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How I do it

Anatomic left hepatic trisegmentectomy

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Abstract

The technique of left trisegmentectomy was first published in 1982 and consists in the removal of the left liver (segments II, III, and IV) along with the right anterior sector (segments V and VIII). This procedure is based on the knowledge of the segmental liver anatomy. There are only a few technical reports describing this complex procedure. We describe an anatomic and standardized way to identify and isolate the glissonian sheaths of the left liver segments along with the portal pedicles from right anterior sector (segments V and VIII). The middle and left hepatic veins are dissected using Arantius ligament as landmark. With this technique, it is possible to achieve inflow and outflow control of the involved liver segments without hilar dissection or clamping. This technique provides a safe way to perform a left extended hepatectomy without warm ischemia of the relatively small remnant liver.

Keywords: Liver; Left trisegmentectomy; technique

Extended left hepatectomy, also referred to as left hepatic trisegmentectomy, consists in the removal of liver segments II, III, IV, V, and VIII. This difficult surgical procedure may be required when the left liver and portions of segments V and VIII are involved.

The authors describe an anatomic and standardized way to identify and isolate the glissonian sheaths of the left liver segments along with the portal pedicles from right anterior sector (segments V and VIII) avoiding hilar dissection. This technique employs a combination of techniques previously reported [1–3] in order to achieve inflow and outflow control of the liver parenchyma to be resected without hilar dissection or clamping and therefore without warm ischemia of the relatively small remnant liver.

Technique

Preoperative investigation includes liver and renal function tests, complete blood count, and electrolytes. Magnetic resonance imaging and magnetic resonance cholangiography and angiography are recommended preoperatively to provide accurate information as to involvement of the hepatic and portal veins and the biliary anatomy.

The goal of the present technique is to obtain a safe control of all vascular structures involved in the left hepatic trisegmentectomy before division of the liver parenchyma. After induction of general anesthesia, the patient is placed in supine position. Bilateral subcostal incisions are made and extended superiorly in the midline to the xiphoid, and a self-retaining retractor is placed. This improves visualization of the confluence of the hepatic veins.

The liver is mobilized by sectioning the falciform, left triangular, and coronary ligaments. At this time, intraoperative ultrasound is performed and it is used to identify the course of the right hepatic vein (Fig. 1). The left lobe is pulled upward, and the lesser omentum is divided exposing the Arantius' ligament (ligamentum venosum) that is encircled and divided. This ligament runs from the left branch of portal vein to the left hepatic vein or to the common trunk and is a useful anatomic landmark for the identification of left hepatic and portal veins [4]. The cephalad stump is used to dissect the recess under the confluence of the middle and left hepatic veins as described elsewhere [3]. Careful dissection in this recess is

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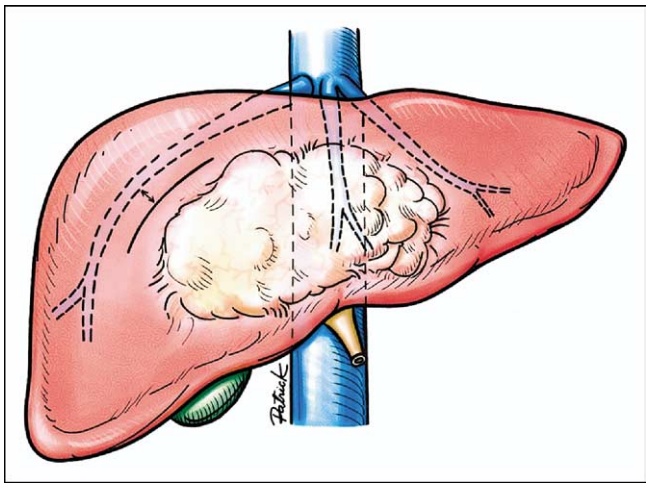

Fig. 1. Schematic view of intraoperative demarcation of a safe line to be positioned 1 cm away from the right hepatic vein course in order to preserve it.

performed and a vascular tape is placed around the confluence of the middle and left hepatic veins. The caudal stump of the ligament is grasped and dissected downward toward the left portal vein. This maneuver discloses the posterior aspect of the left glissonian pedicle. A small (3 mm) anterior incision is made in front of the hilum, and a large curved clamp is introduced through the left side of the left glissonian sheath behind the caudal stump of Arantius' ligament toward anterior incision, allowing the encircling of the left main sheath for further stapling as described elsewhere [2]. This maneuver spares the caudate lobe (segment I) portal branches. Another small incision performed on the right edge of the gallbladder bed permits access to the right anterior pedicle (segments V and VIII) for further division as previously described by the authors [1]. Once the anterior sector glissonian

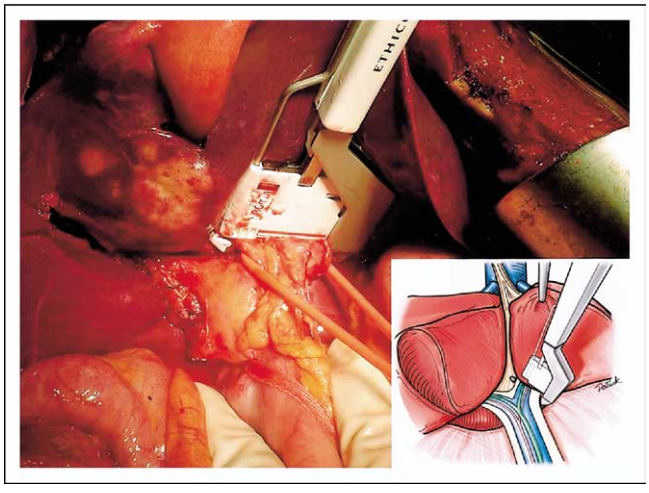

Fig. 2. The left main sheath (containing arterial, portal, and bile ducts branches of segments II, III, and IV) is divided using vascular stapling device.

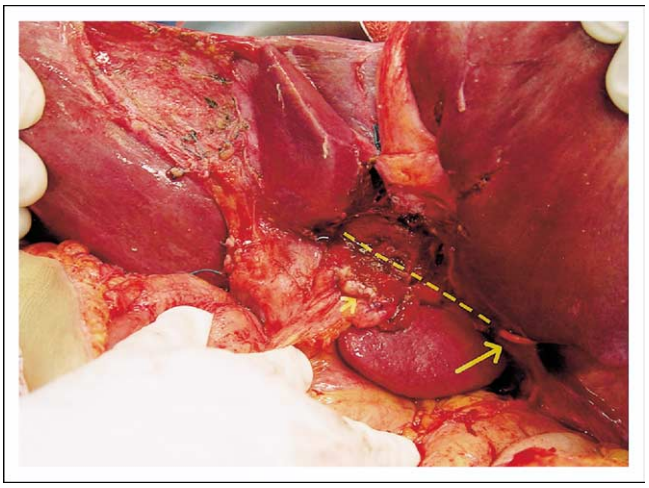

Fig. 3. The left main sheath is already divided (small arrow). This maneuver along with the dissection of the Arantius' ligament superiorly to the segment I show the posterior plane of liver transection (dotted line). The confluence of middle and left hepatic veins is encircled (large arrow).

sheath is identified, it is clamped resulting in a clear demarcation of segments V and VIII anterior to the right hepatic vein previously identified by ultrasound. This maneuver delimitates the right lateral fissura between the anterior and posterior right liver sectors.

Inflow and outflow control of the liver parenchyma containing the tumor without hilar dissection or clamping is then accomplished. The left main sheath (containing arterial, portal, and bile ducts branches of segments II, III, and IV) and the right anterior sheath (segments V and

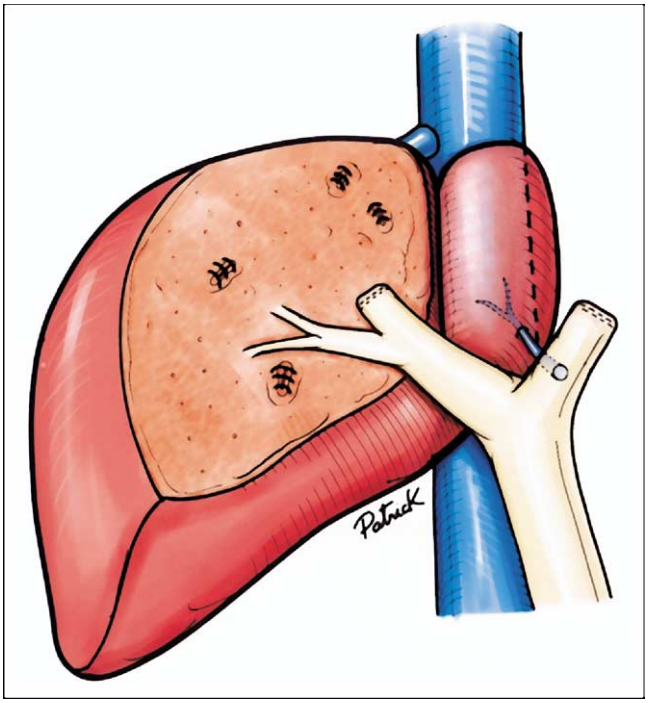

Fig. 4. Schematic view of remnant liver after removal of segments II, III, IV, V, and VIII. The caudate lobe is preserved.