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Leading article

Combined percutaneous and endoscopic procedures for bile duct obstruction

Deep cannulation of the bile duct is essential for the successful treatment of biliary obstruction. Even the most experienced endoscopist cannot always achieve this. Identifiable causes of failure include previous gastric surgery and periampullary diverticulum,[1] but often it is simply not possible to cannulate the bile duct selectively. Successful cannulation can be increased by using intravenous glucagon or sublingual trinitrin to relax the choledochal sphincter. A hydrophilic, polymer coated guidewire can negotiate a tortuous sphincter segment and a finely tapered cannula is useful where there is a very small papillary orifice. Needle knife papillotomy often works when all else fails.[2]

Tumours at any level in the bile duct system may be impossible to negotiate. Success rates can be improved by using a guidewire with a preformed curve. Hydrophilic polymer coated guidewires are particularly valuable, especially if used in conjunction with a stiff catheter such as a biliary dilator. These guidewires will slide through even the tightest, most tortuous stricture, which cannot be accessed by using a standard Teflon coated wire. Unilateral stent placement is adequate treatment for most[3] patients with tumours of the hepatic ducts, but it may be better to place stents bilaterally.[4] This can only be achieved in a few, although stiffer catheters, preformed guidewires, and hydrophilic guidewires all help. A percutaneous transhepatic approach can be useful when it proves impossible to negotiate an obstruction whether physiological, anatomical or pathological.

Percutaneous insertion of plastic stents for malignant bile duct obstruction has now largely been overtaken by the endoscopic approach. This is not only because of the wide availability of endoscopic retrograde cholopancreatography (ERCP), but mainly because of the higher complication rate of percutaneous stenting, which is related to the size of the transhepatic track necessary to undertake the procedure.[5] Percutaneous transhepatic assistance for the endoscopist was initially described for the treatment of gall stone disease,[6 7] but it was soon clear[8] that it was possible to insert a 10 or 12 French stent endoscopically using a transhepatic guidewire provided by the radiologist who need only make a 5 or 6 Fr track through the liver.

Other studies have confirmed the value of the combined percutaneous and endoscopic procedure with success rates for stent placement approaching 100%.[9] The complication rate, as would be expected, is higher than for endoscopic stent insertion and is intermediate between endoscopic and percutaneous palliative procedures. The main complication is cholangitis.

How soon should percutaneous transhepatic cholangiography (PTC) be performed after endoscopic stent insertion has failed? No data exist to answer this question unequivocally, but if an obstructed duct system has been contaminated with contrast medium injected during ERCP, then percutaneous biliary drainage should be provided as soon as possible, probably within 24 hours. Otherwise there is no urgency, but it is probably wise for the patient to continue receiving intravenous antibiotics and a careful check kept on fluid balance and renal function. Some advocate that when ERCP fails, PTC should be performed immediately, followed by repeat ERCP for completion of the combined procedure at the same time. This requires an extremely flexible ERCP list and a patient with a great deal of stamina. My own preferred option is to perform PTC and establish external drainage within 48 hours of failed ERCP and then to proceed to ERCP and stent insertion in the next 48 hours. In this way the patient is not submitted to prolonged, possibly uncomfortable procedures and a short period of external drainage is provided before attempts are made to negotiate the stricture. While many strictures can be negotiated at the time of the initial PTC, nearly all are negotiable after a short period of drainage, particularly if hydrophilic polymer coated wires, straight and angled torque control catheters are available. In addition, if there is possible bacterial contamination of the biliary system, drainage for a short period reduces the risk of severe cholangitis, which can occur if prolonged attempts are made to negotiate the stricture at the initial PTC. There is no published evidence yet to support a preference for either a one stage or a multiple stage combined procedure. A percutaneous external drainage catheter left in position for more than a week becomes an irritation and a frustration to the patient with increasing risk of infection of the catheter entry site, so that a multiple stage procedure should be expedited to minimise these problems. Prophylactic antibiotics, which should be started before the initial ERCP, should be continued until drainage is established. Mezlocillin or piperacillin seem best.[10] Nevertheless, cholangitis will still

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occur despite antibiotics, but is usually mild and easily controlled by adequate bile drainage or by a change in antibiotic treatment based on the results of culture.

Sedation and analgesia are essential during percutaneous procedures. While midazolam is effective sedation for ERCP, it is less successful for PTC, as the patient can become restless, particularly if the procedure causes discomfort. I find a combination of lorazepam and droperidol given orally about 90 minutes before the procedure together with an intravenous opioid when the patient reaches the fluoroscopy table, gives excellent control. Oxygen is started before the opioid is given and pulse oximetry is used to monitor the patient's state throughout.

When using a combined procedure to deal with common duct stones or tumours, a right duct approach is used for the PTC. The fine 22G needle is best inserted in the anterior axillary line, angled a little dorsally towards the porta hepatis. The puncture site should be as far cranially as the costophrenic sulcus will permit and the needle tip should be directed caudally to enter either segment 6 or 7 ducts to provide a smooth curve without sharp angulation for the approach to the common duct. If a left duct approach is necessary, then puncture of the anterior segmental duct (segment 3) in the left lobe should be undertaken peripherally to provide a stable long transhepatic approach to a left hepatic duct lesion. Selection of a duct for puncture is best made using ultrasound guidance, particularly when approaching the left duct system. Having gained access to the bile duct with a sheathed needle large enough to take a 0·035 inch guidewire, it is worthwhile decompressing the duct system before exchanging the sheath for a drainage catheter over the guidewire. If the duct system is not decompressed, bile will leak into the peritoneum during catheter exchange, often causing considerable discomfort to the patient.

Once the obstructing lesion and the papilla have been negotiated, and a guidewire and catheter placed in the duodenum, the endoscopist using an endoscope with a biopsy channel large enough to take at least a 10 Fr stent, can grasp the tip of a 450 cm guidewire using a stone extraction basket or grasping forceps. The guidewire should be grasped at least 3 cm from the tip of its floppy end so that the wire doubles as it is withdrawn up the channel of the endoscope. This reduces the risk of damage to the endoscope biopsy channel. The guidewire should be fed into the percutaneous catheter by an assistant, while a second assistant retracts the wire gently from the endoscope biopsy port. It is essential that throughout the procedure, a catheter covers the transhepatic section of the guidewire. Fatal liver laceration has occurred because of traction on the unprotected guidewire during insertion of the stent. Once sufficient guidewire is in the hands of the endoscopy assistant, then any wire guided accessory can be used through the endoscope; sphincterotomy, balloon dilatation or stenting, being carried out as necessary. When inserting a stent through a stricture affecting the hepatic or intrahepatic ducts, it can be difficult to judge the length of the stent accurately, so that its tip is not inserted into the hepatic parenchymal tract. To avoid this possibility it is best to advance the endoscopic catheter up into the intrahepatic ducts and then to remove the guidewire. The percutaneous catheter can be left in position while the flexible tip of a new endoscopic wire is passed through the endoscopic catheter and into a more vertically orientated intrahepatic bile duct radicle. In this way the stent can be inserted without risk of it passing into the track. If, despite this, the stent does become lodged in the hepatic track it can be repositioned by using a biliary dilatation balloon passed either percutaneously to push the stent out of the track or endoscopically to pull it out into a more acceptable position. Alternatively, a less expensive way of repositioning the stent, is to insert a standard sphincterotome endoscopically into the distal portion of the stent after which an assistant bows the sphincterotome thereby gripping the stent tightly from within. Slight downward angulation of the endoscope will withdraw the stent fractionally into an acceptable position.

Once adequate duct drainage has been established, the percutaneous catheter can be withdrawn. Although some workers prefer to leave the catheter in situ for 24 to 48 hours after endoscopic stent insertion this is rarely necessary[11] and removal of the catheter permits the patient to return home the day after stent placement. If drainage is inadequate, then the catheter can be left in situ for further cholangiography or further procedures as necessary. Stents inserted in this way can be changed endoscopically using simple stent exchange procedures, without risk of having to repeat the combined procedure.[12]

The combined procedure is an effective and versatile technique, permitting selective intrahepatic duct access with percutaneous fine bore catheters, but also permitting the benefits of large bore stents for drainage thereby minimising complications. The days of the combined procedure, however, for the treatment of malignant disease may be numbered. Expandable metal stents with an internal diameter of up to 30 Fr can be introduced through a transhepatic track of as little as 7 Fr. Stent insertion can usually be achieved at the initial PTC.[13] Although these wide bore metal stents do not remain patent indefinitely, they do have a longer life span than plastic stents of more limited calibre.[14] It may be that when initial endoscopic stent placement fails, then percutaneous metal stent insertion is the quickest, most effective, and long lasting course of action for the patient.

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