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Anterior transhepatic approach for total caudate lobectomy including spigelian lobe, paracaval portion and caudate process: A Brazilian experience

To the Editor

Nowadays, because of the infiltration of cholangiocarcinoma to the parenchyma and/or bile ducts of the caudate lobe, the inclusion of caudate lobe combined with a major hepatectomy remains the gold standard approach for a resectable hilar cholangiocarcinoma. Since the last years of the 20th century, some authors have begun to report isolated caudate lobe resection for hepatocellular carcinoma (HCC), in order to achieve a radical surgery by sparing at the same time hepatic parenchyma [1]. Moreover, caudate lobe can be an uncommon site of metastatic involvement. Without any doubt, caudate lobectomy is a very demanding procedure, mainly because of the deep and complex location of the caudate lobe between major vessels. Hepatectomies performed for tumors located in this dangerous area may lead to massive hemorrage that can be difficult to control. In this setting, the so called anterior transhepatic approach provides a very good exposure to the surgical field.

At our institution, between January 2011 and December 2017, four patients (two females and two males), were submitted to isolated complete caudate lobectomy using an anterior transhepatic approach. Two patients were affected by HCC, one by fibrolamellar HCC and one by a metastasis from a previous renal cell carcinoma. All patients had a normal liver function (Child A). Informed consent was obtained from the patients for publication of this report and any accompanying images. The characteristics of the patients are summarized in Table 1. All cases were carefully evaluated with a CT scan completed with liver volumetry and virtual hepatectomy. All patients underwent isolated complete caudate resection through anterior transhepatic approach (Fig. 1). The mean age of patients was 56 years, ranging from 28 to 74 years. The four indications were, respectively: fibrolamellar HCC, HCC in a non-cirrhotic liver affected by non-alcholic steatohepatitis, HCC in HCV-related cirrhotic liver with mild portal hypertension, and metastasis from a bilateral renal cell carcinoma in a patient who was previously submitted to bilateral nephrectomy (hemodialysis 4 times a week). Mean tumor size was 5.4 cm (4.1–6.7). We decided to perform the anterior transhepatic approach for total caudectomy in these very selected cases due to the size and position of these tumors. Conventional extesive major hepatectomies cause significant risk of morbidity and mortality due to posthepatectomy liver failure. Pringle's maneuver was used routinely, if needed. From a technical point of view, in the first two cases middle hepatic vein remained attached to the left lobe: we found mild congestion in right anterior sector during intraoperative Doppler ultrasound, but no related complication was observed postoperatively. In the second two cases, in order to avoid congestion, we attached middle hepatic vein to the right lobe and we did not find any congestion at intraoperative Doppler ultrasound. During the postoperative course, no patient experienced posthepatectomy liver failure according to the definition of International Study Group on Liver Surgery (ISGLS) [2]. Two patients had a grade B biliary leakage according to ISGLS, that was managed conservatively. Postoperative CT scan was performed showing the cavity around the inferior vena cava and a free space along the split line of the hepatic parenchyma. There was no perioperative mortality. All resection margins were negative (R0) as well as the lymphnodes samplings at the hepatic hilum. No local recurrence were observed during the follow-up (range 6 months–7 years). All patients were alive at the end of follow-up.

The diagnosis of a solitary tumor in the caudate lobe is not common and this could be the reason why the procedures of the caudate lobe resection is not well known among many surgeons. In 1994, Takayama et al. originally described the high dorsal resection procedure to achieve isolated total caudate lobectomy and to spare liver transection along the middle hepatic vein plane [3].

Only a few cases of caudate lobectomy using the anterior transhepatic approach was reported [4,5]. In 1992, Yamamoto et al. [4] described an isolated caudate lobectomy. They transected almost the entire caudate lobe along the interlobar plane and opening the hepatic hilus anteriorly. The same group [5] in 1999 reported the same technique for 5 cases. Peng et al. [6] reported 6 cases with one death after 17 months for tumor recurrence and

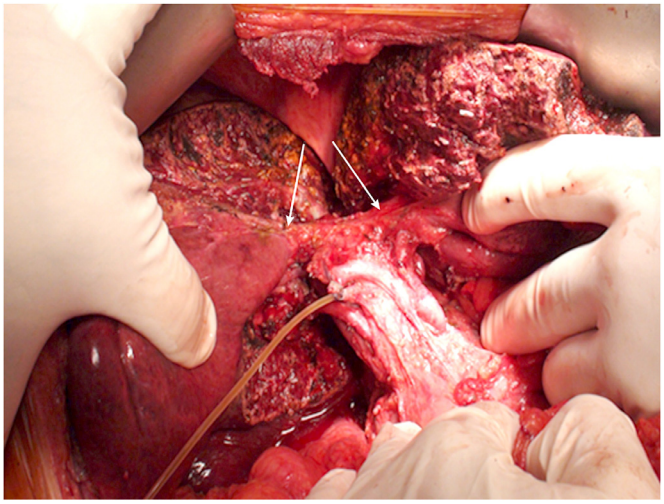

Fig. 1. Intraoperative view of hepatic surfaces with exposure of bilateral hilar plate; right and left bile ducts (arrows).

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Table 1
Characteristics of the patients.

Patient no.	Year	Age (yr) / gender	Tumor size (cm)	Liver function	Hepatic parenchyma	Pathology	PHLF	Bile leakage
1	2011	28/Female	6.7	Child A	Normal	Fibrolamellar HCC	No	No
2	2014	66/Male	4.1	Child A	NASH	HCC	No	No
3	2017	74/Female	4.8	Child A	HCV-related cirrhotic	HCC	No	Grade B
4	2017	56/Male	6.0	Child A	Normal	Renal cell carcinoma metastasis	No	Grade B

PHLF: posthepatectomy liver failure; NASH: non-alcholic steatohepatitis; HCC: hepatocellular carcinoma.

liver failure. Ikegami et al. [1] described the experience of 15 caudate lobe resection for HCC, in 6 cases performed with anterior transhepatic approach. Caudate lobectomy carried a statistically significant longer operative time compared to the other types of hepatectomies. Yang et al. [7] recently reported 9 cases (6 HCC, 2 cavernous hemangiomas and 1 intrahepatic cholangiocarcioma). All were performed with inflow and outflow of hepatic blood control. Wang et al. [8] reported the largest series of isolated complete caudate lobectomies by anterior hepatic parenchymal transection. They reported 14 consecutive patients mainly affected by HCC: median tumor size was 7.3 cm, mean operative time 200 min and mean operative blood loss 700 mL. Nevertheless, to the best of our knowledge, no cases have been reported yet in Brazil nor in South America. At our institution we performed four complete caudate resection with the antherior transhepatic approach. We experienced a significant burden of postoperative complications (50%), mainly due to biliary leakage but all managed very well with conservative tretament. Others authors reported high rates of postoperative complications, ranging from 22% to 37% [7,8]. We did not have postoperative mortality. All our cases were R0 in histology analysis. Traditionally, the operation of tumors in the caudate lobe involved a major hepatectomy including the caudate lobe which severely decreased the liver preservation. We believe that when the tumor is confined to the caudate lobe and does not involve major vascular structures, it is possible to achieve negative margins and to avoid unnecessary hepatic parenchyma resection. One study reported a poorer prognosis for HCC in the caudate lobe because the invasion of major vascular structures [9]. Recent studies [1,10] have demonstrated no differences in survival rates between HCC in caudate lobe and those in others locations, thus this surgery is fully justified from an oncological point of view. Despite longer operative time and likely higher blood loss due to parechymal transection, our suggestion is to perform an anterior transhepatic approach as it provides an excellent surgical view and does not impair remnant liver function. We believe that this approach is especially advisable for the followings: large tumors in the paracaval portions, tumors close to major vascular structures, and in cirrhotic patients because of the high-risk of bleeding.

The main concern in such operations is the high-risk of biliary leak due to the extensive hilar dissection and exposure of bilateral hilar plate. Although extensive hepatectomy with inclusion of the caudate lobe may decrease the biliary leak, the extensive major hepatectomies increase the risks of posthepatectomy liver failure. Therefore, we believe that it is important to individualize the cases in order to perform the best approach to achieve R0 resections in caudate liver tumors.

Moving from the analysis of our experience and the review of literature, we advocate the anterior transhepatic approach as a safe and potentially curative technique that can reach R0 resection.

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Contributors

PCA, MFPT, OAR, PLMS and GCL designed and conducted the study, analyzed the data and helped to write the manuscript. FESM was the principal investigator, and revised and edited the manuscript. All authors approved the final manuscript. FESM is the guarantor.

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Ethical approval

Informed consent was obtained from every patient involved in this study.

Competing interest

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

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