



Original article

Chemical embolisation before laparoscopic hepatic resection in early hepatocellular carcinoma in cirrhotic patients

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Objective: To assess whether preoperative transarterial chemoembolisation (TACE) reduces haemorrhage during laparoscopic resection, thus making the Pringle manoeuvre unnecessary and avoiding any subsequent complications.

Patients and methods: We present 3 cirrhotic Child A patients with early hepatocellular carcinoma, all of whom had been given the same treatment involving resection by laparoscopy and preoperative TACE of the segments to remove. All the nodules were located in the right hepatic lobe. One case was treated using total laparoscopic surgery and the two remaining cases were converted to the hand-assisted technique. In the first case we carried out bisegmentectomy VI–VII; in the second, segmentectomy VI plus radiofrequency of a second nodule in segment VII, and in the third case, segmentectomy V.

Results: There was no morbidity or mortality. Blood transfusion was not required by any of the patients; in fact blood losses were 100, 50, and 150 mL, respectively, and it was not necessary to carry out the Pringle manoeuvre. Surgical margin was greater than 1 cm in the three cases and hospital stay was less than 3, 3 and 4 days, respectively.

Conclusion: TACE prior to early hepatocellular carcinoma resection in cirrhotic patients seems to improve surgical safety with low blood losses without the use of the Pringle manoeuvre. Prospective random studies should be carried out on a larger number of patients in order to assess this technique.

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Quimioembolización previa a la resección hepática laparoscópica en el carcinoma hepatocelular precoz en pacientes cirróticos

R E S U M E N

Palabras clave:

Resección hepática laparoscópica
Embolización transarterial
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La resección hepática por laparoscopia del hepatocarcinoma sobre cirrosis podría asociarse a un mayor riesgo de hemorragia y a un mayor uso de la maniobra de Pringle que cuando se realiza por vía abierta.

Objetivo: Valorar si la quimioembolización intraarterial preoperatoria (QMEP) reduce la hemorragia durante la resección laparoscópica y se evita así el empleo de la maniobra de Pringle y sus posibles complicaciones.

Pacientes y métodos: Se presentan 3 pacientes con cirrosis Child A con carcinoma hepatocelular (CHC) precoz, a los que se practicó QMEP de los segmentos por resecar. Todos los nódulos se localizaron en el lóbulo hepático derecho. Un caso fue intervenido por cirugía totalmente laparoscópica y los 2 restantes se convirtieron a cirugía laparoscópica asistida con la mano. En un caso se realizó bisegmentectomía VI-VII, en otro se realizó segmentectomía VI más radiofrecuencia de un segundo nódulo en segmento VII, y en el otro caso se realizó segmentectomía V.

Resultados: No hubo morbilidad. No se transfundió ningún paciente, las pérdidas hemáticas fueron de 100, 50 y 150 ml, respectivamente, y no fue necesaria la maniobra de Pringle. La resección se completó en los 3 casos con un margen superior a 1 cm y la estancia hospitalaria fue de 3, 3 y 4 días, respectivamente.

Conclusión: La QMEP permite realizar la resección laparoscópica del CHC sobre cirrosis con pocas pérdidas hemáticas sin el uso de la maniobra de Pringle. Estudios prospectivos aleatorizados son necesarios con un mayor número de pacientes para evaluar esta técnica.

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Introduction

Laparoscopic liver resection (LLR) of hepatocellular carcinoma (HCC) secondary to cirrhosis is usually indicated in Child A patients with tumours <5 cm and located in peripheral segments (II-VI)¹⁻⁶ and less frequently in segments VII and VIII.⁷⁻⁹ Due to the special characteristics both of the liver and the cirrhotic patient, LLR may involve a higher risk of haemorrhaging than resection in healthy liver, thus requiring excessively prolonged use of Pringle manoeuvre.^{1,5-8}

So far, preoperative transarterial chemoembolisation (TACE) has been used in large hepatocellular carcinoma (HCC)¹⁰⁻¹² in order to reduce tumour size and improve resectability. The present study aims at using TACE by laparoscopy in cases of early hepatocellular carcinoma, in order to reduce irrigation in the segments to be removed. This technique consists in irrigating the hepatocellular carcinoma by arterial line. TACE aims at causing less vascularization over the affected area.

This article presents immediate intraoperative and postoperative results of 3 Child A cirrhotic patients with HCC stages 0 and A from Barcelona Classification Liver Cancer,¹³ where TACE prior to LLR was performed.

Patients and method

Between January 1996 and May 2009, 590 liver resections (LR) in solid liver tumours were performed, 70 by laparoscopy. In

3 cases LR of HCC was performed due to Child A cirrhosis with laparoscopy and one TACE was carried out to reduce intraoperative haemorrhaging.

TACE technique: in 2 cases after selective catheterisation of hepatic artery, adriamycin in lipiodol suspension was injected followed by occlusion of arterial flow into the segments to remove.¹⁴ For the third case polyvinyl alcohol spheres with adriamycin were employed.¹⁵

Clinical case 1

Sixty-five-year-old patient with Child A alcoholic cirrhosis, without portal hypertension (gastroscopy showed no varices, platelet count 120 000, without splenomegaly) total bilirubin (TB) 1 mg/dL. A 3 cm hypoechogenic nodule was observed between segments VI and VII by echographic follow-up. Alpha fetoprotein (AFP): 40 ng/mL. A computed tomography (CT) over arterial phase showed a nodule vascularised by the arterial branch of segment VI (Figure 1). Prior consulting with this hospital, an HCC was identified by biopsy. TACE of segments VI-VII was performed (Figure 2), prior to laparoscopic resection. A control CT was carried out after 3 weeks (Figure 3), where it was observed tumour response to treatment and poor vascularization to segments VI-VII. Totally laparoscopic surgery (TLS) was performed after 4 weeks and bisegmentectomy VI-VII. With patient in supine position 4 trocars were used; blood loss was 100 mL, surgical time 180 min, and no Pringle manoeuvre was necessary. No postoperative complications appeared and hospital stay



Figure 1 – Three cm hepatocellular carcinoma between segments VI and VII, visible on the arterial phase.

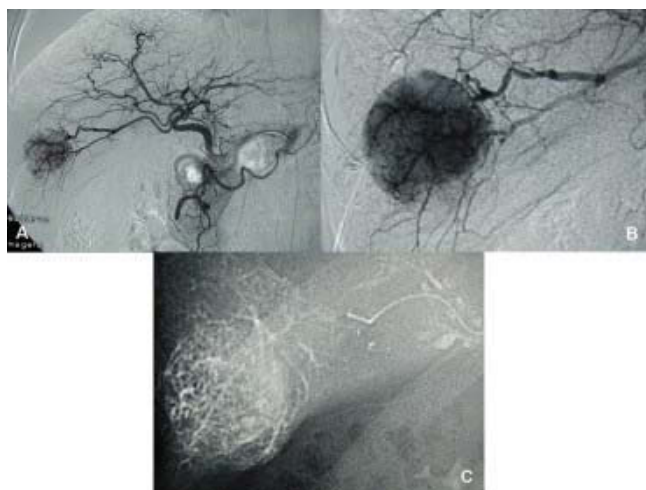


Figure 2 - (A, B, and C). Tumour arteriography and selective chemoembolisation with occlusion of segmental arterial branches VI and VII.

was 3 days. Pathologic anatomy: HCC with 90% necrosis and surgical margin greater than 1 cm.

Clinical case 2

Sixty-four-year-old patient with alcoholic cirrhosis Child A, without portal hypertension (gastroscopy showed no varices, platelet count 105 000, without splenomegaly) and total bilirubin (TB) 0.9 mg/dL. A 2 cm nodule was observed during follow-up between segments VI and VII, and other 1.5 cm nodule located in segment VII, next to right liver vein. AFP: 20 ng/mL. Both nodules were hypervascular, compatibles with HCC as shown by Sonovue echography, CT, and magnetic resonance. The 2 cm nodule biopsied is positive for HCC. Prior to laparoscopic resection, selective TACE was carried out in segments VI and VII. TLS was performed after 5 weeks. Segmentectomy VI with TLS was carried out, but with

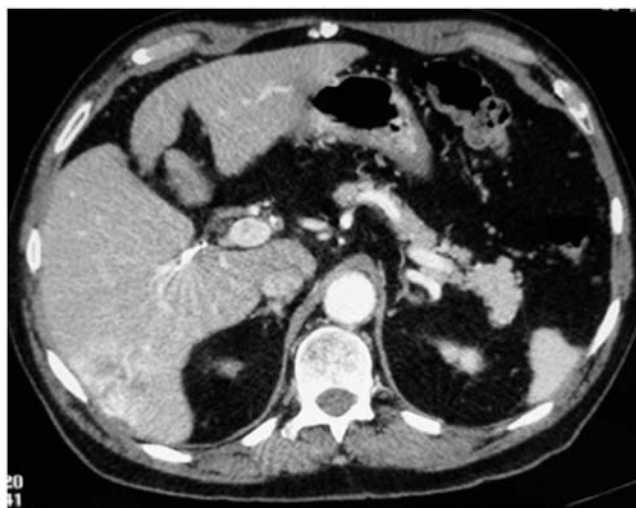


Figure 3 - Check-up CT after 4 weeks post-chemoembolisation, where tumour necrosis is observed and area with arterial ischaemia (segments VI and VII).

conversion to hand-assisted laparoscopic surgery (HALS) using the technique described at our hospital unit^{16,17} in order to achieve complete mobilization of the right lobe and thus perform radiofrequency ablation of nodule in segment VII under intraoperative echographic control, given its proximity to right liver vein. Surgical time was 180 min and blood loss 50 mL. No postoperative complications appeared; hospital stay was 3 days. Pathologic anatomy: HCC with 95% necrosis and surgical margin greater than 1 cm.

Clinical case 3

Sixty-four-year-old woman who had undergone cholecystectomy in 1983 by right subcostal incision, required blood transfusion and acquired virus C. She was diagnosed with Child A liver cirrhosis 10 years ago, without portal hypertension (no oesophageal varices by endoscopy, platelet count 107 000, without splenomegaly) and TB 1 mg/dL. Last control showed increased AFT to 40 ng/mL and echography showed 2.5 cm nodule in segment V. CT confirmed hypervascular lesion in segment V, biopsied positive for HCC. All these studies were performed at our hospital. Selective TACE was carried out in segment V and surgery took place 4 weeks later. TLS was performed and when an adhesive block was found conversion to HALS was decided and carried out. Adhesions were released, right liver lobe was immobilised and segmentectomy V with no occlusion of portal fissure was performed. Surgical time was 120 min and blood loss 150 mL. No postoperative complications appeared and hospital stay was 4 days. Pathologic anatomy: 2.5 cm HCC with 90% necrosis and surgical margin greater than 1 cm.

Discussion

For most authors, LLR involves numerous difficulties,¹⁻⁹ especially with cirrhotic liver^{1-9,16-19} due to hardening of

the liver, portal hypertension occurrence, and coagulation disorders. These difficulties lead to a larger number of laparotomies, mainly because of haemorrhaging. Thus, according to Cherqui et al,¹ in 27 patients with HCC resected by laparoscopy, the conversion rate was 26% (7 patients), 5 due to haemorrhaging; 6 patients presented with blood loss >1000 mL and 3 were transfused (15%). Haemorrhaging risk forced the authors to systematically perform an intermittent Pringle manoeuvre (mean time, 55 min) which might have accounted for the prolonged mean surgical time of 240 min.¹ There were more technical difficulties in tumours located in segment VI (even when left lateral recumbent position was decided and used) than with left lateral sectionectomy due to this technique being simpler to perform.

Due to higher risk of haemorrhaging during LLR of HCC, the authors of this study propose to perform a TACE, as it is a tumour mainly irrigated by arterial line; and selective TACE of segments to resect might result in less vascularization and, therefore, less haemorrhaging during laparoscopic resection. There might be less need for portal fissure occlusion (that would prevent secondary liver ischaemia and, therefore, result in lower risk of postoperative liver insufficiency), shorter surgical time, and less blood transfusion. This seems to be confirmed by the first 3 patients of the present series, with whom, in spite of the tumours being located over the right lobe (segmentectomy VI-VII, segmentectomy VI, and segmentectomy V were performed) where resection involved more technical difficulties for laparoscopy, mean surgical time was short (160 min), mean blood loss was not significant (100 mL), and Pringle manoeuvre was unnecessary.

In this series, as opposed to other authors,¹⁻³ the patient was placed in supine position, even for lesions over segments VI and VII. Two cases had to be converted to HALS, but neither due to haemorrhaging, as opposed to other series where most conversions were performed due to haemorrhaging.^{8,9,18} Conversion was necessary in one case to mobilise the right hepatic lobe to perform radiofrequency ablation in a 1.5 cm nodule located posterior to right hepatic vein (segmentectomy VI had previously been performed) and, in other case, conversion to HALS was needed due to complete adhesive block of subhepatic space caused by a cholecystectomy performed 20 years earlier.

In other series, intraoperative haemorrhaging was less than that published by Cherqui et al.¹ Similarly, Belli et al³ carried out a retrospective study comparing 23 patients with HCC over cirrhosis operated by laparoscopy against 23 patients by open surgery (OS). Blood loss: 260 mL versus 376 mL by OS; transfusion: 0 versus 17% by OS; and Pringle manoeuvre: 0 versus 21% by OS. All values were lower in the laparoscopy group, whereas surgical time was longer by laparoscopy: 148 min versus 125 by OS. In addition, only one out of 23 patients (4.3%) was converted, for a tumour located in segment VI, due to exposure difficulties to perform resection, despite the fact that the patient was in lateral recumbent position. These good results may be related to tumour localisation (50% over left lobe) and to an improved selection of patients, as in all the cases the tumours were subcapsular and exophytic. TACE would probably not be indicated for such peripheral tumours.

There are open surgery retrospective studies^{11,12} that compare patients with liver resection of HCC over cirrhosis with or without TACE. According to Choi et al¹¹ there are no differences in survival to 5 years between either group, and according to Chen et al¹² survival to 5 years was higher for the TACE group. Furthermore, Choi et al¹¹ compared operative results in both groups and observed that the TACE group had a slightly higher blood loss, although differences were not statistically significant. Results are contradictory to the ones obtained in the present study, and this may be due to the facts that the groups are not comparable, since TACE was performed for tumours larger than 5cm and central tumours, and a higher percentage of major liver resections was performed.

In conclusion, selective TACE over segments to be removed by laparoscopy in patients with HCC with early staging, Child A without portal hypertension, permits performing resection with little blood loss and without need to use Pringle manoeuvre. Randomised prospective studies with a larger number of patients comparing laparoscopy resection with or without TACE in selected cases of HCC for cirrhosis are needed to further analyse the advantages during immediate postoperative stage and possible effects over survival for the long term.

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