

REFERENCES

- Carrascosa A, Fernández JM, Fernández C, Ferrández A, López-Siguero JP, Sánchez E, et al. Estudio transversal español de crecimiento 2008. Parte II: valores de talla, peso e índice de masa corporal desde el nacimiento a la talla adulta. *An Pediatr (Barc)*. 2008;68:552-69.
- Benito Peinado PJ, González-Gross M. Conclusiones del Congreso internacional para el tratamiento del sobrepeso y la obesidad: programas de nutrición y actividad física. In: Programa de Nutrición y Actividad Física para el tratamiento de la Obesidad (Pronaf); 2011. Available from: www.pronaf.es
- National Center for Chronic Disease Prevention and Health Promotion. Obesity – Halting the epidemic by making health easier at-a-glance; 2009. Available from: <http://www.cdc.gov/nccdphp/publications/AAG/pdf/obesity.pdf> [cited April 2010, accessed 03.03.12]
- Franks PW, Hanson RL, Knowler WC, Sievers ML, Bennett PH, Looker HC. Childhood obesity, other cardiovascular risk factors, and premature death. *N Engl J Med*. 2010;362:485-93.
- Koebnick C, Smith N, Coleman KJ, Getahun D, Reynolds K, Quinn VP, et al. Prevalence of extreme obesity in a multiethnic cohort of children and adolescents. *J Pediatr*. 2010;157:26-31.
- Gussinyer S, García-Reyna NI, Carrascosa A, Gussinyer M, Yeste D, Clemente M, et al. Cambios antropométricos, dietéticos y psicológicos tras la aplicación del programa Niñ@s en movimiento en la obesidad infantil. *Med Clin (Barc)*. 2008;131:245-9.
- Yeste D, Marhuenda C, Mesa P, Guillen G, Martínez-Ibañez V, Carrascosa A. Morbid obesity in adolescents. Experience and preliminary mid-term results (18-24 months) with intragastric balloon. *Horm Res Paediatr*. 2012;78 Suppl. 1:76-7.
- Chopra A, Chao E, Etkin Y, Merklinger L, Lieb J, Delany H. Laparoscopic sleeve gastrectomy for obesity: can it be considered a definitive procedure? *Surg Endosc*. 2012;26:831-7.
- Alqahtani AR, Antonisamy B, Alamri H, Elahmedi M, Zimmerman VA. Laparoscopic sleeve gastrectomy in 108 obese children and adolescents aged 5 to 21 years. *Ann Surg*. 2012;256:266-73.
- Aikenhead A, Lobstein T, Knai C. Review of current guidelines on adolescent bariatric surgery. *Clin Obes*. 2011;1:3-11.

Ramón Vilallonga^{a*}, Diego Yeste^b, Albert Lecube^c, Manel Armengol^a, José Manuel Fort^a

^aUnidad de Cirugía Endocrina, Bariátrica y Metabólica, Servicio de Cirugía General, Hospital Universitario Vall d'Hebron, European Center of Excellence (EAC-BS), Barcelona, Spain

^bUnidad de Endocrinología Pediátrica, Servicio de Pediatría, Hospital Universitario Vall d'Hebron, Barcelona, Spain

^cUnidad de Obesidad Mórbida, Servicio de Endocrinología, Hospital Universitario Vall d'Hebron, Barcelona, Spain

*Corresponding author.

E-mail address: vilallongapuy@hotmail.com (R. Vilallonga).

2173-5077/\$ – see front matter

© 2012 AEC. Published by Elsevier España, S.L. All rights reserved.

Hepatic Metastasis Marking Before Neoadjuvant Chemotherapy for Their Subsequent Location and Resection Using Non-anatomical Hepatectomy

Marcaje de metástasis hepática antes de quimioterapia neoadyuvante para su posterior localización y resección mediante hepatectomía no anatómica

The high level of therapeutic response obtained with combinations of fluorouracil and leucovorin with oxaliplatin or irinotecan and with monoclonal antibodies such as cetuximab or bevacizumab, and the results of the EORTC trial with peri-operative chemotherapy,¹ have encouraged us to use neoadjuvant chemotherapy in a large number of patients with liver metastases from colorectal cancer. Metastases can disappear or reduce with neoadjuvant treatment after a few cycles, in such a way that their subsequent location can

become very difficult. This is aggravated when liver toxicity occurs from therapeutic agents, giving the hepatic parenchyma an echogenicity which is highly homogenous with metastases. Furthermore, as we find a real pathological complete response in only 10% of lesions that disappear, resection of the hepatic parenchyma where the metastasis was located remains necessary.² In order to avoid these location problems, some authors have described a technique of marking liver metastases prior to starting neoadjuvant

* Please cite this article as: Alonso Casado O, González Moreno S, Encinas García S, Rojo Sebastián A, Olavarría Delgado A. Marcaje de metástasis hepática antes de quimioterapia neoadyuvante para su posterior localización y resección mediante hepatectomía no anatómica. *Cir Esp*. 2013;91:687-689.

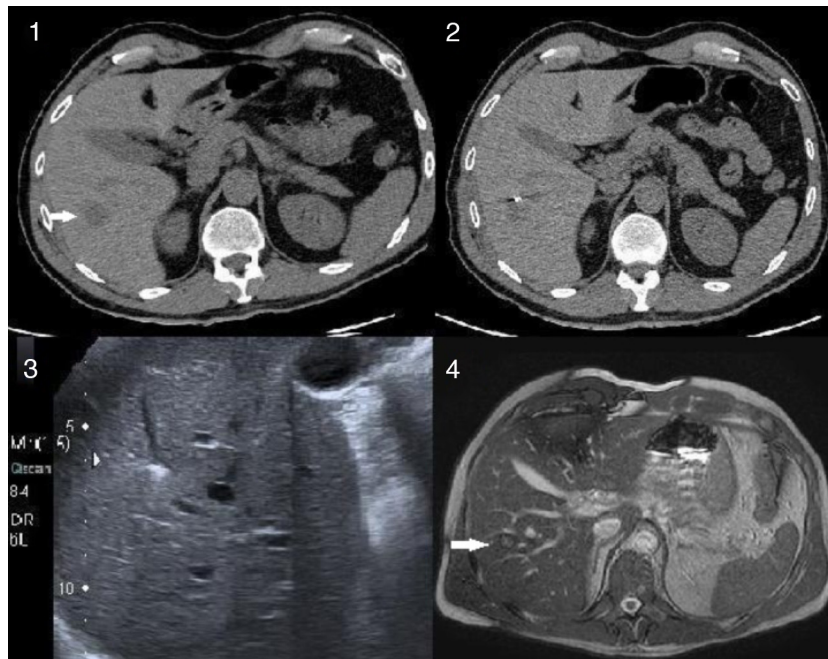


Fig. 1 – The CT scan shows a 2.5 cm metastasis at the confluence of segments v-vi-vii-viii, which is resectable by non-anatomical hepatectomy. Marking with coils prior to neoadjuvant treatment (2) allows subsequent location of the metastasis with ultrasound although it is not ultrasonically visible (3). (4) The post chemotherapy MRI scan shows the metastasis which is 1 cm in size.

treatment.^{3,4} This involves placing one or two coils next to the metastasis under radiological control, by ultrasound or CT scan, before starting chemotherapy treatment. Once the neoadjuvant treatment has been completed, the coils can be located by intraoperative ultrasound during the surgical procedure, even though the metastasis has either disappeared, or is not visible.

The following is a case where this marking technique was necessary. The patient was a 47-year-old male diagnosed with an adenocarcinoma of the colon, 15 cm from the anal margin; the extension study of the carcinoma revealed hepatic metastasis of 2.5 cm located deep in the intersection of segments v-vi-vii-viii (Fig. 1), but at sufficient distance from the vascular pedicles of these segments to allow a non-anatomical

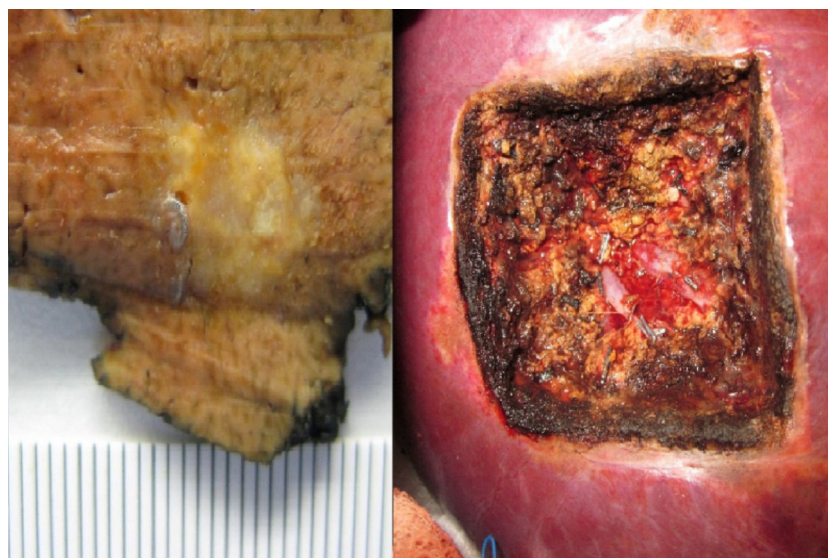


Fig. 2 – Resection sample section showing a coil next to the metastasis. Resection bed in right hepatic lobule.

resection to be performed. The study also revealed a left-sided paraaortic adenopathy, cranial to the origin of the inferior mesenteric (artery), and another precaval infrarenal lymph node, of 2 and 3 cm respectively, with pathological uptake shown on PET scan. It was decided to start treatment with systemic chemotherapy and carry out simultaneous surgical resection of all lesions if there was a response. Given the probable disappearance of the liver metastasis, and/or its very difficult intra-operative location in the event of a response, it was decided to mark the lesion prior to starting chemotherapy. Our team of interventional radiologists, guided by CT, placed a coil in the deep margin of the lesion. The patient received three cycles of FOLFOX and was reassessed using PET/CT and hepatic MRI. The PET/CT showed metabolic and complete radiological response at hepatic level—the lesion was not seen – and partial response of the primary tumour and retroperitoneal adenopathy. The MRI detected liver metastasis with a reduction in size to 1 cm. We performed a pre-operative liver ultrasound which enabled us to see the coil but not the metastasis. Given the evidence of response to the chemotherapy, it was decided to perform one-stage surgery of the entire disease. Surgical exploration showed the primary tumour at the recto-sigmoid junction and the retroperitoneal adenopathies described above; the hepatic lesion was not palpable. The coil was located using intra-operative ultrasound, without it being possible to clearly distinguish the metastasis. The primary tumour and precaval and paraaortic lymph node metastases were resected first. We then proceeded to resect the metastasis by non-anatomical hepatectomy on segments V-VI-VII-VIII. Continuously guided by ultrasound, we resected the hepatic parenchyma area around the coils, taking into account the initial size of the lesion, and achieving at least a margin of 1 cm in depth from the coils. We performed the resection with electrocautery and ultrasonic aspirator, without hilar clamping. When the resection sample had been extracted, we confirmed the presence of an eight mm lesion with free margins, situated 8 mm from the deep margin (Fig. 2). The histology study confirmed that it was a colorectal adenocarcinoma metastasis. There were no complications in the post-operative period; the patient was discharged on the eighth day after surgery.

High risk patients with synchronous hepatic metastasis, “potentially resectable” metastasis or synchronous extrahepatic disease will be treated with chemotherapy prior to hepatic resection.⁵ This marking technique is indicated when these patients present with a small, deep metastasis, which is likely to disappear if there is a good response to treatment. The technique is simple, reproducible and has a low risk of complications. It allows a parenchyma-sparing resection, avoiding unnecessary major anatomical hepatectomies and having to wait for the metastasis to reappear to treat it at a second stage. In our case, only a right-sided hepatectomy could have ensured resection if the lesion had not been

marked. It is important for the coil to be placed in the deep edge of the lesion, without crossing it, to prevent it from spreading. Pre-operative ultrasound, although not essential, allows us to check that the coils are easily visible. The use of intra-operative ultrasound is essential. Hepatic resection will be guided exclusively by ultrasonic image, and the resection margins will depend on the correct knowledge of this technique. Intra-operatively, it must be checked that the metastasis and/or the coils are in the resection sample.

REFERENCES

1. Nordlinger B, Sorbye H, Glimelius B, Poston GJ, Schlag PM, Rougier P, et al. Perioperative chemotherapy with FOLFOX4 and surgery versus surgery alone for resectable liver metastases from colorectal cancer (EORTC Intergroup trial 40983): a randomised controlled trial. *Lancet*. 2008;371:1007-16.
2. Carpenter S, Fong Y. Management of disappearing colorectal hepatic metastases. *Adv Surg*. 2010;44:269-79.
3. Zalinski SK, Abdalla E, Mahvash A, Vauthey JN. A marking technique for intraoperative localization of small liver metastases before systemic chemotherapy. *Ann Surg Oncol*. 2009;16:1208-11.
4. Kornprat P, Schöllnast H, Cerwenka H, Wergartner G, Bernhardt G, Mischinger HJ. Management of colorectal liver metastases after complete response to neoadjuvant chemotherapy. A case of computed tomography-guided wire marking of the liver tumor. *Int J Colorectal Dis*. 2009;24:125-6.
5. Nordlinger B, Van Cutsem E, Gruenberger T, Glimelius B, Poston G, Rougier P, et al. European Colorectal Metastases Treatment Group Combination of surgery and chemotherapy and the role of targeted agents in the treatment of patients with colorectal liver metastases: recommendations from an expert panel. *Ann Oncol*. 2009;20:985-92.

Oscar Alonso Casado^{a,*}, Santiago González Moreno^a, Sara Encinas García^b, Alejandro Rojo Sebastián^c, Andreina Olavarría Delgado^d

^aUnidad de Oncología Quirúrgica Digestiva, MD Anderson Cancer Center, Madrid, Spain

^bUnidad de Oncología Médica Digestiva, MD Anderson Cancer Center, Madrid, Spain

^cServicio de Anatomía Patológica, MD Anderson Cancer Center, Madrid, Spain

^dServicio de Radiología, MD Anderson Cancer Center, Madrid, Spain

*Corresponding author.

E-mail address: oononso@mdanderson.es (O. Alonso Casado).

2173-5077/\$ – see front matter

© 2012 AEC. Published by Elsevier España, S.L. All rights reserved.