



## A Review on Liver-Transection Methodologies and its Outcomes

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### DESCRIPTION

Liver-transection is a surgical procedure that involves cutting through the liver tissue to remove a part of the organ or to access the structures within it. It is often performed as part of liver resection, which is the removal of a portion of the liver that is diseased or damaged by cancer, trauma, infection, or other conditions. Liver resection can be done to treat primary liver tumors (such as hepatocellular carcinoma or cholangiocarcinoma), secondary liver tumors (such as colorectal liver metastases or neuroendocrine liver metastases), benign liver tumors (such as hemangioma or adenoma), liver cysts, abscesses, or injuries. Liver-transection is a challenging and complex procedure that requires a high level of skill and experience from the surgeon. The liver is a highly vascular organ that receives about 25% of the cardiac output and has a dual blood supply from the hepatic artery and the portal vein. The liver also produces bile, which is stored in the gallbladder and transported to the duodenum through the bile ducts. The liver is divided into eight anatomical segments based on the distribution of the hepatic veins, the portal vein branches, and the bile ducts. Each segment has its own vascular and biliary inflow and outflow, which allows for segmental resection of the liver without compromising the function of the remaining segments.

The main challenge of liver-transection is to minimize blood loss and bile leakage during the division of the liver parenchyma, which is composed of hepatocytes, sinusoids, and connective tissue. Blood loss during liver-transection can lead to hemorrhagic shock, coagulopathy, transfusion-related complications, and increased morbidity and mortality. Bile leakage from the cut surface of the liver can cause infection, inflammation, abscess formation, fistula formation, and delayed healing. Therefore, various techniques and devices have been developed to achieve a safe and effective liver-transection. The most common technique for liver-transection is the finger fracture technique or its modifications. This technique is based on the principle that the soft and friable liver tissue can be crushed between the fingers or with a clamp, leaving behind the tougher vascular and biliary structures within the

sheaths. These structures can then be identified, isolated, ligated, clipped, or coagulated before being divided. The finger fracture technique has several advantages, such as simplicity, low cost, wide availability, and preservation of oncological margins. However, it also has some disadvantages, such as imprecision, time consumption, tissue damage, and potential risk of tumor dissemination.

Using an ultrasonic tool (such the CUSA or Harmonic Scalpel) that emits high-frequency vibrations, the liver tissue is sliced while being spared from structures larger than 2-3 mm in diameter. However, it also has disadvantages such as high cost, limited availability, learning curve, risk of thermal injury, and need for additional hemostatic agents. High-pressure water dissection technique uses a water jet device that delivers a pressurized stream of water to dissect the liver tissue while sparing structures larger than 5 mm in diameter. However, it also has disadvantages such as high cost, limited availability, learning curve, risk of water embolism or infection, and need for additional hemostatic agents. Radiofrequency dissection technique uses a radiofrequency device (such as Tissue Link or Liga-Sure) that delivers an electric current to create heat and coagulate or seal vessels and bile ducts up to 7 mm in diameter. However, it also has disadvantages such as high cost, limited availability, learning curve, risk of thermal injury, and need for additional hemostatic agents.

### CONCLUSION

Liver-transection is a vital part of liver resection that requires careful planning, preparation, and execution. There are various techniques and devices that can be used to perform liver-transection safely and effectively. The choice of the technique and device depends on several factors, such as the indication, the anatomy, the extent, the location, and the surgeon's preference and experience. The ultimate goal of liver-transection is to achieve a complete resection of the diseased or damaged liver tissue with minimal blood loss and bile leakage, and to preserve the function and viability of the remaining liver tissue.

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