

# GENERAL ANESTHESIA COMPLICATED BY PERIOPERATIVE IATROGENIC SPLENIC RUPTURE

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## Abstract

Patients with splenomegaly often present with diverse coexisting medical disease and thus offer a variety of anesthetic considerations. The challenges that come with splenectomy have also become increasingly common to the anesthesiologist, given the growing number of indications for surgical intervention including both benign and malignant disease. Removal of the spleen is associated with numerous intraoperative and postoperative risks, including massive intraoperative hemorrhage, perioperative coagulation abnormalities, and post-splenectomy infection<sup>1</sup>. When caring for the patient with an enlarged spleen scheduled for splenectomy, the anesthetic plan must address both patient and procedure specific concerns. We present a medically challenging case of a 28 year old man with splenomegaly secondary to lymphoma, who underwent elective splenectomy, which was complicated by perioperative splenic rupture and hemorrhage.

**Key words:** splenomegaly, intraoperative rupture.

## Introduction

Patients with splenomegaly often present with diverse coexisting medical disease and thus offer a variety of anesthetic considerations. The challenges that come with splenectomy have also become increasingly common to the anesthesiologist, given the growing number of indications for surgical intervention including both benign and malignant disease. Removal of the spleen is associated with numerous intraoperative and postoperative risks, including massive intraoperative hemorrhage, perioperative coagulation abnormalities, and post-splenectomy infection<sup>1</sup>. When caring for the patient with an enlarged spleen scheduled for splenectomy, the anesthetic plan must address both patient and procedure specific concerns. We present a medically challenging case of a 28 year old man with splenomegaly secondary to lymphoma, who underwent elective splenectomy, which was complicated by perioperative splenic rupture and hemorrhage.

## Case Description

A 28 year old man with a medical history significant only for lymphoma presented for elective splenectomy. Preoperative exam was unremarkable except for a massively enlarged spleen. After induction and rapid sequence intubation, an arterial line and two large bore intravenous catheters were placed. Prior to surgical incision, serial abdominal exams were performed by multiple members of the surgical team in order to appreciate the impressive size of the patient's spleen. Following incision, massive intraabdominal bleeding was encountered due to pre-incision splenic rupture.

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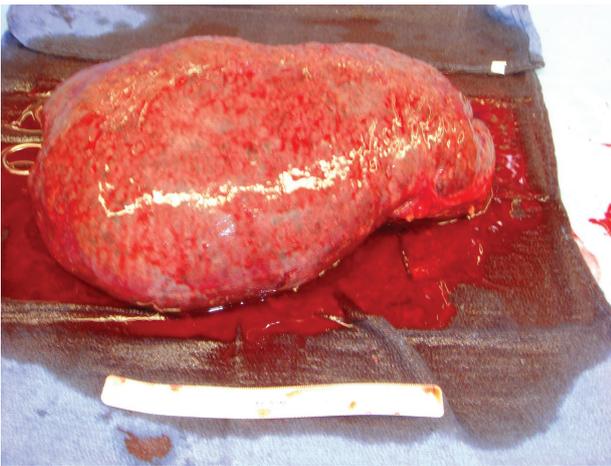
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Tachycardia and progressive hypotension were treated with fluid resuscitation and blood product transfusion. Surgical hemostasis was achieved and the remaining intraoperative course was uneventful. The massively enlarged spleen was removed, and weighed 1950 gms (figure). The estimated blood loss for the procedure was 3 liters. The patient received 3 units packed red blood cells (PRBC), and 5 liters Plasmalyte. The hematocrit at the conclusion of the procedure was 25 per cent.

*Fig.*  
*Massively enlarged spleen*



There was postoperative bleeding, and the patient received an additional 10 units PRBC, 4 U FFP, and 2 units platelets. The patient returned to the operating room on post op day 1. There was oozing at the splenic bed, which was surgically controlled. Intraoperatively the patient received 4 U PRBC, 4 U FFP, and 2 units platelets. The patient recovered, and the rest of the hospitalization was unremarkable. The patient was discharged home 5 days following this second operation.

## Discussion

The patient with splenomegaly represents a challenge for the anesthesiologist, whether scheduled for splenectomy or otherwise. Splenic enlargement is usually secondary to an underlying disease process, including infectious, hematologic, and congestive causes<sup>1,2</sup>. If the patient is scheduled for splenectomy, the etiology of splenic enlargement is almost certainly known. If splenomegaly represents an incidental finding in a patient otherwise scheduled for surgery, however, a

medical workup is necessary to elucidate the causative and coexisting disease. Specific anesthetic concerns invariably depend on the underlying disease process, however, certain themes recur. A large spleen may exert an abdominal pressure effect, causing early satiety and possibly requiring rapid sequence intubation. Patient symptoms and clinical judgment, rather than splenic dimensions, will ultimately help to guide this decision. Splenomegaly may also cause anemia, leukopenia, and thrombocytopenia regardless of etiology, mandating a complete blood count. Perioperative hematologic abnormalities may influence intraoperative transfusion requirements, the feasibility of neuraxial anesthesia for postoperative pain, and perioperative infectious prophylaxis. Standard electrolytes, liver tests, and a focused review of systems are also important in identifying significant coexisting disease if the cause of splenomegaly is unknown.

In patients presenting with splenomegaly, the anesthesiologist must always appreciate the possibility of splenic rupture regardless of the planned procedure. Key features to pathologic rupture, which occurs in the presence of underlying splenic disease, are splenomegaly, an increase in splenic fragility, and changes in local circulation and integrity. Pregnancy, rheumatic diseases, systemic vasculitis, pneumonia, and any disease state resulting in splenomegaly have all been implicated in pathologic rupture<sup>3</sup>. In such patients at risk for pathologic rupture, especially those presenting with marked splenomegaly, avoidance of excessive splenic palpation and manipulation under anesthesia would appear prudent. Anesthetized patients cannot provide physical cues to the examiner, possibly resulting in undue force placed on the already fragile spleen. In the case we present, rupture was directly caused by repeated splenic palpation and pressure. Anesthesiologists must also note positioning concerns in this patient group, avoiding direct pressure to the left upper quadrant. It may be advisable to avoid the left lateral decubitus position, as well as ensure that retractors or other surgical equipment not press on the spleen. If splenectomy is planned, large bore intravenous access and arterial monitoring are essential. The potential for significant blood loss exists. Blood products must be immediately available when bleeding occurs, as it may be very brisk until surgical control is obtained. If thrombocytopenia or other hematological

derangements are present, platelets or other products should also be available.

Perioperative complications are common even for planned splenectomy. The laparoscopic approach may offer advantages compared with the open approach. A meta-analysis of 51 studies indicated that the laparoscopic method was associated with a reduction of postoperative morbidity<sup>4</sup>. In particular, splenic weight has been reported to be the most significant predictor of morbidity<sup>5</sup>. In that study, massive splenomegaly, defined as splenic weight greater than 1000 gm, was associated with a 14 times greater likelihood of developing complications. The incidence of blood loss greater than 2 liters was 15% in cases with spleen weight over 1000 gm, compared with 4% for those with smaller spleen weights. In a subsequent study, the laparoscopic approach to splenectomy for massive splenectomy, also defined in that study as a spleen weighing 1000 gms or greater, was reported to be associated with a lower postoperative morbidity and mortality than open splenectomy<sup>6</sup>. Postoperative morbidity was 13.3% vs 30.8% respectively, and postoperative mortality was 0 vs 7.7 %, respectively.

Although massive splenomegaly carries a risk of rupture, to the best of our knowledge, the current report is the first reported case of massive bleeding resulting

from intraoperative physical examinations while the patient is under general anesthesia. Particular caution must be exercised when examining such patients, especially while anesthetized, and the anesthesiologist must be prepared for possible hemorrhage. Massive splenomegaly is associated with a significantly higher rate of morbidity regardless of technique<sup>5</sup>. All splenectomy patients remain at risk for infection postoperatively, although vaccination and prophylactic antibiotic regimens have decreased infection-related morbidity and mortality.

### Conclusion

In the patient presenting with splenomegaly, the anesthesiologist must appreciate the wide variety of coexisting diseases. Medical workup often reveals specific anesthetic concerns, although a framework exists regardless of underlying etiology. Splenic rupture is always on the differential diagnosis for sudden decompensation in at risk patients. For splenectomy patients - particularly those with massive splenomegaly - appropriate intravenous access, perioperative monitoring, availability of blood products and overall preparedness for large-scale resuscitation are critical to a successful outcome.

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