Percutaneous Transhepatic Feeding Tube Placement

Single-center Experience In 40 Consecutive Patients

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(Ann Surg 2017;265:e8–e10)

Adequate nutrition is essential in surgical patients. In conditions or complications prohibiting oral intake, such as duodenal perforation or postoperative delayed gastric emptying, enteral nutrition is required to facilitate the recovery process. Enteral access can be obtained via various routes, but all routes have their specific downsides. In case of the need for prolonged enteral access, a feeding jejunostomy or percutaneous endoscopic gastrostomy (with jejunal extension) is usually recommended, because nasoenteral feeding tubes are discomforting and tend to dislocate. Transhepatic feeding tube placement may offer a suitable alternative in patients who also require prolonged percutaneous transhepatic biliary drainage (PTBD), for instance because of duodenal perforation, perioperative biliary decompression, or surgical complications. The transhepatic feeding tube allows enteral access through a percutaneous route, which is already necessary for biliary drainage (Fig. 1). Several case reports have reported on transhepatic feeding tubes, but to date evidence about the feasibility and long-term application in a larger population is lacking. We aimed to determine the application and feasibility of percutaneous transhepatic feeding tube placement.

We performed a retrospective single-center cohort study in all consecutive patients undergoing percutaneous transhepatic feeding tube placement between April 2003 and February 2015 in the Academic Medical Center in Amsterdam, which is a national referral center for PTBD and bile duct injuries. Patients were considered for transhepatic feeding tube placement when they had a PTBD catheter and required prolonged enteral access for either enteral nutrition or bile restitution. Patients were identified by a search in a prospectively maintained database of all interventional radiological procedures performed within the study period.

Percutaneous transhepatic feeding tube placement was performed by 1 of 3 interventional radiologists with extensive experience with PTBD. After insertion of a guide wire through the preexisting biliary drainage catheter, this catheter was replaced by a sheath and a second wire was inserted through the sheath and advanced into the duodenum/jejunum or into the efferent jejunal limb if appropriate, following the preexisting transhepatic route. Subsequently, the sheath was removed and both the biliary drainage catheter (10 Fr, Cook Medical, Bloomington, IL) and the feeding tube (Corflo, 8 Fr, Corpak MedSystems UK, Gatwick, United Kingdom) were advanced over the guide wires. The position of the biliary drain and the feeding tube was confirmed using fluoroscopy (Fig. 1B). Finally, the guide wires were removed and the catheters, both exiting from the same incision, were sutured to the skin. When the feeding tube required replacement (eg, after dislodgement or blockage) the entire procedure was repeated.

Data were retrospectively collected from electronic patient records and patient charts with daily notes. Primary endpoint was the technical success rate of primary tube placement, defined as a correct position (in the duodenum or jejunum) followed by successful administration of nutrition or bile via the tube. Complications were recorded during (re)admission or during outpatient clinic visits. Patients who were discharged with the transhepatic feeding tube in situ, were regularly followed up by the consulting dietitian to monitor any problems with the tube.

In our study period, 40 patients (25 male, 15 female) with a mean age of 61 (+14) years underwent transhepatic feeding tube placement. Indications for initial PTBD were the management of surgical complications (n = 28); including anastomotic leak after hepaticojejunostomy, bile duct injury, duodenal perforation, or enterocutaneous fistula), palliative drainage (n = 5), perioperative decompression (n = 3), and other (n = 4). Half of patients received parenteral nutrition prior to the transhepatic feeding tube placement; the others received an oral diet (n = 11) or enteral nutrition (n = 9). The transhepatic feeding tubes were placed for bile restitution (n = 8) or enteral nutrition (n = 32), because of gastroparesis, insufficient intake, or duodenal perforation.

Initial tube placement was successful in 38 of 40 (95%) patients. Median procedure time was 33 minutes (29–43 mins). Reasons for failure included recurrent dislodgement of the tube during the procedure (n = 1) and the inability to visualize the efferent jejunal limb (n = 1). In the first patient, a second attempt was successful. The second patient received a nasoenteral feeding tube by endoscopy.

Median length of hospital stay after tube placement was 12 days (5–34 days). Twenty-nine of 40 patients (73%) were discharged with the transhepatic feeding tube in situ. Three (8%) patients were readmitted after a median of 12 days (11–20 days) for tube related complications. Overall, the primary placed tube remained in the correct position for a median of 29 days (15–50 days). Patients received enteral nutrition and/or bile for a mean of 42 days (19–76 days).
Our study included 5 patients in a palliative setting, but the majority of PTBD catheters were placed for the management of complications, such as bile leakage or duodenal perforation. This illustrates that the technique can be applied more widely than solely in the palliative setting.

Approximately, 95% of the primary procedures was successful. Only one patient eventually required an alternative enteral access route. In the previously published case reports, the success rate was 100%, but this may be subject to publication bias. Nevertheless, the high success rate reflects that the technique of transhepatic feeding tube placement is relatively simple in patients who already have a PTBD catheter, when performed by an experienced interventional radiologist.

In our series, the primary placed tube remained in the correct position for a median of 29 days and the transhepatic route was used for the administration of enteral nutrition of bile for a median of 42 days. In the before mentioned case reports on transhepatic feeding tube placement, long term follow-up was lacking, except for 1 patient in whom the use of the tube extended to 3.5 months.\(^5\)–\(^8\)

Although 15 (38%) patients developed a complication, only 10 (25%) patients required replacement or removal of the tube because of complications during the entire follow-up period. Complaints of discomfort or pain were transient and are well known complaints associated with PTBD, just as leakage of bile alongside the PTBD catheter.\(^9\) Both cholangitis and bleeding, which both led to the need for replacement or removal of the PTBD catheter and feeding tube, are also known complications of PTBD,\(^9\) and are not necessarily the consequence of the presence of a feeding tube in the biliary tract. Dislodgement occurred in 8 (20%) patients and required replacement in most cases. The only previous study on transhepatic feeding tubes describing complications, reported dislodgement in 2 of 4 (50%) patients.\(^7\) Dislodgement of feeding tubes is common, especially for nasoenteral feeding tubes with dislodgement rates up to 36%.\(^3\)–\(^4\) For more invasive alternatives such as surgical or percutaneous endoscopic gastrostomies or jejunostomies, the reported dislodgement rate is almost 10%.\(^10\)–\(^12\) Moreover, these routes are also associated with more severe complications such as upper gastrointestinal bleeding, leakage leading to peritonitis, and even bowel strangulation.\(^10\)–\(^12\) Transhepatic feeding tube placement is not without complications, but may save patients from repeated endoscopic replacement procedures or nasal discomfort compared with a nasoenteral feeding tube, or an additional percutaneous access point, with the previously mentioned risks, compared with a gastrostomy tube or jejunostomy.

The retrospective nature of this study may have led an underreporting of complications and patient-reported outcomes (information bias) as these were extracted from patient files with daily notes from the treating care providers. In addition, there was some loss-to-follow up, as the majority of patients was discharged with the feeding tube still in situ. Patients were, however, regularly followed-up by the consulting dietitian (unless transferred to another care facility). For complications leading to the impossibility to use the tube, patients were readmitted or attended the outpatient clinic in our center, which was recorded in their patient file. Another limitation is the selection of patients, as the procedure was only performed in a very select subset of patients requiring prolonged enteral access. However, this is the natural consequence of the fact that transhepatic feeding tube placement is only suitable for patients who required prolonged PTBD and should be performed by an interventional radiologist with experience with PTBD procedures.

Taking these considerations into account, this study shows that transhepatic feeding tube placement can be successfully and safely applied and may therefore be considered as alternative in patients requiring both prolonged PTBD and enteral access.

No severe complications occurred during the placement procedures. One patient experienced severe pain during the procedure. Overall, tube related complications occurred in 15 (38%) patients. Complications included dislodgement (n = 8), blockage (n = 3), bile leakage (n = 4), bleeding (n = 2), and cholangitis (n = 1) and required replacement in 9 (23%) patients. In one patient the feeding tube and PTBD catheter had to be removed because of severe bleeding from the PTBD catheter, resulting in a decrease in hemoglobin concentration and the need for blood transfusion. Nine (23%) patients reported pain or discomfort around the entry site of the PTBD catheter and feeding tube. There was no tube related mortality.

This is the largest series to date on transhepatic feeding tube placement. Four case reports have previously described the application of a similar technique in 9 patients.\(^3\)–\(^8\) All of these patients were diagnosed with an unresectable malignant gastrointestinal tumor and received a PTBD catheter for palliative drainage. The transhepatic feeding tube was placed because of mechanical obstruction in the gastroduodenal region prohibiting oral intake.
REFERENCES