Revista Española de Enfermedades Digestivas
THE SPANISH JOURNAL OF GASTROENTEROLOGY

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DOI: 10.17235/reed.2018.5670/2018
Link: PubMed (Epub ahead of print)

Please cite this article as:
Pérez Roldán Francisco, González Carro Pedro. Pancreatic stents in ERCP. Where are we?. Rev Esp Enferm Dig 2018. doi: 10.17235/reed.2018.5670/2018.

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OR 5670 inglés

Pancreatic stents in ERCP. Where are we?

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Post-ERCP pancreatitis (PEP) is a common complication most feared by endoscopists. Incidence ranges widely from 2.1% to 24.4%, which results from patient heterogeneity and differences in endoscopist expertise, method, PEP definition, and severity (1,2). Pathophysiology is multifactorial, and involves a combination of chemical, thermal, mechanical, hydrostatic, enzymatic, allergic, and microbiological factors resulting from papillary instrumentation and/or contrast administration within the pancreatic duct (volume and osmolarity). Even genetic abnormalities may represent a risk factor, as is the case with homozygous alpha-1-antitrypsin deficiency, which leads to an increase in hemorrhagic PEP rates (3). The consensus definition of PEP involves increased amylase levels at least three times above the upper limit of normal at 24 hours after the procedure, in association with newly-developed abdominal pain consistent with pancreatitis, which requires patient hospitalization or prolonged hospital stay, and/or computed tomography (CT) images compatible with acute pancreatitis (4).

Much has been written about which drugs or methods are effective for the prevention of PEP (5,6). Drugs include nitrates, low molecular weight heparin, somatostatin/octreotide, secretin, protease inhibitors (e. g., gabexate), non-steroidal anti-inflammatory drugs (e. g., indomethacin, diclofenac), corticosteroids, antibiotics, allopurinol, botulinum toxin, magnesium sulfate, and aggressive hydration with Ringer's lactate solution (2,5,6). Drugs that significantly reduce the incidence of PEP include non-steroidal anti-inflammatory drugs and perhaps Ringer's lactate. Non-drug prevention strategies include temporary plastic stent placement. Reported meta-analyses conclude that the latter reduce not only PEP but also severe pancreatitis rates (5,6).

Other technical factors related to cannulation, sphincterotomy, and ampullectomy also play a role. Thus, use of a guidewire rather than contrast for cannulation improves successful cannulation rates and reduces PEP rate (5,7). A variant involves placement of a pancreatic stent after guidewire positioning, with subsequent advancement into the bile duct. Early precut seems

beneficial for PEP prophylaxis (8). To sum up, currently recommended prophylactic strategies include pancreatic stent placement and NSAID (preferably diclofenac) administration (5).

Historically, pancreatic sphincterotomy has been indicated for sphincter of Oddi dysfunction, chronic pancreatitis, and pancreas divisum (2,9,10). However, it may also be used to facilitate other therapies such as pancreatic stone removal or stent placement, transpapillary pseudocyst drainage, ampullary adenoma resection, management of pancreatic fistulae with stents, and treatment of pancreatic conditions secondary to neoplasms, such as stricture (2,9). The reviewed literature does not recommend sphincterotomy for prophylactic stent placement, but it may be occasionally necessary depending on endoscopist judgement and experience (9). Most common complications of pancreatic sphincterotomy include bleeding and PEP (10-12%), with risk being 3.8-fold higher for minor papilla (9,10). Less common complications include perforation, biliary and/or pancreatic sepsis, and stricture of the papilla or proximal pancreatic duct (9).

Potential stent-related complications should also be taken into account; these will depend upon stent length of stay, and include stent-induced changes in the pancreatic duct and parenchyma, stone formation, duct perforation, stent migration or occlusion, and duodenal erosion (9). No differences have been found between stents with and without inner flaps (5), but it stands to reason that absence of flaps will facilitate spontaneous migration into the duodenum. Therefore, short, flapless stents are used to prevent PEP; these are usually ≤ 4 cm to prevent their going through the neck of the pancreas and to allow them to easily migrate out of the pancreas into the duodenum within two weeks after placement (7).

Pancreatic stents must not be used in patients at high risk for PEP since the study by Freeman et al. (3) showed that failed stent placement is associated with increased PEP rates, even higher than in patients with sphincter of Oddi dysfunction or prior PEP.

In this issue of the *Revista Española de Enfermedades Digestivas,* J García-Cano et al. (11) retrospectively assess pancreatic stent insertion when the pancreatic duct is involuntarily cannulated. This study demonstrated a high rate of bile duct cannulation based on a newly placed stent (95.6%), and most importantly, a low PEP rate (2.17%, a single case). However, intravenous diclofenac, which has a preventive effect on ERCP-related pancreatitis, was also administered during the endoscopic procedure.

The European Society of Gastrointestinal Endoscopy (ESGE) recommends that pancreatic stents be placed in high-risk patients for PEP, namely those with sphincter of Oddi dysfunction, younger women, patients with prior pancreatitis, and individuals with multiple pancreatic duct cannulations and contrast injections during ampullectomy or cannulation (6,7). A 5-Fr stent with a

length of 3-4 cm is recommended, and presence of flaps or pigtails seemingly plays no role (2,7). Also precut sphincterotomy, pancreatic papillotomy, pancreatic duct brush cytology, and balloon biliary dilation on an intact papilla may be considered as risk factors (5). Concomitant use of rectal anti-inflammatories and pancreatic stents in patients at risk for PEP is likely the most appropriate strategy to reduce pancreatitis rates (7).

Regarding choledochal cannulation when the biliary tree cannot be accessed, several approaches are available. Most common is the double guidewire technique, which involves passing a second guidewire into the bile duct when a first guidewire was inadvertently passed into the pancreas (7). An additional technique is choledochal cannulation as assisted by a pancreatic stent (7). Transpancreatic sphincterotomy or septotomy is also appropriate to gain biliary access, followed by a double guidewire technique or with the help of a pancreatic stent. Coté et al. obtained a 90.7% rate of successful stent-assisted cannulations with a low pancreatitis rate (8).

Finally, the present evolution of pancreatic stents, with newer designs and materials, and novel indications including pancreatic duct stricture, should be emphasized. Fully coated metallic stents with a caliber of 8-10 mm and a length of 4-8 cm are now in use (12). To avoid complications such as stent impaction with granulation tissue or pancreatic sepsis novel metallic stents are being designed and used with an add-on suture thread to ease later removal (13), with flaps (14), and with other modifications as well. Biodegradable (polydioxanone) non-coated stents, 6 mm in diameter and variable (custom-made) in length, have also been developed for the management of strictures in chronic pancreatitis (15).

Pancreatic stents represent a major advance in the prophylaxis of PEP. They also facilitate biliary cannulation, using precut for selected cases. Plastic stents and novel stent designs will allow more effective, safer therapies for the pancreatic duct.

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