Communication

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The percutaneous tandem drainage technique for radical treatment of intractable hepaticojejunostomy leakage

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SUMMARY The principal concept of the percutaneous tandem drainage procedure for an intractable hepaticojejunostomy (HJ) leakage is to decrease the amount of fluid and divide the fluid-filled cavity into several small cavities, which can then be drained individually. Percutaneous abscess drainage (PAD) has a role in drainage of the fluid cavity, whereas percutaneous trans-anastomotic jejunum drainage (PTAJD) has a role in drainage to reduce the bile fluid and digestive juices. A decrease in fluid induces effective drainage of the fluid cavity by PAD. A negative pressure suction drain accelerates reduction of the fluid cavity. PAD is removed when the localized fluid cavity has collapsed. PTAJD is finally removed after a clamping test is performed. Since 2020, we performed the percutaneous tandem drainage for two patients, and an intractable HJ leakage was gently resolved within 3 months without any adverse event. The percutaneous tandem drainage technique is safe for steady drain management of an intractable HJ leakage.

Keywords Anastomotic leakage, hepatectomy, drainage

A hepaticojejunostomy (HJ) leakage post-hepatectomy can sometime cause intractable leakage and require long-term drainage or re-anastomosis of the HJ; percutaneous abscess drainage (PAD) is the gold standard therapy for well-localized fluid collections (*1,2*). The principal strategy for a major leakage is to decrease the amount of fluid and divide the fluid-filled cavity into several small cavities, which can then be drained individually (*3*). At the time of cavity was not shrinkage and leakage continued even though PAD worked appropriately, we performed the percutaneous tandem drainage technique for radical intense treatment of intractable HJ leakage as additional therapeutic step. The details of the percutaneous tandem drainage procedure are shown in Figure 1. CT-guided PAD was performed on intra-abdominal fluid cavities with low-pressure contrast radiography. HJ leakage is usually detected 1-3 weeks after PAD, depending on the effectiveness of PAD and the size of the fluid cavity. At this timing, percutaneous trans-anastomotic jejunum drainage (PTAJD) is implanted into the jejunum *via* the HJ leakage point from the same entry site of the skin as the PAD in a tandem manner (Figure 2a). Namely, two guidewires were inserted into the abscess cavity from PAD. And then one of the guidewire placed in the abscess cavity was inserted into the jejunum *via* the HJ leakage point. One catheter was inserted over the wire which was advanced into the jejunum, due to decompressed jejunum and blocked the HJ leakage. Another drainage catheter was placed in the abscess cavity. PTAJD easily reaches the leakage site with PAD guidance. The PAD tip is maintained 1-2 cm away from the leakage site. PAD has a role in drainage of the fluid cavity, whereas PTAJD has a role in drainage to reduce the bile fluid and digestive juices. A decrease in fluid induces effective drainage of the fluid cavity by PAD. The PAD tip is gradually maintained 2-3 cm away from the leakage site, then the fluid cavity is divided into localized fluid and peri-HJ cavities (Figure 2b). A negative pressure suction drain accelerates reduction of the fluid cavity. PAD is removed when the localized fluid cavity has collapsed. PTAJD is finally removed after a clamping test is performed.

We performed hepatectomy with HJ in 24 patients who had hepatobiliary disease between 2019 and 2020. Even though external trans-anastomotic bile drainage stent was routinely placed during hepatectomy with HJ, HJ leakage was developed in three patients who had biliary tract cancer. Since 2020, we performed the percutaneous tandem drainage for two patients who had

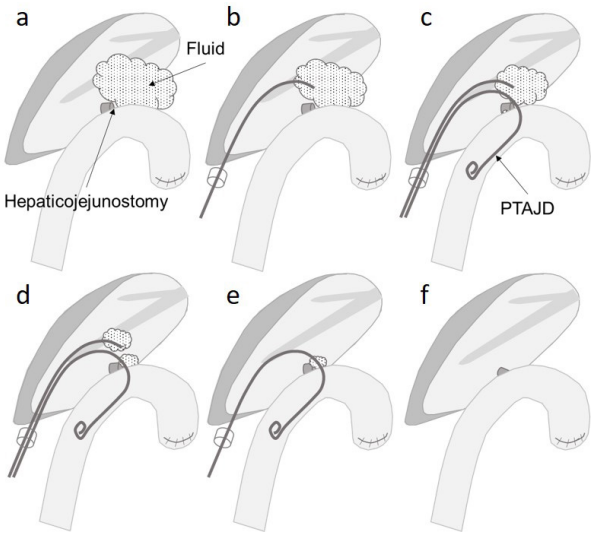

Figure 1. Procedure of percutaneous tandem drainage for an intractable leakage of hepaticojejunostomy. At the time of undrainaged fluid (thick dot) was confirmed **(a)**, CT guided percutaneous abscess drainage (PAD) was performed **(b)**. If major leakage of hepaticojejunostomy (HJ) was confirmed, percutaneous trans anastomotic jejunum drainage (PTAJD) was added from same entry site of skin tandem with PAD **(c)**. Fluid cavity would be divided into localized abscess cavity and peri-HJ cavity **(d)**. PAD was removed whenever localized abscess cavity disappeared **(e)**, then PTAJD was removed **(f)**.

intractable HJ leakage. We preferred using soft type guide wire (Radifocus®) and its sheath for every drain management, and PAD guided tandem insertion of PTAJD was simply performed without any technically failure. Because a drainage tube for PTAJD was soft and highly trackable, we have never experienced tear of HJ leakage point. Consequently, HJ leakage was gently resolved within 3 months without any adverse event. The percutaneous tandem drainage technique is simple and safe for steady drain management of an intractable HJ leakage.

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Conflict of Interest: The authors have no conflicts of interest to disclose.

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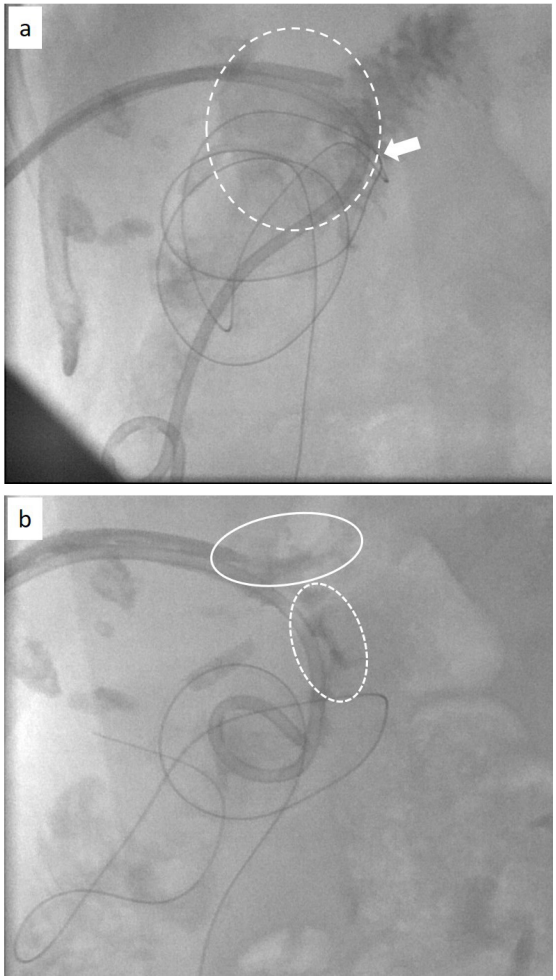

Figure 2. Percutaneous tandem drainage divided abscess cavity into two of separated small cavity. Percutaneous abscess drainage tandem with percutaneous trans anastomotic jejunum drainage was displayed. White allow indicated hepaticojejunostomy, and white dot circle indicated fluid cavity of major leakage of hepaticojejunostomy **(a)**. 2 months later **(b)**, fluid cavity was divided into localized abscess cavity (white circle) and peri-hepaticojejunostomy cavity (white dot circle).

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