

Splenic injury in pregnancy requiring urgent splenectomy: A rare surgical emergency



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Abstract

Objective: The spleen is the most frequently injured organ in blunt abdominal trauma (BAT). We present an interesting case of traumatic splenic rupture in pregnancy managed successfully by emergency splenectomy in a low-resource setting.

Case Presentation: A 27-year old multiparous woman at 23 weeks gestational age presented to the emergency department with a history of BAT following a road traffic accident (RTA). This study was conducted in the Department of Surgery, General Surgery Unit, College of Medicine, Alex Ekwueme Federal University Teaching Hospital, Abakaliki (AEFUTHA), Ebonyi State, Southeast Nigeria, in 2023. A vehicle strayed and hit her from the left side of the abdomen while she was sitting down. She suddenly developed abdominal pain, bruises on the left upper abdomen, and progressive abdominal distension. The abdominal ultrasound report showed a deep trabecular laceration and massive hemoperitoneum. The fetus was viable from obstetric and ultrasound assessments. The patient was hemodynamically unstable and was subsequently prepared for emergency exploratory laparotomy. Intraoperatively, incomplete hilar avulsion injury and multiple parenchymal lacerations of the spleen were noted. An accessory spleen without injury was also noted. Splenectomy with preservation of the accessory spleen was performed. Postoperatively, the fetus remained viable, and the patient was hemodynamically stable. The mother had no morbidities other than paralytic ileus and fever, and both were amenable to conservative management.

Conclusion: Emergency splenectomy is a life-saving procedure in hemodynamically unstable patients with splenic trauma, even in pregnancy.

Keywords: Abdomen, Emergency laparotomy, Pregnancy, Trauma, Splenectomy

Introduction

Trauma is the most common cause of death in the first four decades of life and accounts for 16% of the global burden of disease and 10% of mortality (1-3). Worldwide, trauma is a leading cause of morbidity and mortality, especially in the young (1,4,5). Globally, the disease burden due to road traffic accidents (RTAs) has been on a downward trend since 1990, with the decline observed mainly in high-income nations. However, in low-and middle-income countries (LMICs), the reverse trend has occurred (1,4,5). Pregnancy complicated by trauma is one of the causes of death that is not captured in the maternal mortality ratio, even though it occurs in about 1 in 15 pregnancies (4,5).

Published clinical studies have shown that the spleen is the most frequently injured organ in blunt abdominal trauma (BAT), representing about 25% of all solid

abdominal organ injuries (6-8). In patients with splenic trauma, mortality rates ranging between 7 and 18% have been reported (1,6) RTAs are the most typical causes of trauma in the civil population in Nigeria, and splenic trauma accounts for about 30% of missed blunt abdominal injuries (9). In civilian practice, BAT from RTAs accounts for 80%–90% of all splenic trauma and is widespread in young adults (6,7).

Management of splenic injuries was traditionally done through splenectomy, but recently, emphasis has shifted to splenic preservation or selective non-operative management (1,6-8,10) This is due to a better understanding of the immunological functions of the spleen and the risk of post-splenectomy infections from encapsulated organisms, the severest form being overwhelming post-splenectomy infection (OPSI)



(7,8,11). In hemodynamically stable patients, contrast-enhanced computed tomography (CT) of the abdomen is the modality of choice for preoperative evaluation and diagnosis of splenic injury (1,7,8,12,13). Though abdominal ultrasound has lower sensitivity, specificity, and overall diagnostic accuracy compared to CT in preoperative assessment of splenic trauma, it is still an essential investigative tool in both hemodynamically stable and unstable patients due to its portability, affordability, low radiation dose, and ease of execution (1,12,13).

In our practice, splenic trauma from both BAT and penetrating abdominal trauma is relatively common, but its occurrence in pregnancy is rare. We present an interesting case of traumatic splenic rupture in pregnancy managed successfully by emergency splenectomy in a low-resource setting.

Case Presentation

A 27-year-old multiparous woman at 23 weeks gestational age presented to the emergency unit of a referral hospital in our setting with a two-day history of progressively worsening abdominal pain and distension following a road traffic accident. She had been hit on the left side of her body by a 14-seater commercial bus while sitting down in a shop. She developed abdominal pain immediately after the incident. The pain was initially in the left upper abdomen but later became generalized and spread to the left shoulder tip. There was no loss of consciousness or bleeding per vagina. She was initially taken to a private hospital where she was resuscitated, and an investigation panel was instituted. An abdominopelvic ultrasound report revealed splenic rupture, left renal injury, and massive hemoperitoneum, resulting in her referral to our facility.

On arrival at our accident and emergency department, she was clinically evaluated and noted to be pale, dehydrated, and apprehensive. Her pulse rate was 110 bpm (low volume), her blood pressure was 90/50 mm Hg, her oxygen saturation was 98% and her respiratory rate was 26 cycles/min. The abdomen was distended, tender, and more marked in the left upper quadrant. There were bruises in the left upper region, but left lower rib fractures were not elicited. The kidneys were not ballotable, and no intra-abdominal visceral organs were palpable. Uterus and fetal well-being assessments were difficult due to copious intraperitoneal fluid/blood, though the mother confirmed fetal kicks. The cervical opening was closed, and no uterine contractions were noted. Repeated abdominal ultrasound revealed massive hemoperitoneum and viable singleton fetus at 23 weeks gestational age. Her hematocrit was 24%, though there was marked pallor, suggesting the hematocrit value may be due to hemoconcentration. An obstetric team review was sought. Other selective investigations to optimize her for surgery and comorbidities were urgently done. An anesthetic review was done, and the patient

was booked for emergency exploratory laparotomy. Further delay (several hours) in conducting emergency laparotomy was encountered due to financial constraints and delayed cooperation from the woman's family.

Intraoperatively, a massive hemoperitoneum, approximately 4 liters was observed. Two parenchymal lacerations (Figure 1) and an incomplete hilar avulsion injury (Figure 2) were noted on the background of an enlarged spleen, probably of a pathological nature. An intact accessory spleen (see Figure 3) and left perinephric hematoma were identified.

No other associated intra-abdominal injuries were identified during laparotomy. Splenectomy with preservation of the accessory spleen was performed. The abdominal drain was inserted at the splenic bed, and the wound was closed in layers. Oral feeding was commenced on the third postoperative day following the return of bowel function. The wound drain was removed on the fifth postoperative day, and the patient was discharged on the tenth postoperative day. Postoperatively, the fetus remained viable and the patient was hemodynamically stable. Only two minor complications, namely paralytic ileus and fever, developed and were managed conservatively. Fetal well-being assessments were optimal throughout the time of admission. Medical advice concerning post-splenectomy vaccination (Pneumovax, *Haemophilus influenzae* type b (Hib), and meningococcal vaccines), the need to carry an identification card, and additional antibiotic prophylaxis to compensate for the documented occasional vaccination failure were emphasized. However, vaccination was delayed till the 30th postoperative day due to bureaucratic bottlenecks.

Discussion

Due to industrialization and developments in transportation, trauma has become a public health challenge, especially in developing nations. Human movement has dramatically increased, making RTAs, particularly BATs, a significant cause of abdominal injury. Pregnancy is not a barrier to accessing automobile

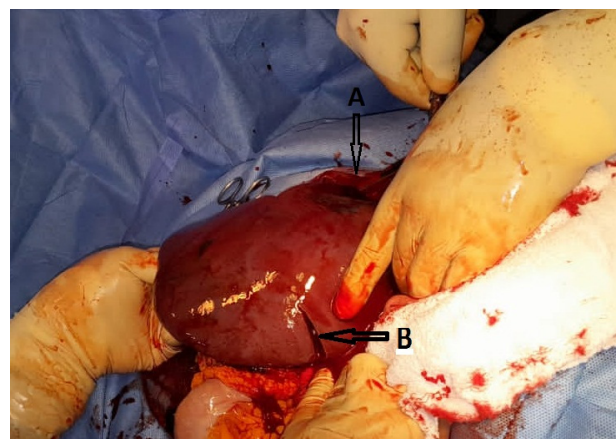


Figure 1. Parenchymal lacerations A and B

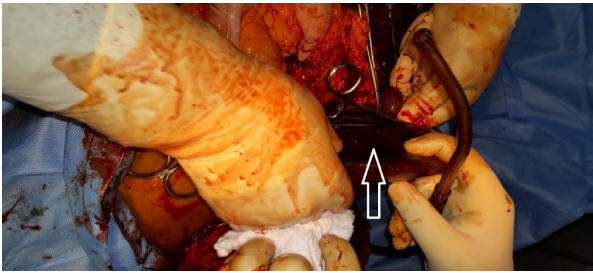


Figure 2. Incomplete hilar avulsion injury

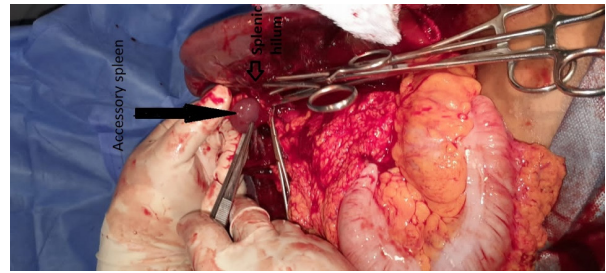


Figure 3. Accessory spleen

transportation of agricultural produce, household materials, clothing, and an array of general-purpose goods from one region to another on dilapidated roads with no or minimal observance of driving and traffic laws which is common in most parts of developing countries.

Our observation that splenic injury in the reported patient was due to BAT from a motor vehicle accident was in line with previous reports from Nigeria (1,7,8,10,14), Central Africa (4,6), the Middle East (13), and Europe (12) implicating BAT as the most frequent injury type leading to splenic trauma. In addition to the deplorable state of the roads and non-adherence to traffic laws, other reasons contributing to the rising rates of RTA in our setting include overloading of poorly-serviced vehicles, drink-and-drive behavior, and use of mobile phones while driving (1,4,6,7,8).

Late presentation of surgical conditions, including emergencies, is common in sub-Saharan Africa (SSA) (1-4,6-10,14). Elsewhere, it has been cited that the barriers against the early presentation of surgical diseases in SSA are many and include financial constraints, intervention by herbal home remedies, non-physician clinicians, and prayer houses, delayed referral by doctors, and socio-cultural beliefs (1,6,14,15). We pointed out earlier that the reported patient had a 48-hours delay before referral to our facility due to a delay in correct diagnosis and informed decision at the private hospital to which she was previously admitted. Further delay (several hours) in treatment was observed at our center due to financial constraints on the part of the patient's family. The above illustrations represent common findings in managing most surgical cases in our environment and call for system-wide health campaigns, public enlightenment, and strategic planning by the government and policymakers. The price for this deplorable health behavior is the high rates of morbidity and mortality; previous studies have reported that the danger lies in the delay and not in the operation in most surgical emergencies (1-4,6,14,15).

In the tropics, enlarged, pathologic spleens are common and more vulnerable to traumatic rupture especially blunt injury (1,6-8,10). In SSA, splenomegaly from hemoglobinopathies, chronic pyogenic infections, chronic parasitic infestations from malaria, visceral leishmaniasis (kala-azar), or schistosomiasis are common, and even minor to moderate trauma with low energy of impact can

lead to splenic rupture and life-threatening hemorrhage (1,6-8,10). Splenomegaly, presumed to be pathological in origin, was observed intraoperatively in the reported patient, suggesting increased susceptibility to traumatic splenic rupture in the patient.

Though the surgical principle has largely shifted in favor of splenic salvage or a selective non-operative approach, the utilization of emergency splenectomy for rapid control of hemorrhage following splenic trauma is still relevant. In this report, hemodynamic instability, delayed presentation, ultrasound report of massive hemoperitoneum and associated renal injury, and pregnancy state precluding serial evaluation with CT scan (to minimize radiation dose) favored operative treatment. In a recent publication from a municipal hospital in southeast Nigeria, Ogbuanya et al reported an extensive series of 313 consecutive adult patients managed for splenic injuries and found that the majority (226, 72.2%) received operative management (OM) (1). The rest (27.8%) were treated by non-operative methods (NOMs) (1). The authors reported that approximately two-thirds (66.8%) of the preoperative gradings using the organ injury scaling of the American Association for the Surgery of Trauma were high grades (grades III–V) (1). The high grades of the splenic injuries (which in turn predict high rates of hemodynamic instability) and occurrence of associated intra-abdominal injuries in 45% of cases may, perhaps, explain why the majority of the splenic trauma patients were treated operatively (1). A more disturbing report in that study was the finding that 78.7% of the 226 patients managed by OM had total splenectomy for control of haemorrhage (1). Published data from Nigeria (7-10) and Tanzania (4,6) are in line with the above results. Elsewhere, it was cited that for spontaneous postpartum splenic rupture, emergency splenectomy resulted in a 95% survival rate compared to 100% mortality in the few patients who did not undergo splenectomy (7,8). In most recent studies, reported maternal mortality from splenic rupture can be as high as 45% with a 47%–82% risk of fetal loss (6,10).

The spleen is critical in regulating immune homeostasis and hemopoiesis through its ability to link innate and adaptive immunity and protect against infections (1,6-11). Indeed, an increased understanding of the spleen's immunological and hemopoietic functions, particularly

its role in clearing encapsulated organisms from the bloodstream, has led to a trend towards NOM or splenic salvage (1,7,8,11,12). Splenectomy in pregnancy may lead to adverse fetal and maternal outcomes, especially abnormalities in immunological and hemopoietic function.

Current clinical data support the value of post-splenectomy vaccination and antimicrobials against encapsulated organisms to prevent OPSI. However, splenic preservation has been superior in minimizing the risk of OPSI (1,7,8,10-13) whenever possible. As noted in the case presentation, irregularity in the cold chain supply of vaccines at the time of this report hampered the prompt utilization of the post-splenectomy vaccine protocol in this patient. Our environment's lack of dedicated trauma centers and interventional radiology services limited the quality of surgical services available for the reported case.

Conclusion

Management of splenic trauma requires the collaboration of surgeons, obstetricians, anesthetists, and intensive care nurses. Hemodynamic instability is an all-time trigger for emergency laparotomy despite the pregnancy state, and successful maternal and fetal outcomes are achievable goals in our environment. More comprehensive coverage of the National Health Insurance Scheme, an increase in national and state health budgets, strict enforcement of existing driving and traffic laws, and legislation of new laws to strengthen safety in driving are necessary in our environment. This case report illustrates a pressing need to formulate robust civilian trauma services and establish a functional trauma center in our setting.

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Competing Interests

None.

Ethical Approval

Approval for this study was granted by the hospital's ethical research board.

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