

CASE REPORT

Ruptured subcapsular hematoma of the liver due to pre-eclampsia presenting as interstitial pregnancy and the role of intra-abdominal packing

NC Ngene, N Amin¹, J Moodley²

Department of Obstetrics and Gynaecology, Edendale Hospital Pietermaritzburg, ¹School of Education, ²Women's Health and HIV Research Group, University of KwaZulu-Natal, Durban, South Africa

Abstract

Ruptured subcapsular hematoma of the liver (RSHL) can mimic ruptured interstitial pregnancy because each of these conditions occasionally presents at the same gestational period and both do manifest hemodynamic instability. The similarities between the two conditions pose a diagnostic challenge, especially in an unbooked patient. We report a case of an unbooked primigravida, at 21 weeks of gestation, who arrived at a regional hospital with evidence of intra-abdominal bleeding and hypovolemic shock. She was diagnosed as potentially having a ruptured interstitial pregnancy. During the ensuing emergency laparotomy, RSHL was discovered, the area around the ruptured liver capsule was packed with large abdominal swabs, and the patient recovered. This case report illustrates the need to consider RSHL in patients presenting with features of ruptured interstitial pregnancy, as this will assist in the planning of intraoperative care. We also describe abdominal packing and highlight the need for this essential surgical intervention to be taught to doctors practising in low-resource settings.

Key words: Abdominal packing, HELLP syndrome, interstitial pregnancy, liver hematoma, pre-eclampsia, surgical training

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Introduction

Ruptured subcapsular hematoma of the liver (RSHL) in pregnancy is uncommon and occurs in 1:45,000 to 1:225,000 deliveries.^[1] It usually develops as a complication of the hemolysis, elevated liver enzymes, and low platelet (HELLP) syndrome, associated with pre-eclampsia. Patients with RSHL present with life-threatening intra-abdominal hemorrhage, leading to hypotension. This clinical picture mimics a ruptured interstitial pregnancy that also results in hypotension, and may present after the first trimester (even at 30 weeks' gestation),^[2] which is also the same gestational period when the clinical signs of pre-eclampsia develop. We report the difficulty in preoperative diagnosis of RSHL, presenting as a ruptured interstitial pregnancy and the subsequent interventions and outcomes. In this patient, abdominal packing was used to treat the hemorrhage from a ruptured liver. The case highlights the need to teach this technique during surgical training.

Address for correspondence:

Dr. NC Ngene,
P.O. Box 101894, Scottsville, Pietermaritzburg, 3209, South Africa.
E-mail: ngenenec@gmail.com

Case Report

An unbooked, 25-year-old primigravida, at 21 weeks' gestation, self-referred herself and presented to the Obstetric Emergency Unit, with a one-day history of spontaneous, severe, lower abdominal pain of gradual onset that was associated with dizziness. The patient had not initiated antenatal care because she felt that her pregnancy was at an early stage. There were no urinary symptoms, changes in bowel habits, trauma, vaginal discharge or bleeding, and no other contributory history was identified. A physical examination showed severe pallor, blood pressure of 95/62 mmHg, a distended and peritonitic abdomen, an abdominopelvic mass of 20 weeks with a smooth contour,

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and a closed cervical os, with cervical excitation tenderness. The bedside investigation revealed a hemoglobin count of 6.7 g/dL, a positive pregnancy test, and a proteinuria of 2+.

A provisional diagnosis of a ruptured interstitial pregnancy was made. The patient collapsed and lost consciousness while trying to sit on the examination couch from a supine position. On account of hypovolemic shock and a peritonitic abdomen, she was immediately prepared for an emergency laparotomy. The following were found intraoperatively: Massive hemoperitoneum and bleeding from the RSHL on the inferior surface of the right lobe of the liver. Intraoperatively, the general surgeons were asked to assist in the laparotomy, and the area around the RSHL was packed with abdominal swabs to control the bleeding. The abdomen was closed temporarily using the Bogota bag^[3] (made from a 3L normal saline bag) and negative pressure wound therapy was also applied. The suction tubing for the negative pressure wound therapy was placed on top of the Bogota bag as prescribed by the National Institute for Health and Care Excellence.^[4] The patient was transfused with red cell concentrate, provided with inotropic support, and subsequently transferred to the Intensive Care Unit (ICU).

The baseline laboratory investigation indicated the HELLP syndrome, with a platelet count of $73 \times 10^9/L$, total bilirubin of 26 $\mu\text{mol/L}$, alanine aminotransferase of 1139 U/L, aspartate aminotransferase of 1193 U/L, and lactate dehydrogenase of 5396 U/L. The investigation also showed the following: White cell count of $4.13 \times 10^9/L$, hemoglobin of 6.6 g/dl, fibrinogen of 1.7 g/L, international normalized ratio of 1.6, and an activated, partial thromboplastin time twice that of the control.

In the ICU, she had multidisciplinary care, including correction of coagulopathy, mechanical ventilation, induced abortion (a 420 g abortus was expelled), and treatment for hypertension, which manifested following resuscitation. The abortus and placenta were anatomically normal. The patient received a broad spectrum antibiotics cover. She had a re-laparotomy to remove the abdominal pack 72 hours after the initial operation. During re-laparotomy, there was minimal hemoperitoneum and no intra-abdominal bleeding. The patient subsequently developed intra-abdominal sepsis resulting in two additional re-laparotomies to wash out the serosanguinous fluid from where *Pseudomonas*, sensitive to ceftazidime, was isolated. The patient improved with antibiotic therapy and after staying in the ICU for four weeks, was transferred to a High Care Dependent Unit where she had normal liver imaging and counseling, and was discharged in a stable condition.

Discussion

Even as the pathogenesis of the HELLP syndrome is not fully understood,^[5] pre-eclamptics who develop liver hematoma

are found to have fibrin deposits in the hepatic vasculature. This leads to obstruction of the liver sinusoids, hepatic ischemia, hemorrhage, and on rare occasions, rupture of the liver capsule,^[5,6] which explains the clinical presentation.

The mean gestational age during which pre-eclamptic patients present with liver hematoma/rupture is 33.2 weeks (standard deviation 4.9).^[6] The diagnostic difficulty encountered in the case reported was partly due to the presentation of the RSHL at 21 weeks. However, the delayed diagnosis of her medical disorders was possibly avoidable if she had booked for antenatal care, as the features of pre-eclampsia could have been detected and a pelvic ultrasound used to exclude an ectopic pregnancy. She would also have been offered supplemental calcium to prevent pre-eclampsia, as stipulated in the South African maternity care guidelines.^[7] A lesson to learn from her clinical presentation is that RSHL should be considered in any patient whose pregnancy is approximately = or > 20 weeks, where a provisional diagnosis of ruptured interstitial pregnancy is made, prior to imaging. In the case presented, the sudden collapse with loss of consciousness and hypovolemic shock did not favor an abdominal ultrasound being performed prior to the initial laparotomy. A diagnosis of an advanced extra-uterine pregnancy was less favored because no fetal parts were easily felt on abdominal palpation.^[8] Understandably, palpation of the fetal parts in a rigid peritonitic abdomen could be challenging. Except for primiparity, the patient had no other risk factors for pre-eclampsia.

Given that clinical history can only predict 41% of pregnant women who will develop pre-eclampsia,^[9] it is possible that in the future, women at risk of pre-eclampsia can be identified during routine clinical practice in the early stages of pregnancy. This can be done by using a combination of variables, such as uterine artery Doppler, pregnancy associated plasma protein-A, and the like,^[9,10] and women at increased risk can be started on prophylactic aspirin.

Hepatic disorders such as aneurysm, adenoma, and infection are some risk factors that may predispose a pre-eclamptic patient to RSHL during the second trimester.^[11] None of these risk factors was detected in the patient. Although the patient was unbooked, she denied having symptoms suggestive of any of the risk factors that would have required further evaluation before her hospital admission. Moreover, the subsequent computerized tomography scan of the abdomen, prior to hospital discharge, was normal. The only risk factor for RSHL identified in the patient was pre-eclampsia/HELLP syndrome.

Even as liver transplantation and selective arterial embolization to treat RSHL has recently been associated with reduced maternal mortality,^[6] they are not always

available and/or appropriate for every clinical setting. This implies that another treatment option, such as, abdominal packing, as performed on our patient, is a skill

Table 1: Operative technique of intra-abdominopelvic packing for uncontrollable hemorrhage

The following should be undertaken

- Scoop-out any hemoperitoneum to aid visualization of the surgical field
- Perform the surgical intervention needed for the patient's disease condition
- Aim to achieve hemostasis using surgical techniques such as: Application of transient local pressure, clamping of bleeding vessels, coagulation of bleeding vessels, ligation of bleeding vessels, suturing of bleeding points, application of a transient warm pack, and so on
- Inform the anesthetist if there is increased blood loss
- Call for help in time if you require assistance
- Administer medications that improve hemostasis, if the bleeding is not amenable to simple surgical techniques. Such medication could include: Tranexamic acid, fresh dried plasma, and so on
- Commence correction of any ensuing coagulopathy, anemia, or acid-base imbalance
- Insert a nasogastric tube to decongest the stomach and perform intra-abdominal packing with abdominal swabs if bleeding is still not amenable to the definitive measures readily available, thus
 - Insert abdominal swab (s) tightly to abut on the bleeding surfaces in order to create a tamponade
 - For a bleeding lacerated liver: Bimanually compress the liver to obliterate the laceration; maintain this compression while an atraumatic vascular clamp or a tourniquet is introduced through the Epiploic foramen of Winslow to occlude the hepatoduodenal ligament/porta hepatis (Pringle's maneuver) for a duration of 20 minutes; release liver compression and pack the anterior and posterior perihepatic surfaces (do not compress or pack over the inferior vena cava to avoid decreasing venous return to the heart); release the Pringle's maneuver and pack any other perihepatic surfaces that bleed
 - Count and note the positions of the abdominal swabs used (important for ensuring removal of all swabs later)
 - Perform temporary abdominal wall closure

Table 2: Postoperative care following intra-abdominopelvic packing for uncontrollable hemorrhage

The following should be undertaken

- Admit patient to a High Care Dependent Unit or Intensive Care Unit. Alternatively transfer the patient where expertise exists for further care
- Monitor the intra-abdominal pressure (to avoid compartment syndrome), hemoglobin, and vital signs
- Correct coagulopathy, electrolyte imbalance, and anemia, and restore other physiological imbalances
- Counsel the patient and/or patient's guardian about the intraoperative events and take consent for re-laparotomy
- Perform a re-laparotomy in 48 to 72 hours, to remove the abdominal swabs. Perform the re-laparotomy earlier if there is evidence of impending compartment syndrome, intra-abdominal hemorrhage or sepsis
- Re-pack the abdomen if uncontrollable bleeding recurs during the removal of the swabs
- Perform permanent abdominal wall closure after removal of the abdominal swabs, in the absence of plans for a scheduled re-laparotomy

that should be taught, to enable the doctors who perform laparotomies for acute abdomen to acquire this expertise, especially in resource-limited settings. Abdominal/pelvic packing for hemorrhage is an intervention used when an intra-abdominal/pelvic bleeding is not amenable to other readily available treatment options. The swabs used for abdominal packing create a tamponade effect. Also, the mechanical distortion of the vascular lumen caused by the swabs can trigger clot formation at the bleeding points, thereby, achieving hemostasis. A simplified description of the technique of abdominal packing is outlined in Tables 1 and 2. As reported by Lin and colleagues^[12] we too do not recommend the routine dissection of perihepatic ligaments when packing a bleeding liver. At the time of such a damage-control surgery, the abdomen should be closed temporarily and a re-laparotomy for possible removal of the abdominal packs performed after correction of the physiological imbalance. It has been previously recommended that such re-laparotomy should be performed 6-72 hours after the initial laparotomy.^[13] In a resource-limited setting, there may be delays for the re-laparotomy, due to: The patient's guardian having to source funds to pay the hospital bill; inadequate laboratory services to monitor the biochemical and hematological indices; and lack of ambulance services, to mention a few. In view of these possible challenges, a re-laparotomy should at least be performed 48-72 hours after the initial laparotomy, unless clinical and logistical situations permit earlier re-operation. Nonetheless, the use of an institutional protocol to guide local practices is recommended.

Conclusion

Intra-abdominal packing is a useful technique for the management of RSHL.

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