SURGEON AT WORK

Fistulojejunostomy for Refractory Post-Traumatic Biliary Fistula in an Austere Environment: An Unusual, Time-Honored Procedure

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Refractory biliary leaks after liver trauma are often managed selectively in Western countries by nonoperative endoscopic/percutaneous techniques,[1] followed by surgery in case of fail. Conversely, in austere environments, such as low-income countries or during war or internal conflicts, such technologies are rarely accessible, and surgery represents the first-line treatment for chronic post-traumatic biliary fistula.[2] However, expertise in complex reconstructive hepatobiliary surgery might not be available in such settings, making surgical management very challenging. Less-demanding surgical solutions would be quite helpful and more suitable in these circumstances.

More than 50 years ago, Galeev,[3] a Russian surgeon, described the anastomosis between the wall of a biliary fistula and the jejunum in a Roux-en-Y fashion as a treatment for chronic refractory fistulas of different causes. This procedure was performed infrequently in Western countries and was later abandoned in favor of operative endoscopy or radiology, or more complex biliary reconstructions. More recently, several reports about fistulojejunostomy in the management of chronic biliary leaks have appeared in the literature from low- and middle-income countries, with satisfactory outcomes. With a review of the literature, we describe the technical details of this operation, according to our experience on a wounded patient during the ongoing conflict in Syria, suggesting that this surgical approach could be a valuable tool in an austere environment, especially for surgeons not trained in reconstructive biliary surgery.

TECHNIQUE

A 24-year-old man, treated by liver packing at Aleppo Hospital (Syria) for a grade IV liver laceration consequent to a gunshot wound, was admitted 1 week later to our hospital (Doctors without Borders Operative Center, Spain) in northern Syria for a persistent bile leak (300 to 400 mL daily) from the laparotomy incision. Two abdominal drains were positioned under ultrasound control, but no reduction of the bile leakage was observed at 28 days after injury. An ERCP was performed in a nearby Turkish hospital 30 days after the injury and an endoscopic stent was placed in the common bile duct without achieving any reduction in fistula output. A fistulogram performed 1 week after ERCP (37 days after the injury) showed a bile collection surrounding the liver, and a CT scan obtained 48 days after injury demonstrated just air in the right biliary tree. The clinical condition of the patient was deteriorating and a relaparotomy was performed 54 days after the injury. A soft silicone tube was inserted into the external orifice of the fistula to facilitate its identification and dissection. The abdomen was entered through the old median incision and a large subdiaphragmatic and perihepatic biloma was removed. The fistulous tract was then followed from the skin to the liver dome, where the fistula opening (1 cm) was found between the seventh and eighth liver segments. The wall of the fistula was not considered suitable for an anastomosis. Conversely, the liver capsule around the fistula opening was heavily fibrotic, and was used to perform an end to side anastomosis between the liver capsule and a Roux-en-Y jejunal loop, with one layer of interrupted stitches (Vycril 3-0) (Fig. 1). A transanastomotic silicone elastomer tube (10 F) was pulled out through the jejunal wall sutured to the abdominal serosa draining in a closed system, without aspiration. The endoscopic stent inserted 1 month before reoperation was found impacted in the terminal ileum and was removed through a 5-mm ileotomy. One intra-abdominal silicone elastomer drain was left in the subhepatic space. The abdominal cavity was irrigated and closed in the standard fashion. The postoperative course was uneventful. The subhepatic and the intra-anastomotic drains were removed at 3 and 8 days postoperatively, respectively. The clinical condition of the patient was satisfactory after 6 months of follow-up.

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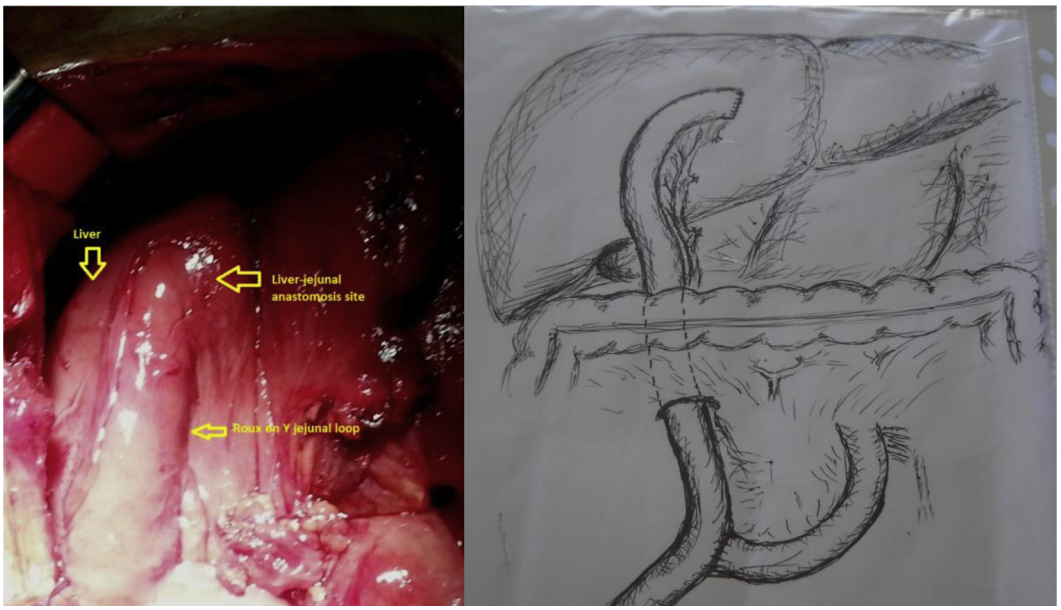

Figure 1. Left, the jejunal loop attached to the liver surface. Right, drawing of the surgical procedure.

DISCUSSION

The occurrence of biliary fistula after blunt or penetrating liver trauma ranges from 2% to 28%.[4] Minor leaks usually resolve spontaneously once adequately drained,[5] and major lesions of larger intra- or extrahepatic ducts can cause refractory bile drainage. Endoscopic/percutaneous biliary stenting, nasobiliary drainage, or endoscopic embolization of the fistulous tract have been demonstrated to be successful in managing bile leaks and reducing the need for, and rate of, surgical repairs. On the contrary, in austere settings, where technological tools and related skills are rarely available, surgery becomes the mainstay option for a refractory post-traumatic biliary fistula. However, surgeons in such environment might not be skilled in the complex reconstructive biliary procedures usually performed in Western countries.

Fistulojejunostomy for biliary fistula was firstly described in 1962.[3] In the last 50 years, 16 articles[3,6-20] have reported on this technique in a total of 53 patients, 14 of these patients (26.4%) had a post-traumatic liver fistula.[6,8,9,11,12,18,20] Nine of 15 patients with post-traumatic bile leaks, including our patient, were treated in low- and middle-income countries.[6,8,9,11,12,18] In contrast, only one patient submitted to fistulojejunostomy was reported in a Western country in the last 20 years.[17]

The procedure has the advantage of avoiding potentially harmful dissections, especially at the liver hilum. Only the fistula tract, usually corresponding to the scar tissue around an abdominal drain, must be isolated and preserved, taking a ring of the skin around the external opening[17] or transecting the tubular stricture right below the abdominal wall. If a drain is not already present, a soft silicone elastomer tube gently introduced through the skin is quite helpful for identifying the tubular structure during the dissection. The fistula tract is merely used as a conduit and sutured to a loop of small bowel. It is crucial to wait for a long period, at least 3 months whenever possible,[7] to obtain a fibrotic and hardy fistula wall, although sometimes the deteriorating clinical conditions of the patient might require an earlier repair, as in our patient. It should be kept in mind that a long waiting time in an austere environment can sometimes carry an considerable risk of electrolyte imbalance, anemia, malnutrition, and infections. When inadequate maturity of the fistula wall is perceived at surgery, a second available option might be the suture of the fibrotic liver capsula around the fistula orifice to the jejunal wall. The fibrotic ring usually provides suitable strength to the anastomosis and can be reinforced with a second row of stitches.[6,8,12]

A tongue of well-vascularized omentum over the anastomosis has been suggested to reduce the risk of anastomotic breakdown, and a transanastomotic drain coming out from the jejunal wall has been recommended to relieve intra-anastomotic pressure and prevent anastomotic leak.[17] The size of the drain should be small, allowing an unconstrained biliary flow through the anastomosis. With a small-sized drain, early removal (8 to 10 days) can be considered when the amount of

drained bile is almost nil, without the need to wait for the maturation of the enterotomy tract.

CONCLUSIONS

This time-honored procedure can be considered an excellent surgical option for the management of refractory biliary leaks in austere settings where operative endoscopy/radiology and reconstructive biliary surgery expertise are lacking.

Author Contributions

Study conception and design: Kada, Contini, De Paoli, Mancini

Acquisition of data: Kada, Abyad, Contini (Kada and Abyad performed the surgical procedure)

Analysis and interpretation of data: Kada, Contini, De Paoli, Mancini

Drafting of manuscript: Contini Critical revision: Kada, Contini, De Paoli, Mancini

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