

# Splenic Artery Aneurysm Rupture: An Uncommon Obstetrical Catastrophy

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When an otherwise healthy young woman, who is pregnant or recently postpartum, arrives in the emergency department in shock for no apparent reason, an initial diagnosis that must be considered is rupture of a splenic artery aneurysm. The urgency of making the diagnosis and institution of surgical intervention are illustrated by the following case report.

## CASE REPORT

A 24-year-old gravida 1, para 1 woman who was seven days postpartum presented to the emergency department in shock. Her pregnancy had been normal with an uncomplicated delivery. She had previously been in excellent health. Her husband related that while arising from a chair, after talking on the telephone, the patient had fainted. She had fallen suddenly to the floor, possibly landing on the telephone with her abdomen. She was initially unarousable and was incontinent of stool. An ambulance was summoned and arrived within five minutes. She was aroused with ammonia but had an unobtainable blood pressure and a rapid, thready pulse.

At arrival to the emergency department approximately 20 minutes later, she was arousable, had a blood pressure of 90/48 mmHg, pulse of 122 beats per minute, and was diaphoretic. She complained of right upper quadrant abdominal pain. A complete blood count showed a hemoglobin of 126 g/L (12.6 g/dL), and white blood count of  $18.5 \times 10^9/L$  ( $18.5 \times 10^3/\mu L$ ). Findings on chest x-ray examination were normal. Physical examination showed a diffusely tender abdomen. A paracentesis returned frank blood. She was started on intravenous fluids and was typed

and cross-matched for blood. The patient was taken to the operating room.

At surgery a large midline incision was made and the peritoneum was entered. Three to 4 L of blood and clots were encountered and were evacuated as rapidly as possible. The liver and spleen were carefully inspected and no lacerations were found. After further inspection, a hematoma was seen in the area of the lesser sac. When this was opened, large clots rapidly extruded and active bleeding was seen. The splenic artery was exposed and a 2- to 3-cm gaping hole was found within 2 cm of the spleen. The splenic artery was clamped and the patient's condition stabilized rapidly. The ruptured aneurysm was then resected and a splenectomy was performed. The patient received a total of seven units of blood and two units of plasminase. She tolerated the procedure well and recovered without any complications.

## LITERATURE REVIEW

### Epidemiology

The true incidence of splenic artery aneurysm is unknown. Splenic artery aneurysms are uncommon and largely asymptomatic, unless they rupture. The high incidence of mortality with rupture makes epidemiologic studies very difficult. Trastek et al<sup>1</sup> point out that the incidence of aneurysm varies considerably depending on the investigative method and the specificity of the search for splenic artery aneurysms. An unselected Mayo Clinic autopsy review reported an incidence of 0.16 percent,<sup>2</sup> while another autopsy review of patients over 60 years of age at death, looking specifically for splenic artery aneurysms, showed an incidence of 10.4 percent.<sup>3</sup> Angiographic reviews report an incidence of 0.78 to 7.1 percent depending on patient selection.<sup>4</sup>

While arterial aneurysms in general show a strong male predominance, splenic artery aneurysms occur in women four to five times more frequently than in men.<sup>5</sup> Of all abdominal aneurysms, splenic artery aneurysms rank

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third behind infrarenal aortic and iliac artery aneurysms.<sup>1,6</sup> It has been reported that approximately one half of ruptures occur in women of childbearing age, typically during the third trimester of pregnancy, or in the immediate postpartum stage.<sup>7,8</sup> The incidence increases with multiparity, with the mean number of pregnancies being 4.5.<sup>1,8,9</sup>

Asymptomatic splenic artery aneurysms are usually diagnosed in the following settings: incidentally during autopsies, as incidental findings at laparotomies, incidentally on angiograms, and, most commonly, by calcific changes seen on radiographs of the abdomen. Beaussier first reported this entity in a cadaver in 1770, and Winckler first recognized it in a living patient during a surgical exploration in 1903.<sup>10</sup> Currently the most typical diagnostic sequence is that a curvilinear "ring-like" calcification is first seen in the left upper quadrant on x-ray examination of a woman in her seventh decade. Angiography then confirms the presence of an asymptomatic splenic artery aneurysm.

Symptomatic splenic artery aneurysms are not usually discovered until rupture occurs. The typical patient is a healthy woman in her 30s. Most commonly the rupture will occur during her third trimester of pregnancy, during labor, or in the immediate postpartum period. She will then present to the physician in shock. The differential diagnosis would include the following: a massive pulmonary embolus, uterine rupture, abruptio placentae with concealed hemorrhage, rupture of the liver or spleen, or rupture of an arterial aneurysm. Rupture of a splenic artery aneurysm is a catastrophic event with a maternal mortality of approximately 70 percent and a concurrent fetal mortality of approximately 94 percent.<sup>1,10</sup> It is so drastic that in 1986, Lowery et al<sup>9</sup> reported only the seventh case of survival for mother and infant since splenic artery aneurysm in pregnancy was first reported in 1869.<sup>1</sup>

**Etiology**

Although the cause of splenic artery aneurysms is unknown, they can be generally classified into broad categories of clinical presentations associated with the following factors: pregnancy, atherosclerosis, multiple vascular aneurysms, previous trauma, and congenital vascular anomalies. Any particular patient may experience more than one of these factors. Interestingly, President Garfield died in 1881 from a ruptured splenic artery aneurysm two months after being shot in an assassination attempt. Histologic examinations of splenic artery aneurysms have not clearly defined a cause.<sup>5,10</sup> Pregnancy-related phenomena that may influence the development of splenic artery aneurysms are (1) the effects of an altered hormonal status upon vasculature, (2) increased blood volume, (3) increased cardiac output, (4) relative portal congestion, (5)

increased splenic arteriovenous shunting, (6) possible hypertension, and (7) increased intra-abdominal pressure.<sup>10</sup>

**Clinical Presentation**

Clinically, a splenic artery aneurysm rupture will usually present in one of two ways. If the bleeding is into the free peritoneal cavity, the patient will have severe abdominal pain, especially in the left upper quadrant, and will rapidly die from blood loss. The bleeding, however, will often go into the lesser sac behind the stomach and present as a "double rupture."<sup>11</sup> The patient will have severe abdominal pain and signs of hypovolemia that will stabilize as the lesser sac is filled and the bleeding is tamponaded. Then, as the blood and clots escape through the foramen of Winslow into the peritoneal cavity, the patient will have right upper quadrant and right shoulder pain, as did the patient described in this paper. The patient will again become hypotensive. This "second rupture" may occur within hours to days, but usually it occurs within 48 hours.<sup>10-12</sup>

**Treatment**

Treatment of splenic artery aneurysms is surgical. Obviously if a rupture has occurred, immediate surgery is indicated. Positive findings on paracentesis should preclude further diagnostic evaluation. Short et al<sup>12</sup> suggested in 1985, that if the patient is stable, digital subtraction angiography may be beneficial for the surgeon. If the aneurysm is diagnosed during the asymptomatic state, then arteriography is indicated to confirm the presence of an aneurysm and to search for other associated visceral aneurysms.<sup>5</sup> At laparotomy, most of the splenic artery aneurysms will be located in the distal one third of the artery, will be saccular in configuration, and will be approximately 2.5 cm in diameter.<sup>1</sup> Whether surgery is indicated for an asymptomatic splenic artery aneurysm is still controversial. Trastek et al,<sup>1</sup> however, feel that if the diameter is greater than 2.0 cm, or pregnancy is anticipated, then surgery is indicated. The optimal surgical approach would be to resect or ligate the aneurysm and, whenever feasible, retain the spleen. Extensive blood supply through the short gastric arteries will prevent splenic infarction.<sup>1,5</sup> Routine palpation of the splenic artery during laparotomies would possibly help to diagnose asymptomatic splenic artery aneurysms more frequently.

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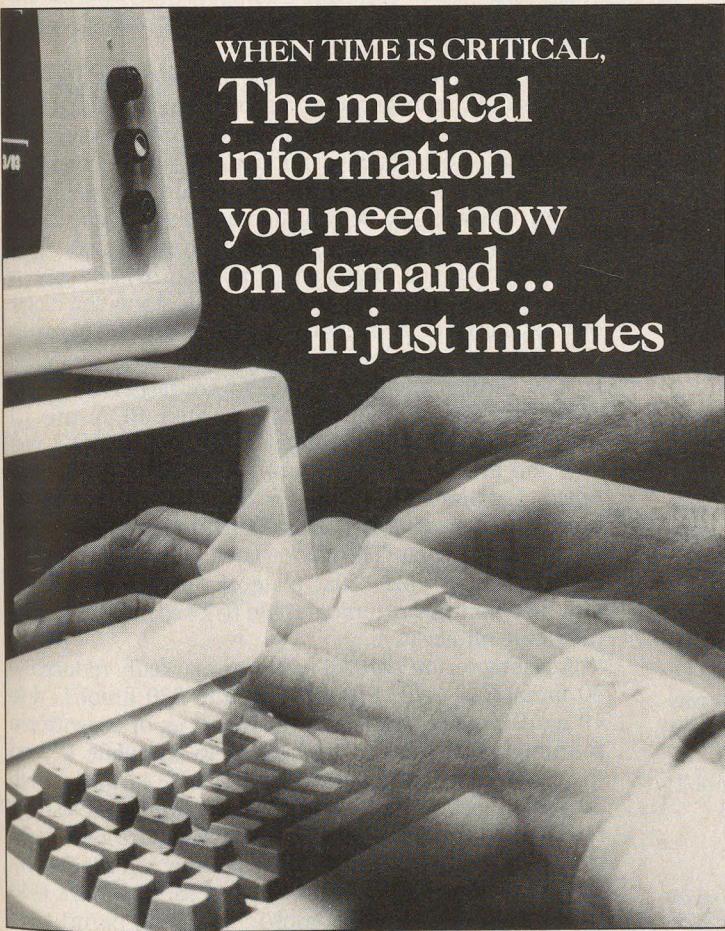
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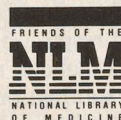


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