Mistakes in... 

Mistakes in endoscopic retrograde cholangiopancreatography and how to avoid them

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**Endoscopic retrograde cholangiopancreatography (ERCP)** is a widespread technique used for the treatment of different diseases of the bile and pancreatic ducts. The technique is, however, associated with rare but potentially severe morbidity. Some of the adverse events associated with ERCP are directly linked to commonly made mistakes and can, therefore, be prevented. Here, we discuss 10 common and/or high-impact mistakes that are made during ERCP and how they can be avoided.

**Mistake 1** Performing an ERCP without having a precise therapeutic aim

With the progress made by endoscopic ultrasound (EUS) and magnetic resonance cholangiopancreatography (MRCP), ERCP is now strictly limited to use in therapeutic situations, such as stone extraction and stenting. In fact, ERCP is not a good procedure to diagnose stones in the common bile duct, with only 70% sensitivity, whereas EUS has a sensitivity of 95%. Furthermore, the morbidity rate after ERCP is far from low and it is now clearly recommended that EUS and/or MRCP be used for diagnosis and then ERCP performed only when treatment is needed. The only remaining indication for diagnostic ERCP is tissue sampling at biliary stenosis, but even in this case stenting is frequently required to treat the stenosis and prevent cholangitis.

**Mistake 2** Beginning an ERCP procedure without informing the patient about the possible complications, such as pancreatitis, bleeding and perforation

Endoscopic cannulation of the bile duct, with associated sphincterotomy, can induce acute pancreatitis in approximately 5%, bleeding in 4.5%, and perforation in 0.1% of cases. The main risk factors for pancreatitis are well known. For example, young women who have Sphincter of Oddi dysfunction or those who have repeated cannulation or opacification of the main pancreatic duct are at greater risk of developing acute pancreatitis following ERCP. Pancreatitis is generally mild and self-limiting and conservative management is sufficient in more than 90% of cases. Bleeding and perforation complications occur in about 1% of cases and are mostly managed conservatively using endoscopic haemostasis, clipping or stenting. However, even more than for other endoscopic examinations, it is essential to give a clear explanation to the patient of the benefits and risks of the procedure, and this must be recorded in the patient medical file in order to limit the potential for medicolegal issues in case an adverse event occurs.

**Mistake 3** Systematically preferring sphincter dilation with a balloon to sphincterotomy to avoid bleeding

The ESGE (European Society of Gastrointestinal Endoscopy) does not recommend endoscopic papillary balloon dilation as an alternative to sphincterotomy in routine ERCP due to the risk of pancreatitis. However, endoscopic papillary balloon dilation may be advantageous in selected patients, such as those who are taking antiagulant drugs without acute possible reversion and who need an emergency ERCP (i.e. due to septic shock). If this technique is used, the duration of dilation should be longer than 1 minute to get good sphincter dilation.

**Mistake 4** Attempting cannulation repeatedly without changing the technique when the bile duct is not easily accessible and forgetting to prevent post-ERCP acute pancreatitis associated with pancreatic duct stenting by rectal administration of a nonsteroidal anti-inflammatory drug

In case of cannulation failure, the ESGE suggests changing the technique to reduce the number of cannulations as much as possible to reduce the risk of pancreatitis. The ESGE also suggests restricting the use of a pancreatic guidewire as a backup technique for biliary cannulation to cases in which there is repeated inadvertent cannulation of the pancreatic duct; if this method is used, deep biliary cannulation should be attempted using a guidewire rather than the contrast-assisted method and a prophylactic pancreatic stent should be placed. According to the ESGE, needle-knife fistulotomy should be the preferred precut technique in patients who have a bile duct dilated down to the papilla. Conventional precut and transpancreatic sphincterotomy have similar success and complication rates; if the conventional precut is selected and pancreatic cannulation is easily achieved, the ESGE advises attempting to place a small-diameter (3 Fr or 5 Fr) pancreatic stent to guide the cut and leaving the pancreatic stent in place at the end of ERCP for a minimum of 12–24 hours.

The benefits of administering a rectal nonsteroidal anti-inflammatory drug (NSAID), such as diclofenac, for the prevention of acute pancreatitis post ERCP are debated because of the opposing results obtained in different studies. Nevertheless, many studies have demonstrated the efficacy of NSAIDs in this setting and administration of a rectal NSAID is nowadays recommended by the ESGE guidelines. The ESGE guidelines also recommend pancreatic stenting in high-risk patients (i.e. those with Sphincter of Oddi dysfunction, multiple pancreatic cannulations, young women etc.) with a 3 Fr or 5 Fr stent.

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Mistake 5 Not obtaining complete opacification of the bile tract (complete mapping) and especially of the intrahepatic bile ducts to diagnose intrahepatic stones or stenosis

Except in cases of hilar stenosis, because of the risk of cholangitis (see below), complete mapping of the intrahepatic biliary tree is advised to detect additional diseases, such as intrahepatic stones or stenosis, which could explain the occurrence of recurrent cholangitis. Opacification should be conducted with a certain pressure, using, for example, an extraction balloon to avoid contrast leakage in the duodenum. Different pictures taken from different axes are needed to understand bile duct insertion and to avoid structure superposition. All the segmental intrahepatic bile ducts should be visible and analysed one by one. In fact, MRI (MRCP, magnetic resonance cholangiopancreatography) is also effective and combining MRI with ERCP is another option to reduce the opacification of the bile tract and exposure of the patient to X-rays.

Mistake 6 In case of hilar stenosis, beginning an ERCP for drainage without MRI mapping of the obstructed bile ducts (MRCP)

One of the major, classic mistakes to be avoided when performing ERCP is to begin the procedure in cases of hilar stenosis without first mapping the obstructed bile ducts with MRCP.\(^{11,12}\) Opacification of occluded bile ducts may lead to cholangitis if this duct cannot be drained with a stent.\(^{3}\) Prior ERCP, precise mapping and a precise drainage strategy are needed.\(^{12}\) Which technique should be used (ERCP, percutaneous drainage or immediate surgical resection)? Which duct should be drained? How many ducts should be drained? Having a strategy allows the catheterization and injection of only those areas that have to be drained.

Mistake 7 Inserting one or several noncovered metal stents in cases of hilar disease without having a histological diagnosis

The differential diagnosis between cholangitis and cholangiocarcinoma is challenging and may require histological analysis of several brushing or biopsy samples.\(^{13}\) Inserting one or more metal stents in case of primary sclerosing cholangitis or in case of neoplastic disease that is reversible by chemotherapy is a mistake because stent removal is usually impossible. Patients will present with stent obstruction and repeated cholangitis and are at risk of developing secondary sclerosing cholangitis and/or cholestatic cirrhosis.\(^{14,15}\) Furthermore, placement of a noncovered metallic stent can prevent further biliary sampling. The expert recommendation is usually, therefore, to insert plastic stents until the diagnosis is obtained or to perform a percutaneous drainage with a silicone tube.

Mistake 8 In cases of biliary leakage, performing a sphincterotomy without having clear visualization of the fistula

ERCP can be very effective at stopping a biliary post-surgical leakage.\(^{16,17}\) Depending the location and the associated biliary lesions, different options (e.g. papilotomy alone, nasobiliary drainage, stenting, stone removal) have to be used. The first step is nevertheless to demonstrate the leakage by ERCP and the mistake is to perform any therapeutic manoeuvre without such a demonstration, especially when the leakage is from the intrahepatic bile ducts following a partial hepatectomy.\(^{16,17}\) Indeed, leakage can arise from intrahepatic biliary ducts isolated by the liver resection from the rest of the biliary tree. Prior to ERCP, MRCP is, therefore, essential to verify whether any sector is excluded or not and to localize the bile duct defect. Following ERCP, sphincterotomy is therefore not justified in the first instance while the leakage is not clearly seen, because it presents an additional risk of acute pancreatitis without any benefit for the patient.\(^{3}\) When a leakage is suspected but not demonstrated at the time of the first contrast injection, it is suggested to inject contrast medium under pressure, for example with an occluding balloon (expert recommendation).

Mistake 9 Mixing up the cystic duct stump and hepatic bile duct in cases of post-cholecystectomy biliary stenosis

Biliary stenosis following a difficult cholecystectomy is usually located at the level of the common hepatic duct. The stenosis is frequently complete and difficult to pass even with a hydrophilic guidewire. A frequent mistake is to mix up the cystic duct stump and the occluded common hepatic duct and to repeatedly push the guidewire into the cystic duct stump. The two channels superimpose on fluoroscopy, but there are two possible solutions. First, to always think that the cystic duct stump can superimpose and mimic the stenotic common hepatic duct. Second, to change the radiological exposure in order to separate both ducts on imaging.

Mistake 10 Ignoring the fact that Mirizzi syndrome can mimic or be associated with cholangiocarcinoma

Mirizzi syndrome type I is a common bile duct compression that is caused by a stone impacted at the neck of the gallbladder or at the cystic duct.\(^{18,19}\) The compression induces obstructive jaundice and its diagnosis and treatment are challenging. It has been reported that there is an association with gallbladder cancer in one third of Mirizzi cases and Mirizzi syndrome can also masquerade as cholangiocarcinoma. Thickening of the gallbladder or the cystic duct wall is not specific enough to rule out or confirm the presence of associated cholangiocarcinoma. Management of Mirizzi syndrome is usually a combination of endoscopy and surgery and repeated attempts to treat Mirizzi syndrome endoscopically should be avoided in patients at low surgical risk.\(^{20,21}\)

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References


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**UEG Week sessions**

- ‘Management of bile duct stones’ session at UEG Week 2015 [https://www.ueg.eu/education/session-files/?session=1394&conference=109].
- ‘Live endoscopy’ at UEG Week 2014 [https://www.ueg.eu/education/session-files/?session=1111&conference=76].
- ‘Failed ERCP: What options do we have’ at UEG Week 2014 [https://www.ueg.eu/education/session-files/?session=1138&conference=76].
- ‘Ensuring quality in ERCP’ presentation in the ‘Quality endoscopy: From East to West’ session at UEG Week 2014 [https://www.ueg.eu/education/session-files/?session=1172&conference=76].

**Society conferences**

- ‘Diagnostic ERCP v MRCP in children’ presentation in the ‘Live endoscopy day with lectures on therapeutic endoscopy’ session at ESPGHAN Summer School Sheffield 2015 [https://www.ueg.eu/education/session-files/?session=1500&conference=137].
- ‘Hepatology’ session at ASNEMGE Summer School 2012 [https://www.ueg.eu/education/session-files/?session=1010&conference=31].

**Standards and Guidelines**