CASE REPORT

Spontaneous cholecystocolic fistula and locoregional liver tumour ablation: a cautionary tale

¹U PUA, FRCR, FAMS and ²E M MERKLE, MD

¹Department of Diagnostic Radiology, Tan Tock Seng Hospital, Singapore, and ²Department of Radiology, Duke University Medical Center, USA

ABSTRACT. A liver abscess is a feared and potentially fatal complication following transarterial chemoembolisation (TACE) and radiofrequency ablation (RFA) of liver tumours. Iatrogenic bilio-enteric communications, such as bilio-enteric anastomosis, sphincterotomy and biliary stents, are considered major risk factors and are due to bacterial colonisation of the biliary tree with enteric flora. Naturally occurring spontaneous cholecysto-enteric fistula poses a similar risk as its iatrogenic counterparts but is rarely described in the literature. We present a case where abscess formation complicated a combined TACE and RFA in an unrecognised cholecystocolic fistula.

Received 23 October 2010

Revised 7 January 2011

Accepted 17 January 2011

DOI: 10.1259/bjr/13919678

© 2011 The British Institute of Radiology

Liver abscess formation is a serious complication of transarterial chemoembolisation (TACE) and radiofrequency ablation (RFA). The strong association of abscess formation following TACE and RFA with surgical bilio-enteric anastomosis and functionally incompetent sphincter of Oddi is well recognised. In the literature, these associations are dominated by iatrogenic causes, such as sphincterotomies, biliary stents and drains, and bilio-enteric reconstructive surgery [1, 2]. Naturally occurring spontaneous bilio-enteric fistula, on the other hand, is rarely mentioned as an associated risk factor.

Case report

A 76-year-old male developed a solitary metastasis in segment 6 of the liver 6 years after low anterior resection for rectal carcinoma (arrow in Figure 1a). The same CT had an incidental finding of chronic calculous cholecystitis (arrow in Figure 1b), but this was asymptomatic. The patient subsequently underwent TACE of the segment 6 lesion (mixture of 50 mg adriamycin, 20 mg mitomycin C and 8 ml of lipiodol) followed by embolisation until stasis with gelfoam slurry (Figure 2a). This was followed by RFA using a LeVeen RFA needle (Boston Scientific Corporation, Natick, MA), performed 5 days after TACE (Figure 2b) under CT fluoroscopic guidance.

1 month after RFA, the patient developed fever with epigastric pain. Leukocytosis was found with a new rim-enhancing 3-cm sized segment 8 liver lesion on CT (arrow in Figure 3a). This was diagnosed as a liver abscess, based on the imaging and clinical findings, and treated successfully with 4 weeks of oral antibiotics; there was a complete resolution on CT (not shown). No percutaneous

aspiration of the abscess was considered necessary during the course of the illness owing to the small size of the lesion, the relatively mild clinical course and a good response to therapy.

Retrospective review of the CT images obtained during RFA revealed an unrecognised spontaneous choledochocolic fistula had developed in the 4-week interval between the earlier diagnostic CT and the RFA session. The suspicion of a fistula was raised when gallstones were absent and small locules of air appeared in the gallbladder on the CT obtained during RFA (compare Figure 1b and Figure 3b). The fistula was subsequently confirmed with sagittal reconstruction using the Leonardo 3D workstation (Siemens Medical, Erlangen, Germany) (Figure 4).

In our institution, prophylactic antibiotics are not routinely administered for TACE or RFA, unless a bacterial colonised biliary tree is suspected. Early detection of the choledochocolic fistula would have altered the pre-procedural preparation and prompted aggressive antibiotic prophylaxis.

Discussion

Liver abscess is a serious complication following TACE and RFA. It often results in a prolonged hospital stay and can be fatal [1, 2, 3]. The reported incidence of liver abscess following TACE is between 0.3% and 2.7% [4, 5] and, following RFA, between 0.66% and 2.4% [6, 7]. A major risk factor for liver abscess formation following TACE and RFA is the presence of abnormal bilio-enteric communications (*e.g.* surgical bilio-enteric reconstructions) or a functionally incompetent sphincter of Oddi (secondary to sphincterotomy or biliary-enteric stent/drain) [1–6]. In the presence of a bilio-enteric anastomosis, the risk of liver abscess formation is increased up to 800 times (odds ratio of 894) following TACE and 36 times (odds ratio of 36.4) following RFA [1, 7]. The

Address correspondence to: Dr Uei Pua, Department of Diagnostic Radiology, Tan Tock Seng Hospital, 11 Jalan Tan Tock Seng, Singapore 308433. E-mail: druei@yahoo.com

Figure 1. (a) Contrast-enhanced CT showing a solitary, rim-enhancing, 4 × 3-cm metastasis in segment 6 of the liver (arrow). (b) In addition, gallstones (arrow) within a thick-walled gallbladder were noted, consistent with chronic calculus cholecystitis. The gallbladder appears adherent to the anterior abdominal wall.

Figure 2. (a) The metastasis was hypervascular on angiography (arrow) and treated with transarterial chemoembolisation (TACE). (b) CT image obtained during radiofrequency ablation (RFA) (5 days after TACE) showing good positioning of the RFA needle within the tumour, which was heavily stained with iodised oil.

increased risk related to these procedures is believed to be due to ascending bacterial colonisation of the biliary tree by enteric flora through an incompetent sphincter of Oddi or retrograde colonisation in the case of biliary-enteric anastomoses. A biliary tree colonised by enteric bacteria predisposes the ablated necrotic liver or tumour tissue to secondary infection, with locoregional ischaemia induced by TACE and RFA contributing to the risk.

Many operators consider the presence of a bacterial colonised biliary tree to be a contra-indication for TACE and RFA because of the significant increase in risk of septic complications. Several strategies, including prolonged antibiotics coverage and cleansing enemas, are being developed for this group of patients, with varying success [8]. The diagnosis of liver abscess formation following TACE and RFA is a challenge. An abscess can

Figure 3. (a) CT obtained 4 weeks after treatment showing interval development of an enhancing, complex and septated collection in segment 8. The patient had a fever, epigastric pain and leukocytosis, which is consistent with an abscess (arrow). (b) Retrospective review of the CT images obtained during radiofrequency ablation (RFA), showing disappearance of the gallstones and presence of air within the gallbladder (arrow). This was compared with Figure 1b, raising the suspicion of a cholecystocolic fistula, which was not recognised at the time of RFA.

Figure 4. Sagittal reconstruction of the CT dataset showing an enhancing fistula track (white arrow) extending from the gallbladder (arrowhead) to the transverse colon (C), confirming the presence of a cholecystocolic fistula.

form 1–4 weeks after TACE. If symptoms occur in the period immediately following TACE, it can be difficult to distinguish it from post-embolisation syndrome. Furthermore, the presence of air at the site of TACE and RFA is not an uncommon imaging finding and has been shown not to be specific for abscess formation [9]. Therefore, the diagnosis of abscess formation after TACE and RFA remains largely clinical. This diagnostic challenge forms the rationale for prolonged antibiotics therapy (4–6 weeks) in suspected or high-risk cases and underscores the need for vigilance in identifying patients at risk.

Spontaneous cholecysto-enteric fistula formation is a rare complication of choledocholithiasis. Cholecysto-duodenal fistula followed by cholecystocolic fistula are more common [10]. The fistulous communication is formed along the track of the gallstones as they erode through the inflamed gallbladder into the adjacent bowel.

Cholecysto-enteric fistula is a diagnostic challenge. It is often clinically silent and subtle on imaging [10]. As illustrated in our case, the patient was asymptomatic and the tell-tale signs (*e.g.* aerobilia) can be minimal. However, we believe a mature bilio-enteric fistula poses the same risk for abscess formation after TACE and RFA. The fistula serves as a conduit for ascending bacteria colonisation of the biliary tree in the same way as its iatrogenic

counterparts. Enteric flora is commonly isolated from post-TACE or RFA liver abscesses [1, 7]. Aspiration of the abscess in our case would have allowed further antimicrobial study, especially when the colonising bacteria is likely to be of colonic origin as opposed to small bowel origin in all previously reported cases. However, aspiration was not required as the patient responded well with conservative treatment.

Prior to TACE and RFA, relevant history of previous biliary interventions and imaging findings of aerobilia or biliary stents/drains allows easy identification of high-risk patients. In contrast, owing to its innocuous and silent nature, detection of a spontaneous bilio-enteric fistula requires rigorous review of pre-procedural imaging, particularly in patients with gallstone disease.

References

1. Kim W, Clark TW, Baum RA, Soulen MC. Risk factors for liver abscess formation after hepatic chemoembolization. *J Vasc Interv Radiol* 2001;12:965–8.
2. Elias D, Di Pietroantonio D, Gachot B, Menegon P, Hakime A, De Baere T. Liver abscess after radiofrequency ablation of tumors in patients with a biliary tract procedure. *Gastroenterol Clin Biol* 2006;30:823–7.
3. Hashimoto T, Mitani T, Nakamura H, Hori S, Kozuka T, Kobayashi Y, et al. Fatal septic complication of transcatheter chemoembolization for hepatocellular carcinoma. *Cardiovasc Intervent Radiol* 1993;16:325–7.
4. Farinati F, De Maria N, Marafin C, Herszényi L, Del Prato S, Rinaldi M, et al. Unresectable hepatocellular carcinoma in cirrhosis: survival, prognostic factors, and unexpected side effects after transcatheter arterial chemoembolization. *Dig Dis Sci* 1996;41:2332–9.
5. Chung JW, Park JH, Han JK, Choi BI, Han MC, Lee HS, et al. Hepatic tumors: predisposing factors for complications of transcatheter oily chemoembolization. *Radiology* 1996;198:33–40.
6. Livraghi T, Solbiati L, Meloni MF, Gazelle GS, Halpern EF, Goldberg SN. Treatment of focal liver tumors with percutaneous radiofrequency ablation: complications encountered in a multicenter study. *Radiology* 2003;226:441–51.
7. Shibata T, Yamamoto Y, Yamamoto N, Maetani Y, Shibata T, Ikai I, et al. Cholangitis and liver abscess after percutaneous ablation therapy for liver tumors: incidence and risk factors. *J Vasc Interv Radiol* 2003;14:1535–42.
8. Geschwind JF, Kaushik S, Ramsey DE, Choti MA, Fishman EK, Kobeiter H. Influence of a new prophylactic antibiotic therapy on the incidence of liver abscesses after chemoembolization treatment of liver tumors. *J Vasc Interv Radiol* 2002;13:1163–6.
9. Rhim H, Yoon KH, Lee JM, Cho Y, Cho JS, Kim SH, et al. Major complications after radio-frequency thermal ablation of hepatic tumors: spectrum of imaging findings. *Radiographics* 2003;23:123–34.
10. Costi R, Randone B, Violi V, Scatton O, Sarli L, Soubrane O, et al. Cholecystocolonic fistula: facts and myths. A review of the 231 published cases. *J Hepatobiliary Pancreat Surg* 2009; 16:8–18.