

Large-volume hemoperitoneum and hemodynamic instability in uterine fibroid rupture: A case report

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ARTICLE INFO

Keywords:

Uterine fibroids
Leiomyomas
Hemoperitoneum

ABSTRACT

A perimenopausal woman with a known history of fibroid uterus presented to the emergency department with the chief complaint of three weeks of intermittent abdominal pain with acute worsening for two days. The pain was described as 10/10 “tearing” peri-umbilical pain with radiation to the rectum associated with nausea. Vital signs, laboratory results, and physical examination were largely unremarkable at presentation, aside from diffuse tenderness with rebound. Computed tomography revealed a markedly enlarged uterus and large-volume hemoperitoneum and sentinel clot sign, suggesting fibroid as the source of bleeding. Upon re-examination, the patient was found to be hypotensive and tachycardic with worsening hemoglobin, worsening abdominal distension, and a positive focused assessment with sonography in trauma (FAST) exam. Although the source of bleeding was non-specific, a decision was made by the gynecology and general surgery teams to perform an emergency exploratory laparotomy. A midline vertical incision was made and four liters of blood were evacuated from the peritoneal cavity. The gynecology and general surgery teams thoroughly inspected the abdomen. A myomectomy was performed and good hemostasis was confirmed. The patient was transferred to the surgical intensive care unit, where she had an uncomplicated post-operative course. She was discharged home on postoperative day 4. Uterine fibroid rupture should be on the differential for hemoperitoneum in a patient with known fibroids and should be addressed with a timely multi-specialty approach.

1. Introduction

Uterine leiomyomas, also known as uterine fibroids, are benign tumors that stem from the smooth muscle of the myometrium. They are among the most common benign neoplasms in women of reproductive age, with upwards of 70% of white women and more than 80% of black women in the US diagnosed during their lifetime [1,2]. Uterine fibroid is also the leading indication for hysterectomies [1]. The majority of patients with uterine fibroids are asymptomatic and their diagnosis is incidental. In symptomatic patients, uterine leiomyomas can present with prolonged or heavy uterine bleeding, pelvic or back pain, infertility, or bowel and/or bladder complaints.

In rare cases, uterine fibroids can cause very serious complications associated with severe morbidity and mortality, including acute urinary retention, torsion of a subserosal or pedunculated fibroid, and bowel

obstruction [3,4]. Another uncommon but devastating complication is the spontaneous rupture of a uterine fibroid, which can precipitate intra-abdominal hemorrhage and hypovolemic shock. Reports on this acute complication are limited, and so it is easily misdiagnosed or inadequately treated [5]. The case presented here of intraperitoneal hemorrhage derived from a ruptured uterine leiomyoma demonstrates the importance of considering ruptured fibroids as a possible diagnosis in patients presenting with acute abdominal pain.

2. Case Presentation

A 51-year-old woman, G3P3003, with a known history of fibroid uterus presented to the emergency department with a chief complaint of three weeks of intermittent abdominal pain with acute worsening for two days. Pain was described as 10/10 “tearing” peri-umbilical pain

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<https://doi.org/10.1016/j.crwh.2023.e00572>

Received 27 October 2023; Received in revised form 28 November 2023; Accepted 28 November 2023

Available online 1 December 2023

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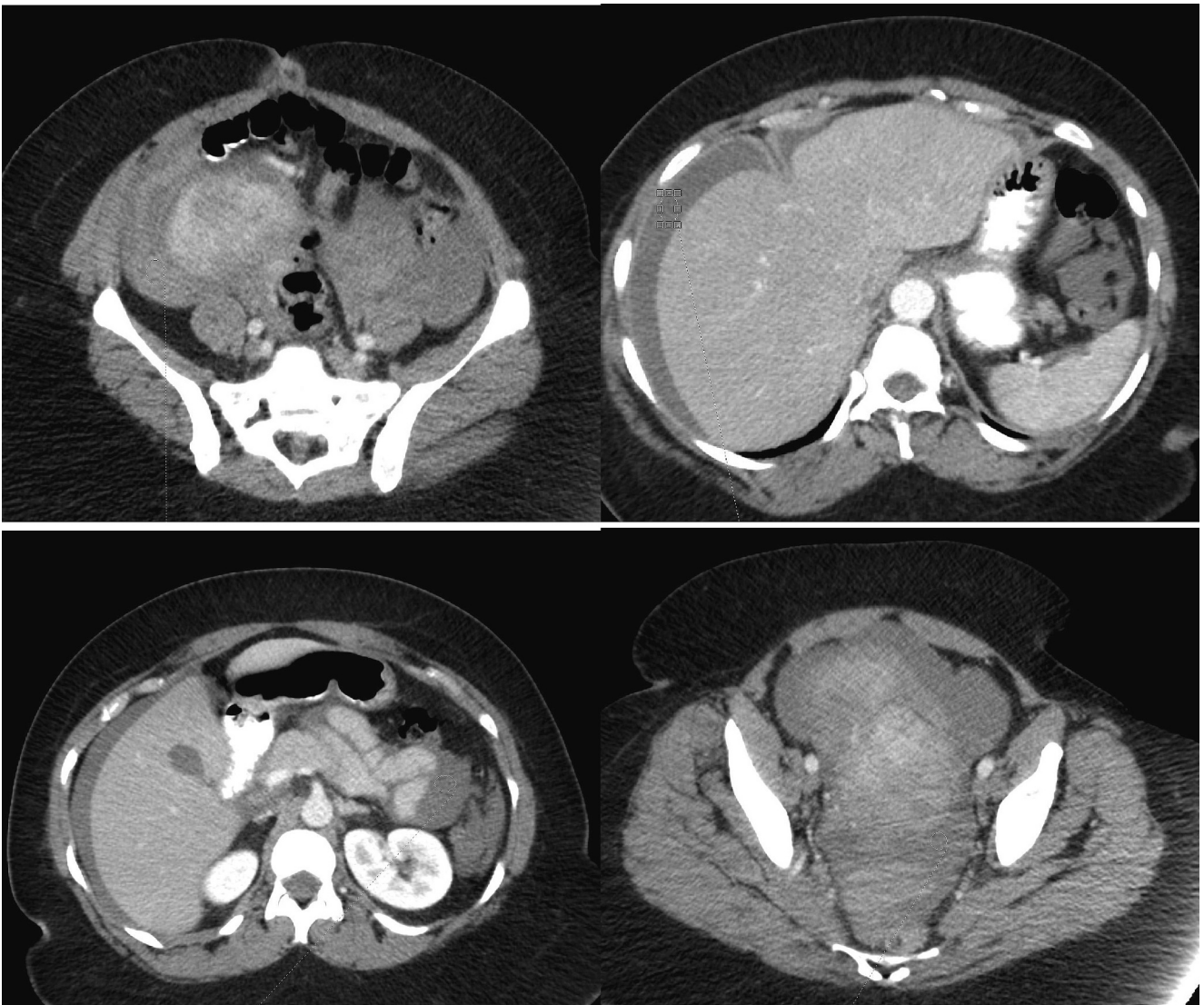


Fig. 1. CT images show significant hemoperitoneum. The sentinel clot sign, a finding of hyperdense fluid collection adjacent to the bleeding organ, is best seen in the top-left image. Fluid near the liver, intestines, and pelvis is not as dense as it is near subserosal fibroid.

with radiation to the rectum associated with nausea. At presentation, her vital signs included a blood pressure of 100/64 mmHg and a heart rate of 88 beats/min. Her initial abdominal exam was remarkable for diffuse tenderness with rebounding. No distension or guarding was appreciated. Her initial hemoglobin level was 11.6 g/dL. Past medical history was significant for hypertension, diabetes mellitus, and daily smoking. The patient had no prior abdominal surgeries.

Computed tomography (CT) revealed a markedly enlarged uterus, and heterogeneously and peripherally enhancing fibroids with central necrosis likely representing degenerated fibroids (Fig. 1). A large volume of complex intra-abdominal free fluid was found in the dependent regions, including peri-hepatic, peri-splenic, and peri-colic areas. The most dense fluid (sentinel clot sign) was found adjacent to a large pedunculated serosal fibroid in the right lower quadrant, which might represent acute hemorrhage secondary to rupture of a degenerated fibroid.

At the conclusion of the CT and prior to the final study read, the patient was noted to be diaphoretic and pale, with increased abdominal distension, now with a blood pressure of 66/40 mmHg and a positive focused assessment with sonography in trauma (FAST) exam. Hemoglobin had dropped to 8.2 g/dL. Although the source of bleeding was non-specific, due to the patient's hemodynamic instability a decision

was made by the gynecology and general surgery teams to perform an emergency exploratory laparotomy. In addition to the peripheral intravenous access, femoral and radial arterial lines were placed and blood transfusion was initiated before induction by anesthesia.

A midline vertical incision was made to the umbilicus. Four liters of blood were evacuated from the peritoneal cavity. The entirety of the abdomen was inspected by both the general surgery and gynecology teams but without a clear source of bleeding being initially identified. On re-inspection of the abdomen, a vessel on the largest 10 cm pedunculated fibroid (FIGO type 7) was seen to be bleeding. A myomectomy was performed and good hemostasis was confirmed. The patient was transfused a total of 5 units of packed red blood cells, 3 units of fresh frozen plasma, and 1 pack of platelets. Recovery was uncomplicated in the surgical intensive care unit. The patient was discharged home on postoperative day 4. She was seen for follow-up by gynecology in the outpatient setting and was in a stable condition.

3. Discussion

Uterine leiomyomas are typically managed medically or with planned surgical intervention, depending on the location, size, and severity of symptoms. This case highlights a rare acute complication of uterine

leiomyomas: fibroid rupture. A post-menopausal patient with a known history of fibroids presented with acute on chronic abdominal pain. Workup was significant for hypotension, acute decrease in hematocrit, and imaging consistent with hemoperitoneum and degenerative fibroid. The ruptured fibroid was managed with emergency laparotomy and myomectomy. Immediate recognition and rapid multidisciplinary intervention were important to adequately address this rare complication. Previous case reports have highlighted similar presentations consistent with uterine fibroid rupture. Providers should be able to identify fibroid rupture as a possible sequela to fibroids and include it in their differential diagnosis for patients with a history of fibroid uterus presenting with an acute abdomen.

Fibroids characteristically have a hypovascular core with a hypervascular capsule. Perifibroid vessels form a network of vessels, largely sourced from uterine arteries, that are larger in diameter with decreased resistance and, therefore, increased flow compared to normal myometrium. The angiogenesis and vasculogenesis of fibroids have yet to be elucidated. Their hypervascular nature is the basis for uterine artery embolization: a first-line treatment for fibroids via catheterization and embolization of the uterine artery. This property also contributes to the high bleeding risk associated with myomectomies. Therefore, it can be deduced that disruption of large peri-fibroid vessels, either spontaneously or secondary to trauma, could cause rapid large-volume intra-abdominal bleeding.

A systematic review conducted in 2020 by Lim et al. identified 125 cases of intra-abdominal hemoperitoneum due to uterine fibroids reported between 1902 and 2018 [3]. The most common presentation was acute abdominal pain and hypovolemia with the pre-operative diagnosis of intra-abdominal hemoperitoneum of unknown origin in 96% of cases. Intra-operative causes of hemoperitoneum included rupture of superficial blood vessels (60.8%), ruptured fibroids (27.25%), and fibroid avulsion (8%). Precipitating factors for avulsion and rupture of blood vessels included mechanical trauma, such as falls or motor vehicle accidents, increased venous pressure due to lifting heavy weights or defecation, or pregnancy [4]. Necrosis from degeneration was suspected in cases with spontaneous rupture of the fibroid.

Our case report highlights several management pearls consistent with the findings of the systematic review by Lim et al. [3] Although ultrasound and magnetic resonance imaging (MRI) are helpful in diagnosing types of fibroids and identifying hemoperitoneum, they are not helpful in diagnosing the origin of the bleeding. CT is therefore the first-line imaging modality to identify abdominal hemorrhage and its origin. The typical "sentinel clot sign" seen on CT is based on the fact that acutely clotted blood has high attenuation and signifies the source of bleeding. Abdominal myomectomy is a reasonable primary surgical route, particularly in pre-menopausal patients with unspecified fertility goals. A myomectomy decreases intra-operative time and quickly addresses the source of bleeding while avoiding the additional risk associated with hysterectomy, including damage to surrounding urogenital

structures.

Contributors

Ali Antoine contributed to patient care, the conception of the case report, acquiring the data, drafting the manuscript, and revising the article.

Laveena Kondagari contributed to patient care, the conception of the case report, and the revising of the article.

Chihiro Okada contributed to the literature review and contributed to the writing of the manuscript.

Cynthia Arvizo contributed to patient care and assisted with the revision of the article.

All authors approved the final submitted manuscript.

Funding

No funding from an external source supported the publication of this case report.

Patient consent

Written informed consent for publication was obtained from the patient.

Provenance and peer review

This article was not commissioned and was peer reviewed.

Conflict of interest statement

The authors declare that they have no conflict of interest regarding the publication of this case report.

References

- [1] E. Giuliani, S. As-Sanie, E.E. Marsh, Epidemiology and management of uterine fibroids, *Int. J. Gynaecol. Obstet.* 149 (1) (Apr 2020) 3–9, <https://doi.org/10.1002/ijgo.13102>.
- [2] D.D. Baird, D.B. Dunson, M.C. Hill, D. Cousins, J.M. Schectman, High cumulative incidence of uterine leiomyoma in black and white women: ultrasound evidence, *Am. J. Obstet. Gynecol.* 188 (1) (Jan 2003) 100–107, <https://doi.org/10.1067/mob.2003.99>.
- [3] W.H. Lim, S.C. Cohen, V.P. Lamaro, Intra-abdominal haemorrhage from uterine fibroids: a systematic review of the literature, *BMC Surg.* 20 (1) (Apr 15 2020) 70, <https://doi.org/10.1186/s12893-020-00736-5>.
- [4] S. Estrade-Huchon, P. Bouhanna, O. Limot, A. Fauconnier, G. Bader, Severe life-threatening hemoperitoneum from posttraumatic avulsion of a pedunculated uterine leiomyoma, *J. Minim. Invasive Gynecol.* 17 (5) (Sep-Oct 2010) 651–652, <https://doi.org/10.1016/j.jmig.2010.04.006>.
- [5] J.H. Choi, H.J. Liu, S.M. Heo, S.A. Kim, Hemoperitoneum caused by spontaneous rupture of uterine leiomyoma in a Perimenopausal woman, *J. Menopausal Med.* 27 (1) (Apr 2021) 42–45, <https://doi.org/10.6118/jmm.20037>.