Hepatic adenoma during pregnancy and anesthetic management

J. Bernstein, Y. Spitzer, S. Reddy, A. Mazur
Montefiore Medical Center, Jack D Weiler Hospital, Department of Obstetric Anesthesiology, Bronx, USA

ABSTRACT
We report the case of a 24-year-old woman with a large hepatic adenoma diagnosed in the third trimester of pregnancy. The adenoma was at risk of rupture. She underwent scheduled preterm cesarean delivery under combined spinal-epidural anesthesia, followed by transarterial embolization on post-partum day six. Definitive resection of the adenoma took place two months postpartum.

Keywords: Hepatic adenoma in pregnancy; Liver mass in pregnancy; Liver adenoma in pregnancy; Hepatic rupture in pregnancy; Liver disease and pregnancy

Introduction

Hepatic adenomas in pregnancy are described in the literature in small retrospective reviews, with 26 cases reported in pregnancy but none published in the anesthetic literature. Sixteen patients presented with hepatic rupture, frequently with a delay in diagnosis: maternal and fetal mortality were 44% and 38% respectively.[1] An aggressive approach, with hepatic resection of lesions greater than 5 cm, has been recommended.[2] In 2011, the multicenter prospective Pregnancy And Liver Adenoma Management (PALM) study was performed to generate diagnostic and management algorithms, the results of which are pending.[3–5]

This case report describes the successful management of a large hepatic adenoma discovered during the third trimester. We highlight preparation for resuscitation in case of hepatic rupture, timing and mode of obstetric and hepatobiliary interventions, and anesthesia for cesarean delivery in a patient with an hepatic adenoma.

Case report

A 24-year-old woman (body weight 74 kg, body mass index 28.9 kg/m^2), gravida two para zero and at 32 weeks-of-gestation, was admitted for evaluation of three weeks' recurrent, intermittent and severe epigastric pain despite a gluten-free diet. She had a past history of celiac disease and 10-year oral contraceptive use. Her examination was unremarkable, and she had a Mallampati I view of the oral cavity. Magnetic resonance imaging (MRI) revealed a 16.1 × 10.1 × 9.5 cm vascularized, subcapsular hepatic adenoma, with both central necrosis and recent hemorrhage (Fig. 1).

The patient was admitted for monitoring, maternal and fetal optimization, and multidisciplinary delivery planning. Due to concern about possible hepatic rupture, a cesarean delivery at 33 weeks-of-gestation was planned. To reduce the risk of rupture and tumor load, hepatic embolization was planned six days after stabilization of her postpartum course. Definitive treatment of the tumor was deferred beyond four weeks postpartum, to allow for tumor regression with hormone deprivation; return to baseline maternal physiology and a reduced risk of aspiration, thromboembolism and cardiac output; and an interval between surgical insults. In the event of hepatic rupture, emergency cesarean delivery under general anesthesia was planned, using a vertical skin incision and with facilities for massive transfusion, embolization, and hepatic intervention available.

Scheduled cesarean delivery took place at 33 weeks-of-gestation, with hepatic surgery and interventional radiology staff on standby. The patient's coagulation profile was normal and, after siting large bore intravenous access, a combined spinal-epidural (CSE) anesthetic was performed at the level of the L2–3 intervertebral space, using intrathecal hyperbaric bupivacaine 12.75 mg, fentanyl 10 μg and preservative-free morphine 150 μg. This resulted in a dense block to T4. Blood pressure was maintained within 20% of baseline with 2 L of intravenous crystalloid via pressurized infusion and 200 μg phenylephrine in incremental doses of

Accepted January 2019
Correspondence to: A. Mazur. Montefiore Medical Center, Jack D Weiler Hospital, Department of Obstetric Anesthesiology, Bronx, USA
E-mail address: alexandra.mazur@gmail.com

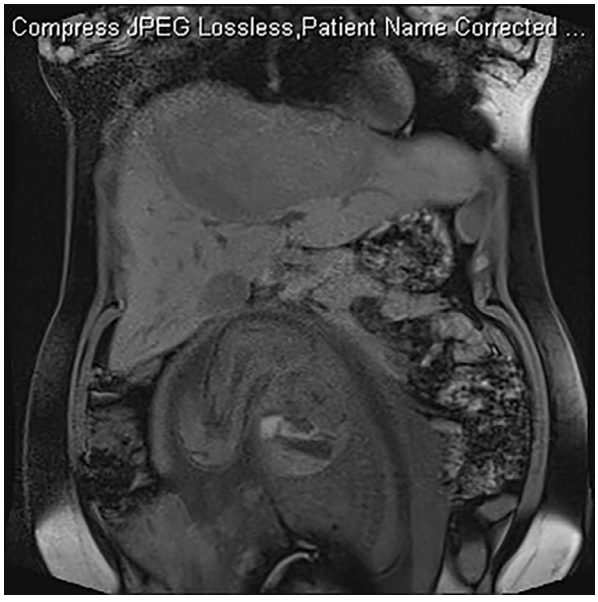

Fig. 1 MRI without contrast obtained at outside hospital at thirty two weeks gestation showing a large 16.1 × 10.1 × 9.5 cm liver mass

50 μg. A phenylephrine infusion was available but not used prophylactically to avoid hypertension.

Pfannenstiel and low transverse uterine incisions were made, and the hysterotomy was extended to reduce the need for abdominal pressure during delivery. Due to difficulty delivering the fetal head, a second operator gave fundal pressure, while a third operator assisted externally to avoid compression of the upper abdomen. The neonate was delivered with an Apgar score of 4 and 9 at 1 and 5 minutes, respectively. An intravenous oxytocin infusion of 30 U in 500 mL of lactated Ringer's solution was infused over one hour. Intravenous ondansetron 4 mg and metoclopramide 10 mg were given for prophylaxis of nausea. Estimated blood loss was 800 mL and quantitative blood loss was 659 mL. Total crystalloid administration was 3000 mL and urine output was 0.8 mL/kg/min. Facilities for conversion to general anesthesia, activation of a massive transfusion protocol, additional vascular access and arterial monitoring were immediately available.

Postoperatively, she was monitored in the recovery room for six hours. The epidural catheter was removed to permit evaluation of right upper quadrant pain. Pain control was achieved in the first 24 h with two doses of intravenous ketorolac 30 mg and four doses of oral oxycodone/acetaminophen 5 mg/325 mg (two tablets), in addition to the previously administered intrathecal morphine. Observations were unremarkable, and she was sent to the post-partum ward, where six-hourly monitoring of vital signs continued.

On post-partum day two, repeat MRI with contrast showed the adenoma was slightly smaller. On post-partum day six, she underwent transarterial embolization of the hepatic lesion (Fig. 2). She was discharged on post-partum day nine with hepatobiliary follow-up. Four weeks post-partum, she was readmitted with fever and found to have a post-necrotic intrahepatic hematoma, which was drained. Two months post-partum, she continued to be symptomatic with epigastric pain, and repeat imaging showed a large portion of residual adenoma for which she underwent partial laparoscopic hepatectomy (Fig. 3).

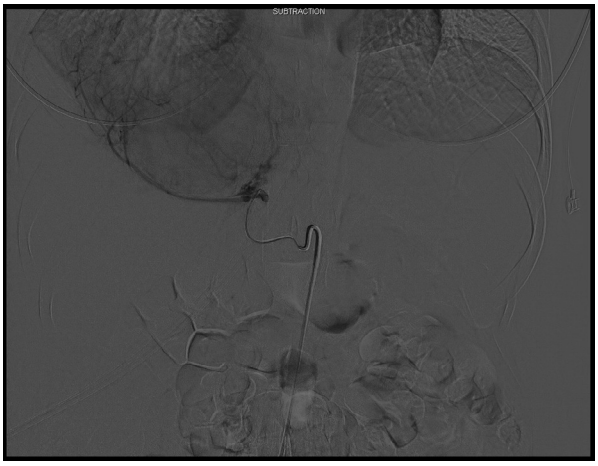

Fig. 2 Interventional radiologic bland transarterial embolization of hepatic adenoma on postpartum day six

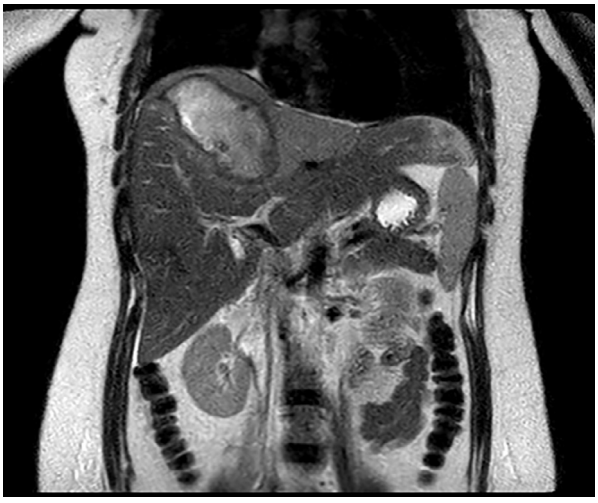

Fig. 3 MRI with contrast demonstrating 40% residual viable adenoma and 60% fluid-filled necrosis at two months postpartum

Discussion

Hepatic adenomas are often found incidentally by ultrasonography during pregnancy and are difficult to distinguish from gestational or abdominothoracic pathology by symptomatology. Gestation alters the nature of the lesions and increases the risk of interventions.

Abdominal pain is the presenting symptom, and the potential for misdiagnosis of adenoma as other abdominothoracic pathologies, including celiac flare or pregnancy-related complications such as placental abruption, makes correct diagnosis challenging.[4,6] The lesions usually grow in pregnancy, resulting in greater non-specific compressive symptoms, and localization is difficult due to decreased response to peritoneal irritation and altered referred pain perception from the stretched gravid abdominal wall.[7] The growth is due to the increased estrogen level, a hyperdynamic circulation and increased hepatic vascularity, such that the risk of hepatic rupture increases as pregnancy progresses.[3,8] Pregnancy, lesion size >3.5 cm, lesional arteries, left lateral lobe location and exophytic growth are risk factors for spontaneous bleeding, all of which were present in our patient.[8]

Hepatocellular carcinoma cannot be excluded on imaging and the risk of malignant transformation from hepatic adenoma to hepatocellular carcinoma is 4.2%. In this patient, the diagnosis was suggested by imaging and the history of prolonged contraceptive use, in the absence of risk factors for malignancy such as liver disease, hepatitis and male sex.[9,10] Biopsy is not usually considered because pregnancy increases the risk of hemorrhage it may cause seeding, and it yields false negative results.[11]

To balance optimal maternal and fetal outcome, management must take into account the risk of rupture, the timing of delivery and hepatic interventions. The increased risk of preterm labor and interference of the fetus with abdominal surgery in the third trimester means the optimal time to resect enlarging adenomas or those ≥5 cm is in the second trimester.[6,12] Patients with lesions <5 cm may be managed expectantly, and those with larger lesions presenting in the second trimester may undergo embolization or resection.[13,11] There are few data about the intra-operative management of liver resection during pregnancy, including vascular clamping and induced hypotension to reduce blood loss, although they are presumed harmful to the fetus.[14] Our patient had a large adenoma diagnosed in the third trimester, making her a poor candidate for intra-abdominal surgery and putting her at risk of rupture and disease progression if pregnancy continued. Hepatic management proceeded in a semi-urgent manner, allowing more diagnostic and therapeutic options postpartum, including MRI and transarterial embolization with contrast, and laparoscopic hepatic resection.

The multidisciplinary team generated plans based on the risk of rupture. Anesthetic management was guided by preoperative evaluation of coagulation status and the risk of hemorrhage. A CSE technique allowed for an awake, comfortable patient, decreased drug transfer to the fetus, and avoidance of airway instrumentation. However, neuraxial techniques may provide inadequate anesthesia or contribute to hypoperfusion if emergency hepatic resection is needed in the event of hepatic rupture. These disadvantages were mitigated by the immediate availability of general anesthesia in a patient with a reassuring airway.

Intraoperative management included plans for massive transfusion. The CSE block provided dense analgesia which prevented Valsalva maneuvers, an anticipated risk factor for tumor rupture based on the physiologic effect of increased systemic vascular resistance on liver blood flow. Narrow blood pressure control within 20% of baseline helped prevent nausea from hypotension and the potentially deleterious effects of hypertension. Oxytocin may cause vasodilation, reflex tachycardia and increased cardiac output during uterine involution, and its use was carefully controlled.

One quarter of hepatic adenomas rupture, but in patients with adenomas larger than 5 cm the risk increases to 59%. The risk increases as pregnancy progresses, secondary to the expanded blood volume and estrogenic effects of increasing tumor size and vascularity.[15,16] Hepatic rupture is diagnosed during cesarean delivery by intraperitoneal blood in the setting of hemodynamic instability. It may be suggested preoperatively by acute pain, peritonitis, hypovolemia, thrombocytopenia, prolonged prothrombin time and hypofibrinogenemia, and may be demonstrated by focused assessment ultrasonography. In such circumstances, the fetus should be delivered rapidly and the liver repaired under general anesthesia.[9,15]

The greatest risk period for rupture is postpartum, due to the increased cardiac output from autotransfusion and the rapid fall in estrogen levels that may lead to tumor degeneration and hemorrhage. In one case series, one third of reported ruptures occurred postpartum and half of the postpartum cases presented with rupture, mandating very close post-partum follow-up in non-resected cases.[2] Frequent monitoring of vital signs, hemoglobin concentration, and abdominal symptoms unmasked by epidural analgesia, was essential.

We report the case of a pregnant patient who presented in the third trimester with a large hepatic adenoma. She was managed with early cesarean delivery under neuraxial anesthesia, followed by semi-urgent hepatic therapy. Careful blood pressure control, monitoring, nausea and vomiting prophylaxis, dense neuraxial blockade to avoid Valsalva manouvers and preparedness, led to a successful outcome.

References

1. Broker M, Ijzermans J, van Aalten S, et al. The management of pregnancy in women with hepatocellular adenoma: a plea for an individualized approach. *Int J Hepatol* 2012;**2012**:725–35.
2. Milburn J, Black M, Ahmed I, et al. Diagnosis and management of liver masses in pregnancy. *Obstet Gynaecologist* 2016;**18**:43–51.

3. Cobey F, Salem R. A review of liver masses in pregnancy and a proposed algorithm for their diagnosis and management. *Am J Surg* 2004;**187**:181–91.
4. van Aalten SM, Broker MEE, Busschbach JJV, et al. Pregnancy and liver adenoma management: PALM-study. *BMC Gastroenterol* 2012;**12**:82.
5. Blanc JF, Frulio N, Chiche L, et al. Hepatocellular adenoma management: call for shared guidelines and multidisciplinary approach. *Clin Res Hepatol Gastroenterol* 2015;**39**:180–7.
6. Kort B, Katz VL, Watson W. The effect of non-obstetric operation during pregnancy. *Surg Gynecol Obstet* 1993;**177**:371–6.
7. Parangi S, Levine D, Henry A, Isakovich N, Pories S. Surgical gastrointestinal disorders during pregnancy. *Am J Surg* 2007;**193**:223–32.
8. Vijay A, Elaffandi A, Khalaf H. Hepatocellular adenoma: an update. *World J Hepatol* 2015;**7**:2603–9.
9. Chappell M. Hepatic disorders severely affected by pregnancy: medical and obstetric management. *Med Clin North Am* 2008;**92**:739–60.
10. Thomeer MG, Broker M, Verheij J, et al. Hepatocellular adenoma: when and how to treat? Update of current evidence. *Ther Advance Gastroenterol* 2016;**9**:898–912.
11. Noels J, van Aalten SM, van der Windt D, et al. Management of hepatocellular adenoma during pregnancy. *J Hepatol* 2011;**54**:533–8.
12. Visser BC, Glasgow RE, Mulvihill K, Mulvihill SJ. Safety and timing of non-obstetric abdominal surgery in pregnancy. *Digestive Surg* 2001;**18**:409–17.
13. Paech MJ, Scott K. Liver and renal disease. In: Gambling D, ed. Obstetric Anesthesia and Uncommon Disorders. 2nd ed. Cambridge University Press; 2008:255–6.
14. Reid RW, Chestnut DH. Liver disease. In: Chestnut DH, ed. Obstetric Anesthesia Principles and Practice. 5th ed. Philadelphia: Elsevier Saunders; 2014:1068–80.
15. Paech M. Renal and Hepatic disorders in pregnancy. In: Suresh MS, ed. Anesthesia for Obstetrics. 5th ed. Lippincott Williams & Wilkins; 2013:606–25.
16. Wilson CH, Manas DM, French JJ. Laparoscopic liver resection for hepatic adenoma in pregnancy. *J Clin Gastroenterol* 2011;**45**:838–43.

0959-289X/$ - see front matter
https://doi.org/10.1016/j.ijoa.2019.01.007