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Case Report

Laparoscopically Resected Solitary Metastasis of Hepatocellular Carcinoma to the Round Ligament

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Hepatocellular carcinoma (HCC) is known to metastasize to the lung, lymph node, and musculoskeletal regions; however, to our knowledge, metastasis to the round ligament of the liver has never been reported. In addition, because the conventional approach for surgical resection of intra-abdominal metastasis is open surgery, the laparoscopic approach has been rarely performed. This report presents the case of a 72-year-old Asian man who developed a tumor in the round ligament, a rare site for distant metastases, 2 years after complete resection of an HCC. As the tumor was solitary and noninvasive, laparoscopic resection was planned and safely performed. He has now been free of recurrence for more than 3 years. Good perioperative outcomes and a long-term disease-free survival were thus achieved with minimally invasive surgery. In addition to being the first report of this rare recurrence site, this is also the first reported case of resection of an extrahepatic metastasis by laparoscopic surgery alone. This report may encourage surgeons to select a laparoscopic approach when managing intra-abdominal metastases from an HCC.

Key words: Hepatocellular carcinoma – Laparoscopic surgery – Metastasis – Round ligament

With the increasing prolongation of survival of patients with hepatocellular carcinoma (HCC), the incidence of extrahepatic metastases seems to be increasing.[1] While the most frequent sites of metastases are lung, lymph node (LN) and bone, there are several reports of metastasis to other abdominal organs, muscles, and soft tissues.[2,3] We describe here the first reported case, to our knowledge, of metastasis to the round ligament that was successfully resected laparoscopically. In addition to this unusual recurrence site, a pure laparoscopic approach to excision of recurrent extrahepatic HCC has not previously been reported to our knowledge. We believe that this report may encourage surgeons to select a laparoscopic approach when managing intra-abdominal metastases from HCC.

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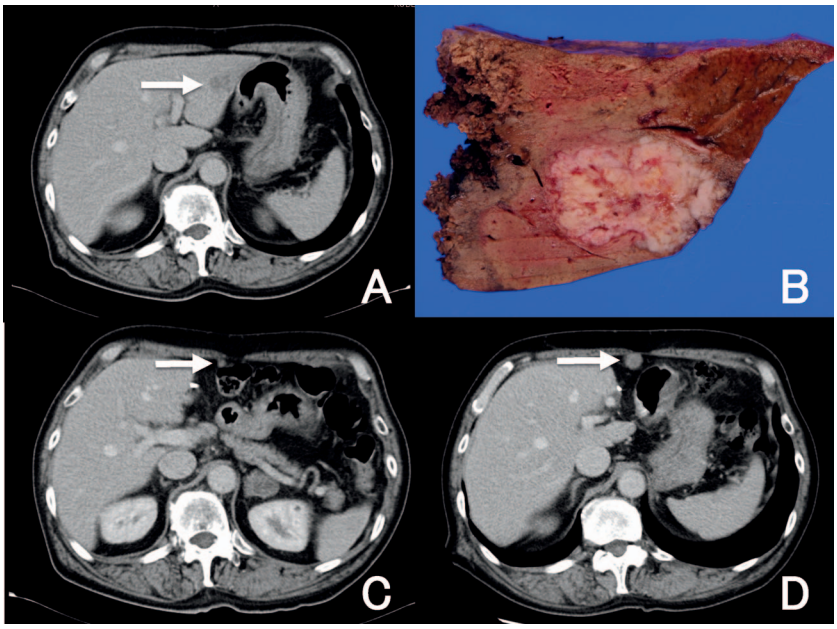

Fig. 1 (A, B) A 30 × 20 × 25-mm solitary HCC in segments 2 and 3 on CT scan image (arrow) and the specimen resected in the original operation. (C) A 5-mm mass beneath the rectus abdominis muscle on a CT scan image 12 months after the initial operation (arrow). (D) The mass had grown to 25 mm by 24 months after the initial operation (arrow).

Case Presentation

A 72-year-old Asian man presented with an enlarging nodule in the abdomen. Two years earlier, he had undergone laparoscopic left lateral segmentectomy for a 30 × 20 × 25-mm solitary HCC (Figs. 1A and 1B) and had been undergoing follow-up, including computed tomography (CT) scanning and assessment of serum tumor markers, at 6-month intervals. His original diagnosis was HCC T2N0M0 stage II according to the TNM classification. His serology for both hepatitis B and C viruses was negative. Although a series of examinations revealed no definite intrahepatic recurrence, a CT scan showed a 25-mm mass beneath the rectus abdominis muscle (Figs. 1C and 1D). The serum concentration of protein induced by vitamin K absence or antagonist (PIVKA)–II, a tumor marker, was slightly increased at 48 mAU/mL (normal range: <40 mAU/mL). A positron emission tomography scan showed hypermetabolic activity in the mass and no other abnormal uptake. A preliminary diagnosis of ectopic recurrence of HCC was made and exploratory laparoscopic surgery planned.

Laparoscopic surgery with 3 ports was performed under general anesthesia. Initially, minor adhesions between the omentum and peritoneum were identified, but the mass detected by scanning was not evident. After adhesiolysis, the target mass was found in the round ligament, covered within preperitoneal fat and successfully resected using laparoscopic coagulating shears. The mass did not invade the rectus abdominis muscle or protrude from the peritoneum. Intraoperative findings are summarized in Fig. 2. During the procedure, port site dissemination attributable to the previous operation was suspected; however, the mass was not precisely located at any of the previous port sites (Fig. 3A). A 25 × 20-mm round nodule was hidden within fat tissue in the resected specimen (Figs. 3B and 3C). Following tumor resection, laparoscopic mesh repair of a concomitant umbilical incisional hernia was performed. The total operative time was 53 minutes and there was no bleeding. The postoperative course was uneventful and the patient was discharged on postoperative day 7. Histological findings were consistent with moderately differentiated HCC and were similar to those of the original primary tumor (Fig. 3D). He has now been free of recurrence for more than 3 years.

Discussion

Extrahepatic metastases of HCC are occurring more frequently with prolongation of survival, the most frequent sites of metastases being lung, LN, and bone.[2] Metastases occur much less frequently to soft tissue than to lung or LN; the reported rate of soft tissue metastasis being 15%–25%.[3–6] The median survival time after diagnosis of extrahepatic metastases is reportedly about 5 months.[3] In the present case, the metastasis occurred in preperitoneal fat. In particular, metastasis to the round ligament is very uncommon, having not previously been reported.

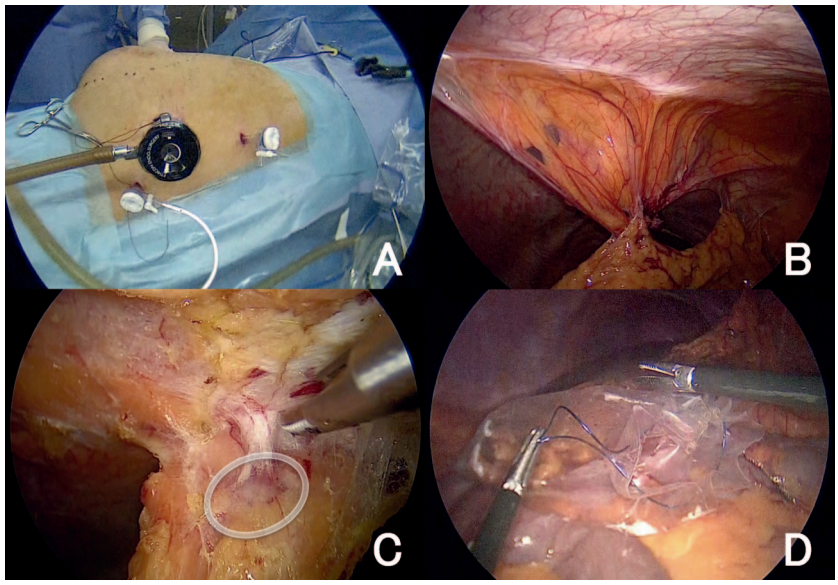

Fig. 2 Intraoperative findings. (A) The operation was performed with three ports. (B) The mass was found in the round ligament, covered with preperitoneal fat. (C) The mass (white circle) was resected using laparoscopic coagulating shears. No invasion of the rectus sheath was observed. (D) The mass was placed into a plastic bag and removed via the first port site.

This was not a peritoneal implant because no malignant cells were found on the surface of the resected peritoneum. Although port-site metastases after laparoscopic surgery for malignancies have been reported,[6] the site of the tumor did not coincide with the sites of previous ports in this case. Given that the metastatic nodule was along the round ligament, it may have originated from hematogenous spread of tumor cells through variceal collateral pathways. As for other malignancies, only 1 case report about breast cancer metastasis to the round ligament could be detected through the literature review.[7]

Although there is no consensus on treatment of extrahepatic metastasis after hepatic resection, there are several recent reports of good outcomes being achieved by aggressive surgical resection. Zhou *et al*[2] reported a small case series in which pulmonary metastasectomy in selected patients achieved a low perioperative mortality and longer 5-year overall survival rate than nonsurgical treatment.[2] Kobayashi *et al*[8] suggested that a single abdominal metachronous LN metastasis after hepatectomy should be resected in patients without uncontrollable intrahepatic or extrahepatic tumors with the expectation of

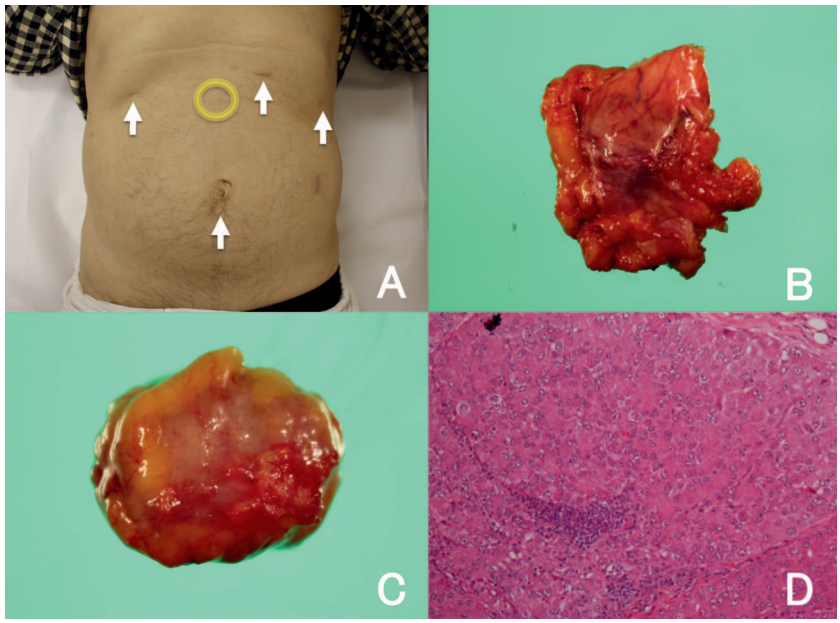

Fig. 3 Specimen. (A) The recurrence site (yellow circle) is far from the port sites of the initial operation (white arrows). (B) No invasion of the peritoneum was apparent macroscopically. (C) A 25 × 20-mm round nodule was found within fat tissue. (D) Microscopic examination revealed metastatic hepatocellular carcinoma that was consistent with the original tumor (hematoxylin and eosin staining, original magnification ×20).

long-term survival. Even resection of peritoneal or thoracoabdominal wall implants should be considered in selected patients, provided intrahepatic disease is absent or well-controlled.[9] As for larger studies, Chan *et al*[6] reviewed their experience of 140 patients with pathologically proven extrahepatic metastases of HCC and evaluated the outcomes of those who had undergone surgical resection for extrahepatic metastatic lesions. They concluded that surgical excision of extrahepatic metastases can provide survival benefit, especially regarding 1- and 3-year survival rates, in patients with 1 or 2 isolated extrahepatic metastases, provided the patient has a good performance status and hepatic functional reserve and well-controlled intrahepatic HCC.

The conventional surgical approach for intra-abdominal metastases is laparotomy.[8,10] Thus far, there have been few reports of laparoscopic resection of extrahepatic metastases of HCC, excluding pulmonary metastases; additionally, only 1 case of video-assisted thoracoscopic surgery for a solitary cardiophrenic lymph node metastasis has been reported.[11] The present report is the first to describe resection of an extrahepatic metastasis by laparoscopic surgery alone. Surgical resection was planned because the present case had a solitary metastasis and a laparoscopic approach was selected because no invasion of other organs had been identified by preoperative radiological assessment. As the experience of a successful laparoscopic resection of a 10-cm mesothelial cyst of the round ligament has been reported before, laparoscopic approach has been considered to be safe and less invasive.[12] As a result, complete resection was achieved with minimal scars. Therefore, this minimally invasive surgery can be effective and achieve a good perioperative outcome.

Conclusion

General surgeons should be aware of the possibility of this rare form of extrahepatic recurrence when a growing nodule is found in the preperitoneal fat during the follow-up of HCC. In such cases, laparoscopic surgery should be carefully considered. As in the present case, it can be a feasible means of performing curative surgery for a solitary and non-invasive intra-abdominal metastasis.

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