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A Standardized Technique for Right Segmental Liver Resections

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Hypothesis: The indications for segmental liver resections are increasing. This type of procedure can be performed by deep wedge transparenchymal transection or by the intrahepatic approach, reaching the portal pedicle through the hilar plate. We devised a systematized way to perform such an operation.

Design: Original surgical technique.

Patients and Methods: Fourteen consecutive patients (8 men and 6 women; mean age, 55 years) underwent right segmental liver resections between July 1, 2001, and July 31, 2002. Seven patients had liver metastasis, 3 had primary liver cancer, 3 had benign lesions, and 1 had gallbladder cancer. The surgery was performed by making 3 small incisions around the hilar plate. With a standardized method, the right posterior and anterior sheaths were reached by combining these incisions.

Results: Right segmental liver resection was feasible with the proposed technique in all patients. Intraoperative blood loss was minimal in all cases, and 11 patients did not require blood transfusion. There was no postoperative death.

Conclusions: This operative procedure standardizes the intrahepatic approach to the right portal pedicle for right segmental resections. It may reduce bleeding at the site of hilar plate incisions and the need for main hepatic pedicle clamping and may facilitate the recognition of right posterior and anterior sheaths, with excellent immediate results.

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EXPERIENCE WITH liver resection has increased in recent years, and so have the indications for segmental resections. In an attempt to improve the resectability rate and facilitate liver surgery, Galperin and Karagiulian[1] in 1989 reported a technique for the isolation of portal pedicles through an extraglissonian approach. Three years later, Launois and Jamieson[2] described the intrahepatic posterior approach to the structures of the portal triad for right hepatectomy or right-sided segmentectomies. However, the main concern with these techniques is the division of the caudate process, which may cause bleeding if hepatic vessels from the caudate lobe are torn.[3] Furthermore, hilar clamping is advised to avoid bleeding from intrahepatic digital dissection.

The technique described in this article is a modification of the intrahepatic posterior approach technique,[2] with a systematized way to identify and isolate the glissonian sheaths without hilar clamping or digital maneuvers.

TECHNIQUE

The liver is mobilized in a standard fashion, and the portal triad outside of the liver is encircled and pulled downward without clamping or dissecting these structures individually. This maneuver is useful for the identification of the hilar plate, but may not be necessary in all cases. If the gallbladder is in place, cholecystectomy is performed and a small anterior incision is made in front of the hilum (shown at A in **Figure 1**). The hepatic parenchyma is divided with blunt dissection or by means of an ultrasonic dissector to disclose the anterior surface of the right glissonian pedicle and its limits. A second incision is made perpendicular to the hepatic hilum in the segment VII, where it connects to the caudate lobe (B in Figure 1). A large curved clamp (Mixter or Gray) is introduced through the left side of the right glissonian sheath, with the tip of the instrument allowed to slide from left to right diagonally at a 30° angle to place a tape around the right main sheath. This precludes incision on the caudate lobe, avoiding damage of its vessels (Figure 1). A third incision (C in Figure 1) performed on the right edge of the gallbladder bed permits access to the right anterior pedicle when the clamp is inserted through the first incision at a 60° angle (**Figures 2**, **3**, and **4**). By combining the second and the third liver incisions, it is possible to isolate the right posterior pedicle (Figure 1). All of these steps are performed without the Pringle maneuver.

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RESULTS

We have successfully used this technique in 14 consecutive right segmental liver resections between July 1, 2001, and July 31, 2002. There were 8 men and 6 women with a mean age of 55 years (range, 27-75 years). Seven patients had liver metastasis, 3 had primary liver cancer, 3 had benign lesions, and 1 had gallbladder cancer. Five patients underwent resection of segment V, 4 had bisegmentectomy of segments V and VIII, 2 had bisegmentectomy of VI and VII, 2 had resection of segment VIII alone, and 1 had resection of V and IVb. In this last patient, the technique was also helpful for the creation of an intrahepatic hepaticojejunostomy after en bloc resection of the common hepatic duct for gallbladder cancer.

In 2 patients there were lesions in both sides of the liver, and in their treatment we used double bisegmentectomies: II and III associated with V-VIII in one patient and II and III associated with VI-VII in another patient. In 2 patients, because of a small left liver, the technique was used for segmental right liver resection, thus avoiding classic right hepatectomy.

Blood transfusion was required in 3 patients (mean, 2 U). Both patients who underwent isolated segment VIII resection required blood transfusion. There was only 1 major complication, represented by sepsis due to a subhepatic abscess that was successfully drained. No postoperative mortality was observed.

COMMENT

The intrahepatic approach is a safe technique that allows fast clamping of the right hepatic pedicle and early identification of the limits of every right liver segment. The main indication for this technique is right segmental resection. Furthermore, for right hepatectomies, this technique is particularly helpful in patients with previous interventions on the hepatic hilum, avoiding a difficult and/or tedious hilar dissection. This technique is useful to spare liver parenchyma during resection of small or bilateral lesions. The initial experience with this technique showed excellent short- and medium-term results.[4]

The present technique is a variant of the technique proposed by Launois and Jamieson,[2] the main drawback of which is the incision on the caudate process that may cause substantial bleeding, as also pointed out by Batignani.[5] To alleviate this

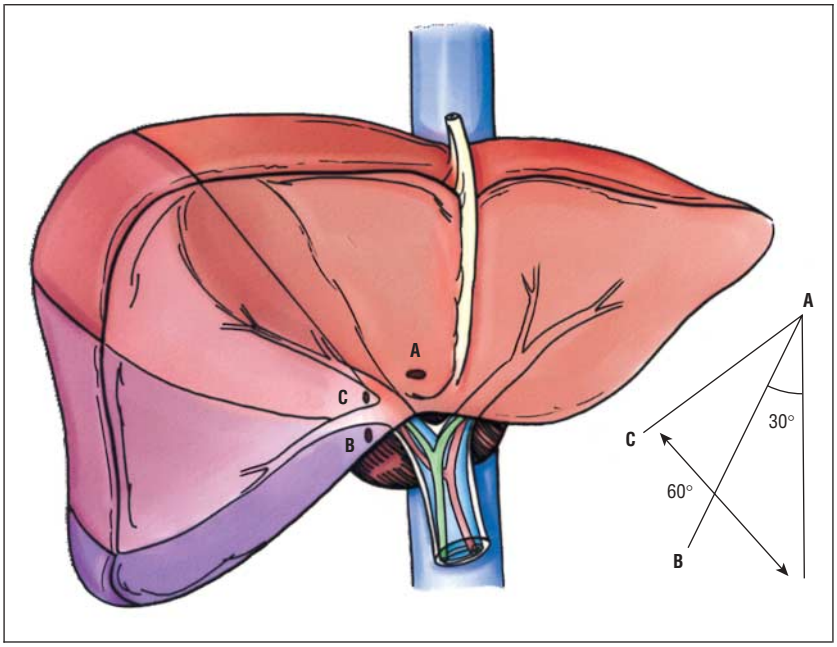

Figure 1. Incisions for the intrahepatic approach of the Glisson pedicle and the angles to isolate the sheaths. A, Anterior incision in front of the hilum; B, a vertical incision is made perpendicular to the hepatic hilum in segment VII; C, a third incision is performed on the right edge of the gallbladder bed. When a clamp is passed from A to B, access to the right main sheath (containing arterial, portal, and bile duct branches of segments V to VIII) is obtained. This maneuver is used for right hepatectomy. When a clamp is passed from A to C, access to the right anterior sheath (containing arterial, portal, and bile duct branches of segments V and VIII) is obtained. This maneuver is used for en bloc resection of segments V and VIII or resection of segment V or VIII alone. When a clamp is passed from C to B, access to the right posterior sheath (containing arterial, portal, and bile duct branches of segments VI and VII) is obtained. This maneuver is used for en bloc resection of segments VI and VII or resection of segment VI or VII alone.

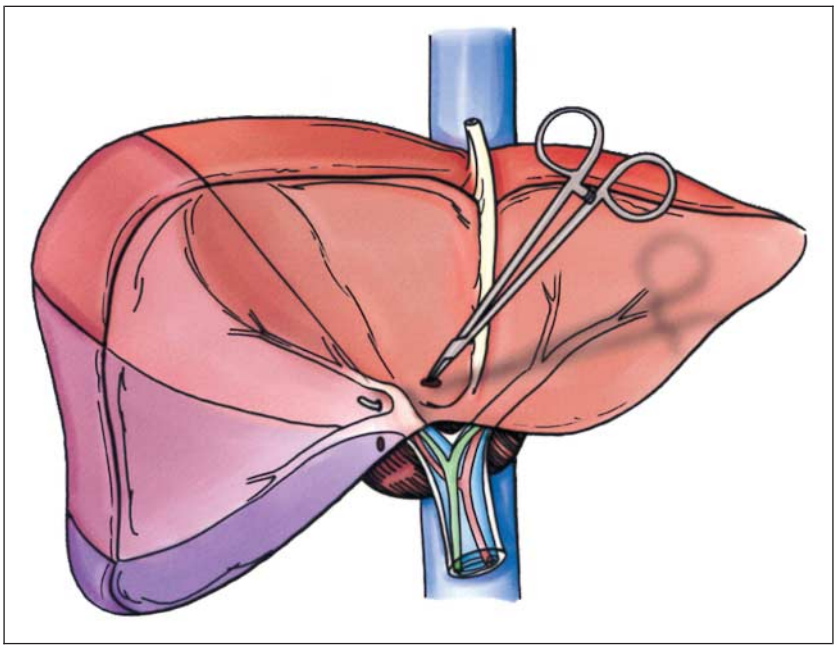

Figure 2. Schematic view of right anterior pedicle dissection (containing arterial, portal, and bile duct branches of segments V and VIII).

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Figure 3. Intraoperative view of right anterior pedicle delineation.

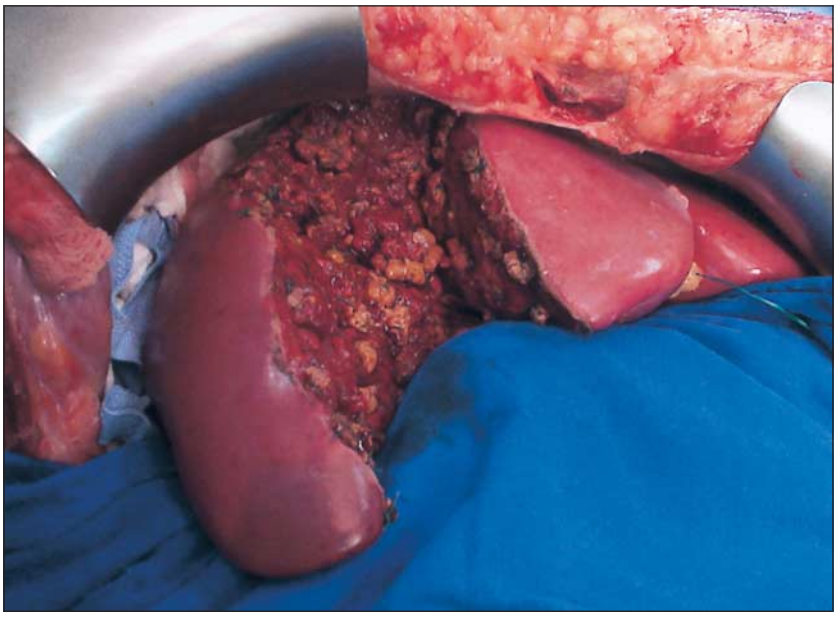

Figure 4. Intraoperative view of raw surface of the liver after right anterior hepatectomy.

potentially hazardous maneuver, we devised 2 small vertical incisions (Figure 1).

In many patients, especially in those with steatotic livers, finger dissection can be hazardous or may result in local bleeding. In the present technique, digital maneuvers are avoided with the use of a large curved clamp. The preclusion of the Pringle maneuver in our series was not followed by any additional bleeding.

The main advantage over other techniques is the ability to gain direct access to the right posterior and anterior sheaths in a systematic way. By changing the angle of inclination of the clamp (Figure 1), this was easily accomplished in every patient in this series without the need for intraoperative ultrasound or other auxiliary techniques.

We believe that this technique facilitates the intrahepatic approach to the Glisson pedicle for right segmental resections. It may also reduce the bleeding at the site of incisions and the need for main hepatic pedicle clamping and may facilitate the recognition of right posterior and anterior sheaths, with excellent immediate results.

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