Right trisegmentectomy with thoracoabdominal approach after transarterial embolization for giant hepatic hemangioma

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INTRODUCTION
Liver hemangiomas are the most common benign tumors occurring in the liver, and are believed to be slowly growing hamartomatous lesions or true vascular neoplasms[1]. They occur more frequently in women than in men, and are believed to be related to levels of female hormones because their size increases during pregnancy[2]. In most cases, the hemangioma is small in size and asymptomatic, and thus follow-up is considered enough, without treatment. However, a giant hemangioma, which is defined as a hemangioma over 4 cm in diameter, can cause symptoms and require intervention. Preoperative diagnosis is possible using ultrasound or helical CT, and the indications for surgical resection are the presence of symptoms, a high risk of rupture, and being indistinguishable from malignancy. Here, we report the successful removal of a giant hemangioma (over 30 cm) from the right side of the liver through a J-shaped incision, using a thoracoabdominal approach, after transarterial embolization (TAE).

CASE REPORT
A 41-year-old female patient visited a secondary hospital for abdominal girth (which had not decreased since delivery a year ago), intermittent abdominal pain, and indigestion, as the chief complaints. Ultrasonography, performed during the visit, detected huge hyperechoic lesions, and under the diagnosis of giant hemangioma, she was recommended for surgery and transferred to the present hospital. During a physical examination upon admission, an abdominal mass was palpated from the right upper quadrant to the pelvic cavity. Preoperative serum biochemical studies revealed no abnormal findings, except for an increase of total bilirubin to 2.5 (normal < 1.20 mg/dL). Using helical CT, a non-contrast image showed a homogenous hypodense lesion...
giant hemangioma, but recurrence is common because long-term results have been poor other treatment methods have been reported but their surgical resection is primarily recommended. Various of a giant hemangioma accompanied with symptoms, but direct bilirubin was normal, which findings did pain and dyspepsia. Total bilirubin increased slightly only non-specific symptoms such as mild abdominal obstruction obstructive jaundice, biliary colic, and gastric outlet obstruction of the mass effect, it might show symptoms such as Merritt syndrome, and spontaneous rupture. Out infarction (and consequent stomachache), Kasabach- it can cause congestion, bleeding, thrombosis and preoperatively. As a hemangioma increases in size, diagnosis, therefore most cases can be diagnosed Hemangiomas show specific features in imaging diagnosis, therefore most cases can be diagnosed preoperatively. As a hemangioma increases in size, it can cause congestion, bleeding, thrombosis and infarction (and consequent stomachache), Kasabach-Merritt syndrome, and spontaneous rupture. Out of the mass effect, it might show symptoms such as obstructive jaundice, biliary colic, and gastric outlet obstruction. In our case, the patient complained of only non-specific symptoms such as mild abdominal pain and dyspepsia. Total bilirubin increased slightly but direct bilirubin was normal, which findings did not indicate obstructive jaundice. For the treatment of a giant hemangioma accompanied with symptoms, surgical resection is primarily recommended. Various other treatment methods have been reported but their long-term results have been poor. TAE is suggested as an excellent therapy for easing the symptoms of a giant hemangioma, but recurrence is common because of vascular recanalization. However, there is a report that TAE for a giant hemangioma, performed prior to surgical resection, facilitated the mobilization of the right river by shrinking the hemangioma and, consequently, decreased intraoperative hemorrhage. The authors also performed TAE one day before the operation, and experienced a decrease in the size of hemangioma, as in the previous report. Various complications can occur after embolization and they could postpone the operation and result in the loss of an opportunity for surgery due to vascular recanalization. Accordingly, it is desirable to perform the operation soon after embolization. Thus, the present authors performed the laparotomy within 24 h, and observed the shrinkage of hemangioma during the operation, as in the previous report. This helped minimize bleeding from the hepatic raw surface during the mobilization of the liver.

Preoperative TAE can decrease the risk of bleeding during resection of a hemangioma, but in the liver resection of a 30 cm large giant hemangioma, conventional approaches might cause difficulties. Lai et al. reported successful resection of a giant hemangioma using the anterior approach, but they recommended that it should be done by skillful and experienced surgeons because it can cause excessive bleeding from the middle hepatic vein during parenchymal resection. The thoracoabdominal approach is advantageous in that it provides a sufficiently large field of view in a partial heptectomy or the resection of Couinaud’s Segment 7 and 8, and it has been reported as a useful method for right side heptectomy by Japanese and European researchers since the 1990s. Compared to conventional approaches, the thoracoabdominal approach is just as safe as a right-sided heptectomy, but it seems not to be used frequently because it can cause excessive bleeding from the middle hepatic vein during parenchymal resection. The thoracoabdominal approach and intraoperative blood loss was 250 mL. The resected tumor was 32.0 cm × 26.5 cm × 8.0 cm in size and 2300 g in weight. Upon histological examination, it was diagnosed as a cavernous-type hemangioma. The patient’s postoperative course was stable. The chest tube was removed on the fifth day and the patient was discharged on the 10th day. Follow-up has been continued for eight months without any particular findings.

**DISCUSSION**

Hemangiomas show specific features in imaging diagnosis, therefore most cases can be diagnosed preoperatively. As a hemangioma increases in size, it can cause congestion, bleeding, thrombosis and infarction (and consequent stomachache), Kasabach-Merritt syndrome, and spontaneous rupture. Out of the mass effect, it might show symptoms such as obstructive jaundice, biliary colic, and gastric outlet obstruction. In our case, the patient complained of only non-specific symptoms such as mild abdominal pain and dyspepsia. Total bilirubin increased slightly but direct bilirubin was normal, which findings did not indicate obstructive jaundice. For the treatment of a giant hemangioma accompanied with symptoms, surgical resection is primarily recommended. Various other treatment methods have been reported but their long-term results have been poor. TAE is suggested as an excellent therapy for easing the symptoms of a giant hemangioma, but recurrence is common because of vascular recanalization. However, there is a report that TAE for a giant hemangioma, performed prior to surgical resection, facilitated the mobilization of the right river by shrinking the hemangioma and, consequently, decreased intraoperative hemorrhage. The authors also performed TAE one day before the operation, and experienced a decrease in the size of hemangioma, as in the previous report. Various complications can occur after embolization and they could postpone the operation and result in the loss of an opportunity for surgery due to vascular recanalization. Accordingly, it is desirable to perform the operation soon after embolization. Thus, the present authors performed the laparotomy within 24 h, and observed the shrinkage of hemangioma during the operation, as in the previous report. This helped minimize bleeding from the hepatic raw surface during the mobilization of the liver.

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is obviously a useful method for the safe resection of the right triangular ligament and mobilization of the right liver from the inferior vena cava. Accordingly, when a right-side hepatectomy is performed for a huge mass, such as a giant hemangioma in the right liver, a J-shaped incision using a thoracoabdominal approach is considered a safe and useful method. The addition of “sternotomy” to this incision might be considered of clinical value if the tumor is even larger than in this case.

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