [1,2]. More than 95 percent of patients with pancreatic divisum are asymptomatic, and it remains controversial whether the symptoms that occur in the remaining patients are due to pancreas divisum.

This topic will review the management of patients with pancreas divisum. The epidemiology, pathogenesis, clinical manifestations, and diagnosis of pancreas divisum are discussed separately. (See "[Pancreas divisum: Clinical manifestations and diagnosis](#)".)

## APPROACH TO MANAGEMENT

Due to the uncertainty of pancreas divisum as a causative factor in acute or chronic pancreatitis or chronic abdominal pain and the risks associated with treatment, our approach to the patient with pancreas divisum varies based on the clinical presentation.

**Asymptomatic patients** — Asymptomatic patients in whom pancreas divisum is incidentally found on abdominal imaging (eg, computed tomography scan or magnetic resonance cholangiopancreatogram [MRCP]) and who have no abnormality of the pancreas or clinical history of pancreatitis require no additional evaluation or treatment of pancreas divisum. (See "[Pancreas divisum: Clinical manifestations and diagnosis](#)", section on 'Diagnostic

evaluation'.)

**Patients with minimal/infrequent symptoms** — In patients with pancreas divisum and mild or infrequent bouts of pain, we suggest conservative management rather than treatment of the minor papilla narrowing associated with pancreas divisum. Conservative management includes a low-fat diet, analgesics, anticholinergics, and if necessary, pancreatic enzyme supplements. The management of acute and chronic pancreatitis is discussed in detail, separately. (See "[Management of acute pancreatitis](#)" and "[Chronic pancreatitis: Management](#)".)

**Patients with recurrent/severe symptoms** — Patients with pancreas divisum and recurrent pancreatobiliary-type pain, acute pancreatitis, or chronic pancreatitis associated with clinically significant disability warrant pancreatic imaging (eg, MRCP) and an evaluation of the underlying etiology. However, we reserve minor papilla therapy for patients with two or more bouts of acute pancreatitis regardless of severity and consider therapy in patients with one bout of severe acute pancreatitis if no other etiology is found. Evidence of dorsal duct dilation on pancreatic imaging may suggest a stenotic minor papilla orifice, but is not a requirement for proceeding with minor papilla therapy [3]. (See "[Pancreas divisum: Clinical manifestations and diagnosis](#)", section on 'Symptomatic or evidence of pancreatitis/complications' and "[Etiology of acute pancreatitis](#)", section on 'Approach to establishing the underlying etiology'.)

**Choice of therapy** — The choice of therapy should be guided by the patients' comorbidities, preference, and local institutional expertise. For patients who are low surgical risk, either endoscopy or surgery can be performed to treat pancreas divisum. Endoscopic therapy with sphincterotomy has the advantage of being less invasive than surgery. We reserve surgery for patients who either fail endoscopic therapy or in whom endoscopy is not possible due to altered surgical anatomy, and in patients with early or repeated minor papilla stenosis.

While endoscopic and surgical sphincterotomy have not been compared directly, they appear to have comparable success rates and rates of restenosis [4]. Success rates vary based on the clinical presentation and may be higher in patients with idiopathic recurrent acute pancreatitis as compared with those with chronic pancreatitis or chronic abdominal pain. In a systematic review that included 28 studies in which patients underwent endotherapy or surgery for pancreas divisum, there was no significant difference in the proportion of patients with complete or partial pain relief (70 and 75 percent, respectively). The response rates, defined broadly as the percentage of patients with complete, partial, or overall pain relief at follow-up, were significantly higher in patients with pancreas divisum and idiopathic

recurrent acute pancreatitis as compared with those with chronic pancreatitis and chronic abdominal pain (81 versus 69, 53 percent, respectively) [5]. The restenosis rate for any therapy of the minor papilla is estimated to be 10 to 20 percent. High-grade strictures of the terminal 10 mm of the dorsal duct are estimated to occur in 2 to 3 percent of patients. (See "[Chronic pancreatitis: Management](#)".)

**Surgery** — Surgical options for the treatment of pancreas divisum include minor papilla sphincterotomy or sphincteroplasty. The success of surgery has only been evaluated in small surgical series, and most surgeons also include a cholecystectomy and major papilla sphincteroplasty [6]. However, these data suggest that minor papilla sphincterotomy and sphincteroplasty have comparably high success rates [7,8]. Surgery is limited by a morbidity rate of approximately 10 percent. The rate of major complications is approximately 4 percent, and the restenosis rate is approximately 8 percent. Postoperative deaths have occurred.

Other surgical procedures have been used in selected cases. Patients with obviously dilated dorsal ducts may be candidates for a Puestow procedure (lateral pancreaticojejunostomy). Severely symptomatic patients who fail to respond to duct decompression, or those with non-dilated ducts who fail to respond to minor papilla or medical therapy, may be candidates for pancreatic denervation or resection, but results from both are variable. Total pancreatectomy has controlled incapacitating pain in a limited number of patients, but severe maldigestion and diabetes mellitus are inevitable complications [9]. Salvaging and reinfusion of the islet cells (or autotransplantation) is now an available alternative, with promising results. (See "[Chronic pancreatitis: Management](#)".)

**Endoscopic therapy** — Endoscopic therapy for pancreas divisum consists of endoscopic sphincterotomy. Endoscopic balloon dilation and long-term stenting are not recommended due to the risk of complications. Endoscopic therapy response rates range from 76 to 80 percent in patients with recurrent acute pancreatitis [5,10-13]. Response rates appear to be lower in patients with chronic pancreatitis (42 to 69 percent), and chronic abdominal pain (33 to 54 percent). However, the follow-up period varies from 14 to 64 months, with most studies reporting a period of 36 months. In this episodic disease where episodes of pancreatitis may occur several years apart, longer follow-up is necessary. In an effort to identify if endotherapy is beneficial in patients with pancreas divisum and acute recurrent pancreatitis, a randomized clinical trial (SHARP) is underway [14].

**Endoscopic sphincterotomy** — Endoscopic sphincterotomy (papillotomy) of the minor papilla can be performed with pull sphincterotomy or a needle-knife technique, both of which are equally effective [3,15]. (See "[Precut \(access\) papillotomy](#)".)

- **Pull-type sphincterotomy** – This technique involves initial dilation of the minor papillary orifice to 5 to 7 Fr, followed by use of a mini-papillotome or standard papillotome (generally wire-guided) to make a 4 to 6 mm incision in approximately the 10 to 12 o'clock position.
- **Needle-knife** – This technique involves placement of a small-caliber (3 to 4 Fr) 4- to 8-cm long plastic stent, followed by a needle-knife cut, generally in the 10 to 12 o'clock position to a depth of 3 to 4 mm and a height of 4 to 6 mm, using the stent as a guide [16]. The depth and height of the cuts have not been precisely defined, except in santorinicele patients in whom unroofing of the bulbous segment is the goal. Placement of a stent without an internal flange will often result in spontaneous dislodgement of the stent into the small bowel within several days post-placement [17]. If the stent is still present on KUB, typically performed at two weeks, it should be removed endoscopically. In patients with a santorinicele or a very dilated dorsal duct, sphincterotomy can be performed without stenting as post-ERCP pancreatitis rates are lower in this group. (See "[Prophylactic pancreatic stents to prevent ERCP-induced pancreatitis: When do you use them?](#)".)

**Endoscopic minor papilla dilation and stenting** — Endoscopic dilation of the narrowed minor papilla and long-term endoscopic stenting are no longer performed for treatment of pancreas divisum due to the risk of associated complications [18-20]. Endoscopic dilation can provoke tissue disruption and serious pancreatitis. Stenting of the dorsal pancreatic duct has been associated with an improvement in symptoms, but prolonged pancreatic stenting is associated with a variety of complications including stent occlusion or migration, pancreatitis, pancreatic duct perforation, and pseudocyst formation [21-23]. Another major concern in treating minor papilla stenosis with long-term stenting is the induction of ductal and parenchymal changes indicating or simulating chronic pancreatitis [24-27].

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## SUMMARY AND RECOMMENDATIONS

- Pancreas divisum is the most common congenital pancreatic anomaly, occurring in approximately 7 percent of subjects in autopsy series. More than 95 percent of patients with pancreas divisum are asymptomatic, and it remains controversial whether the symptoms that occur in the remaining patients are due to pancreas divisum. (See '[Introduction](#)' above.)

- Due to the uncertainty of pancreas divisum as a causative factor in acute or chronic pancreatitis or chronic abdominal pain and the risks associated with treatment, our approach to the patient with pancreas divisum varies based on the clinical presentation. (See '[Approach to management](#)' above.)
- Asymptomatic patients in whom pancreas divisum is incidentally found on abdominal imaging (eg, computed tomography scan or magnetic resonance cholangiopancreatogram) and have no abnormality of the pancreas or clinical history of pancreatitis require no additional evaluation or treatment of pancreas divisum. (See '[Asymptomatic patients](#)' above.)
- In patients with pancreas divisum and mild or infrequent bouts of pain, we suggest conservative management rather than treatment of the minor papilla narrowing associated with pancreas divisum (**Grade 2B**). (See '[Patients with minimal/infrequent symptoms](#)' above.)
- Patients with pancreas divisum and recurrent pancreatobiliary-type pain, acute pancreatitis, or chronic pancreatitis associated with clinically significant disability require pancreatic imaging and an evaluation of the underlying etiology. We suggest minor papilla therapy for patients with two or more bouts of acute pancreatitis, or one bout of severe acute pancreatitis, if no other etiology is found (**Grade 2B**). (See '[Patients with recurrent/severe symptoms](#)' above.)
- While endoscopic and surgical sphincterotomy have not been compared directly, they appear to have comparable success rates and rates of restenosis. The choice of therapy should be guided by the patients' comorbidities, preference, and local institutional expertise. Success rates vary based on the clinical presentation and may be higher in patients with idiopathic recurrent acute pancreatitis as compared with those with chronic pancreatitis or chronic abdominal pain. (See '[Choice of therapy](#)' above and '[Surgery](#)' above and '[Endoscopic therapy](#)' above.)

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