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**Case Report**

**Keywords:** Sclerosing stromal tumor, ovarian tumor, preoperative embolization, interventional radiology, pediatric ovarian tumor, NBCA

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# Preoperative Embolisation of Sclerosing Stromal Tumor Associated with Good Clinical Outcome: A Case Report


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## Abstract

**Background: Sclerosing stromal tumor (SST) is a rare, predominantly benign ovarian sex** cord-stromal tumor that occurs mainly in young women during the second and third decades of life. Its occurrence in premenarchal girls is particularly uncommon. Although surgical resection is the established treatment, the marked vascularity sometimes associated with these tumors may present an intraoperative bleeding challenge. The role of preoperative embolization in the management of ovarian SST has not been established.

Case presentation: We report the case of an 11-year-old girl who presented with lower abdominal pain and a history of intermittent abdominal discomfort over approximately two years. Initial ultrasonography demonstrated a highly vascular right adnexal mass with prominent arterial and venous flow and central calcification. Further evaluation with computed tomography and magnetic resonance imaging demonstrated a well-defined, highly vascular lesion measuring approximately 7 × 5 × 5 cm, with prominent peripheral vascular structures and characteristic enhancement patterns. Given the marked vascularity and the possibility of significant intraoperative hemorrhage, the patient was referred to the vascular and interventional radiology department for preoperative embolization. Selective angiography demonstrated abnormal vascular supply from the right uterine and ovarian arteries. The pathological feeding vessels were selectively embolized using N-butyl cyanoacrylate (NBCA). The patient subsequently underwent surgical resection without reported intraoperative complications or the need for blood transfusion. Histopathological examination confirmed an ovarian sclerosing stromal tumor.

Outcome: The postoperative course was uneventful. The patient was discharged on postoperative day three and placed under joint pediatric surgery and interventional radiology follow-up, with ultrasound surveillance at six-month intervals.

Conclusion: This case demonstrates the feasibility of preoperative selective embolization in the management of a highly vascular ovarian SST in a pediatric patient. Although the benefit of this approach cannot be established from a single case, preoperative embolization may be

considered in selected patients with markedly vascular ovarian tumors when substantial intraoperative blood loss is anticipated.

Keywords: Sclerosing stromal tumor; ovarian tumor; preoperative embolization; interventional radiology; pediatric ovarian tumor; NBCA.

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## 1. Introduction

Sclerosing stromal tumor (SST) is an uncommon benign ovarian neoplasm originating from the sex cord-stromal cells. It was first described by Chalvardjian and Scully in 1973 as a distinct histological subtype of ovarian stromal tumor [1].

Unlike many other ovarian sex cord-stromal tumors, which predominantly affect women in their fifth and sixth decades of life, SST occurs mainly in young women during the second and third decades [2,5,6]. Its occurrence in children and adolescents, particularly in premenarchal girls, is rare [6,9]. Although most cases are unilateral, bilateral involvement has also been described [7,8].

The clinical presentation is variable and may include pelvic or abdominal pain, menstrual irregularities, and symptoms related to tumor size or mass effect [9,10]. Imaging findings are also variable, although the presence of prominent vascularity and characteristic enhancement patterns can provide useful diagnostic clues.

Surgical excision remains the established treatment. However, the pronounced vascularity of some SSTs may increase the potential for intraoperative hemorrhage. To our knowledge, the role of preoperative selective embolization specifically in the management of ovarian SST has not been previously described.

We present an unusual case of an 11-year-old girl with a highly vascular right ovarian SST who underwent preoperative selective embolization followed by surgical resection, with an uncomplicated perioperative course.

## 2. Patient Information

An 11-year-old premenarchal girl was referred to our university hospital from an external healthcare facility with suspected ovarian torsion based on an initial ultrasound examination.

On presentation to the pediatric emergency department, she complained of lower abdominal pain. Her medical history revealed intermittent episodes of abdominal pain over approximately two years. These episodes had occasionally awakened her from sleep and had previously been attributed to urinary tract infection at an external healthcare facility, for which antibiotic treatment had been prescribed.

No additional significant complaints were reported until the recent recurrence of lower abdominal pain.

Physical examination revealed mild abdominal tenderness and a palpable mass in the right pelvic region. Mild conjunctival pallor was also noted.

Laboratory investigations were unremarkable apart from mild anemia, with a hemoglobin level of 11.5 g/dL.

## 3. Clinical Findings and Diagnostic Assessment

### 3.1. Ultrasonography

Initial ultrasonography demonstrated a solid-appearing mass in the right adnexal region, measuring approximately 57 mm in maximum diameter.

The lesion exhibited prominent peripheral and central arterial and venous vascularity on Doppler examination. A small central calcified focus was also identified. The right ovary could not be separately visualized from the lesion. The left ovary demonstrated normal sonographic morphology and preserved stromal architecture.

The degree of vascularity raised suspicion for a highly vascular ovarian or adnexal lesion, with hemangioma and an adnexal soft-tissue mass associated with an arteriovenous malformation considered in the initial differential diagnosis.

Figure 1. Ultrasonographic findings.

A: Solid-appearing right ovarian mass with prominent vascularity on Doppler examination.
B–D: Prominent abnormal feeding arterial vessels, predominantly located peripherally.
E: Focal central calcification within the lesion.
F: Normal appearance of the left ovary.

3.2. Computed Tomography

Contrast-enhanced computed tomography demonstrated a lobulated right adnexal mass measuring approximately 7 × 5 × 5 cm.

The lesion exhibited partially hypodense areas and focal central calcifications. Marked contrast enhancement was observed in the surrounding vascular structures, which appeared dilated and varicose.

These findings supported the presence of a markedly vascular ovarian or adnexal mass.

Figure 2. Computed tomography findings.

A: Non-contrast CT image demonstrating the right adnexal mass.
B: Arterial-phase image demonstrating prominent vascular enhancement.
C: Portal venous-phase image.
D: Venous-phase image demonstrating the vascular characteristics of the lesion.

3.3. Magnetic Resonance Imaging

Magnetic resonance imaging demonstrated a right adnexal lesion measuring approximately 6 × 5 cm, with predominantly central cystic components.

The lesion showed heterogeneous signal intensity, including central T2 hyperintense and hypointense components, and a relatively hypointense peripheral rim. Following intravenous contrast administration, prominent enhancement was observed, extending from the periphery toward the center.

Conspicuously dilated vascular structures surrounded the lesion. The left ovary measured approximately 28 × 13 mm and contained small follicles.

The MRI findings, particularly the heterogeneous signal characteristics and prominent peripheral-to-central enhancement, suggested a highly vascular ovarian neoplasm.

Figure 3. Magnetic resonance imaging findings.

A: Sagittal T2-weighted image.
B and E: Coronal T2-weighted images.

C: Sagittal fat-suppressed T2-weighted image demonstrating the characteristic spoke-wheel enhancement pattern (as indicated by the arrow).
D: Axial T2-weighted image.
F: Axial T1-weighted fat-suppressed image.

### 3.4. Differential Diagnosis and Clinical Reasoning

Based on the combined ultrasonographic, CT, and MRI findings, the lesion was considered a markedly vascular ovarian or adnexal mass.

The initial differential diagnoses included ovarian hemangioma and an adnexal soft-tissue tumor associated with abnormal arteriovenous vascularity.

Given the extensive vascular supply and the anticipated potential for significant intraoperative bleeding, the pediatric surgery team requested an interventional radiology consultation to evaluate the feasibility of preoperative selective embolization.

## 4. Therapeutic Intervention

### 4.1. Angiography and Preoperative Embolization

The patient underwent selective angiographic assessment in the vascular and interventional radiology department.

Angiography of the pelvic arterial circulation demonstrated a highly vascular right ovarian mass measuring approximately 6 × 4.5 × 5 cm, supplied by abnormal vascular branches arising from the right uterine and right ovarian arteries.

The pathological feeding vessels were selectively catheterized using a microcatheter. N-butyl cyanoacrylate (NBCA) was subsequently injected to occlude the abnormal vascular supply.

Post-embolization angiographic images demonstrated successful occlusion of the targeted pathological feeding vessels and a reduction in the lesion's vascular supply.

Figure 4. Angiographic findings and preoperative embolization.

A–C: Angiographic images demonstrating the highly vascular right ovarian lesion and its pathological arterial and venous vascular structures, supplied by branches of the right uterine and ovarian arteries.
D–F: Selective catheterization and embolization of the pathological feeding vessels using NBCA, with post-embolization images demonstrating successful occlusion of the targeted vascular supply.

### 4.2. Surgical Management

Following embolization, the patient underwent surgical resection by the pediatric surgery team.

Intraoperatively, a well-circumscribed right ovarian mass measuring approximately 5–6 cm was identified. The lesion contained hemorrhagic components and prominent vascular structures.

A sample was obtained for frozen-section examination. According to the preliminary verbal assessment, a definitive distinction between a sex cord-stromal tumor and a germ cell tumor could not be established intraoperatively.

The surgical procedure proceeded with right salpingo-oophorectomy. The right fallopian tube was mobilized, and its vascular and supporting structures were ligated using Hemoclips and LigaSure. The abnormal vascular collaterals surrounding the ovary and tumor were also

controlled.

The resected specimen was removed using an endoscopic retrieval bag. The intra-abdominal lymph nodes were inspected, with no suspicious lymphadenopathy identified. Omentectomy was also performed.

The contralateral ovary appeared macroscopically normal. A biopsy specimen measuring approximately 1 cm was obtained from the left ovary.

Hemostasis was achieved, and the surgical procedure was completed without reported complications.

Figure 5. Intraoperative and macroscopic surgical findings.

A: Identification of the right ovarian mass.
B: Surgical access to the lesion.
C: Exposure of the hemorrhagic components.
D: Right salpingo-oophorectomy.
E and F: Macroscopic appearance of the completely resected lesion.

4.3. Histopathological Findings

Final histopathological examination confirmed a sclerosing stromal tumor originating from the right ovary.

The biopsy specimen obtained from the left ovary demonstrated normal ovarian tissue.

5. Follow-up and Outcomes

The postoperative period was uneventful. No intraoperative complications or significant bleeding events were reported, and the patient did not require blood transfusion.

She was admitted to the pediatric surgical ward for postoperative monitoring and was discharged on postoperative day three.

Following discharge, the patient was scheduled for joint follow-up by the pediatric surgery and vascular and interventional radiology teams.

Ultrasound surveillance was planned at six-month intervals.

6. Discussion

Sclerosing stromal tumor is a rare ovarian sex cord-stromal neoplasm with distinctive clinical, radiological, and histopathological characteristics. Although it is generally considered benign, its rarity and variable imaging appearance may make preoperative diagnosis challenging.

The majority of reported cases occur in young women during the second and third decades of life. Presentation in premenarchal children is particularly unusual [2,6,9]. Our patient was 11 years old, making this case notable from an age-related perspective.

6.1. Imaging Characteristics

SST typically appears as a unilateral, well-defined ovarian mass with heterogeneous solid and cystic components. Its prominent vascularity is one of its important imaging characteristics.

On Doppler ultrasonography, SST may demonstrate marked peripheral and central vascularity, reflecting its characteristic vascular architecture [3].

On CT, the tumor may demonstrate heterogeneous enhancement, with variable solid and cystic

components. Calcifications, although not a defining feature, may occasionally be present [5].

MRI is particularly useful in characterizing SST. The presence of a heterogeneous solid component, a peripheral low-signal rim, and avid contrast enhancement extending from the periphery toward the center can produce a characteristic spoke-wheel appearance. This enhancement pattern has been described as resembling the vascular enhancement pattern of a hemangioma [2,4].

In our patient, ultrasonography demonstrated a solid right adnexal mass with prominent peripheral vascularity and central calcification. CT confirmed a highly vascular lesion with dilated surrounding vascular structures. MRI demonstrated heterogeneous signal characteristics and prominent enhancement, with a spoke-wheel appearance.

Although these findings were compatible with a highly vascular ovarian neoplasm, the rarity of SST and the initial clinical suspicion of ovarian torsion made preoperative diagnosis difficult. Hemangioma and an adnexal mass associated with arteriovenous malformation were initially considered.

### 6.2. Rationale for Preoperative Embolization

Surgical excision remains the standard treatment for ovarian SST. Depending on the patient's age, reproductive considerations, tumor characteristics, and clinical circumstances, ovarian-sparing surgery may be considered when feasible.

However, the prominent vascularity of SST can create technical challenges during surgical dissection and may increase the potential for intraoperative hemorrhage.

Preoperative embolization is an established interventional approach used in selected highly vascular tumors to reduce tumor blood supply before surgical resection. Its application in ovarian SST, however, has not been established.

In our case, angiography demonstrated abnormal vascular supply arising from the right uterine and ovarian arteries. Selective catheterization and NBCA embolization were performed before surgery.

The subsequent surgical procedure was completed without reported significant bleeding, complications, or the need for blood transfusion.

These findings demonstrate the technical feasibility of combining selective preoperative embolization with surgical resection in a highly vascular ovarian SST.

Nevertheless, it is important to acknowledge that the absence of significant intraoperative bleeding in this case does not establish that embolization was solely responsible for the favorable surgical outcome. The potential contribution of embolization to reducing intraoperative blood loss requires further evaluation in additional cases.

### 6.3. Clinical Implications

To our knowledge, this case represents a previously unreported application of preoperative selective embolization in an ovarian SST.

The multidisciplinary approach involving pediatric surgery and vascular and interventional radiology enabled angiographic assessment and targeted embolization of the abnormal tumor-feeding vessels before surgical resection.

We believe that interventional radiology consultation should be considered in selected cases of

markedly vascular ovarian tumors, particularly when preoperative imaging demonstrates extensive abnormal vascularity and the surgical team anticipates an increased risk of hemorrhage.

However, embolization should not be considered a routine requirement for all patients with SST. Decisions should be individualized, taking into account the vascular anatomy, surgical plan, potential embolization-related complications, and the importance of preserving ovarian function.

### 6.4. Limitations

This report describes a single patient and therefore cannot establish the efficacy or superiority of preoperative embolization over surgery alone.

Furthermore, the absence of a quantitative measurement of intraoperative blood loss and the lack of a comparative surgical group limit the assessment of the actual impact of embolization on surgical outcomes.

Longer-term clinical and imaging follow-up will also be important to evaluate the outcome following treatment.

## 7. Conclusion

Sclerosing stromal tumor is an uncommon ovarian neoplasm, particularly in the premenarchal pediatric population. Its marked vascularity may create challenges during surgical resection.

This case demonstrates the feasibility of preoperative selective embolization of a highly vascular ovarian SST using NBCA, followed by uncomplicated surgical resection without the need for blood transfusion.

Although further studies are required to establish its clinical benefit, preoperative embolization may represent a useful adjunct in carefully selected patients with highly vascular ovarian tumors.

A multidisciplinary approach involving pediatric surgery and vascular and interventional radiology may help optimize perioperative management in these uncommon cases.

## 8. Learning Points

1. Sclerosing stromal tumor is a rare ovarian sex cord-stromal tumor that predominantly affects young women and is particularly uncommon in premenarchal girls.
2. Prominent peripheral and central vascularity, together with a characteristic spoke-wheel enhancement pattern on MRI, may suggest the diagnosis of SST.
3. Preoperative embolization may be considered in selected patients with highly vascular ovarian tumors when substantial intraoperative bleeding is anticipated.
4. Collaboration between pediatric surgeons and interventional radiologists can facilitate a multidisciplinary approach to the management of highly vascular ovarian tumors.
5. The potential benefits of preoperative embolization in ovarian SST require further investigation.

## 9. Patient and Family Perspective

The parent's of the patient are grateful for the diagnostic process, treatment, and postoperative experience.

10. Patient Consent

Written informed consent for publication of the clinical information and accompanying images was obtained from the patient's parent. And is available with the authors.

11. Ethics Approval

The need for ethical approval was waived for this case report,in accordance with institutional policyon the reporting of single case reports.

The study was conducted in accordance with the ethical

standards of the institutional research committee and with the 1964 Declaration of Helsinki and its later amendments.

Written informed consent to participate in this case report was obtained from the legal guardian (father) of the girl.

The guardian was informed of the purpose of the case report, the nature of the clinical information to be used, and the

associated risks and benefits before providing consent.

12. Funding

The authors received no financial or material support for this research or publication.

13. Conflict of Interest

The authors,confirm,that no conflicts of interest exist.

14. Data Availability

**The** clinical data supporting this case report are available from the corresponding author upon reasonable request, subject to applicable institutional and patient confidentiality requirements.

15. Clinical Trial Registration

Not applicable.

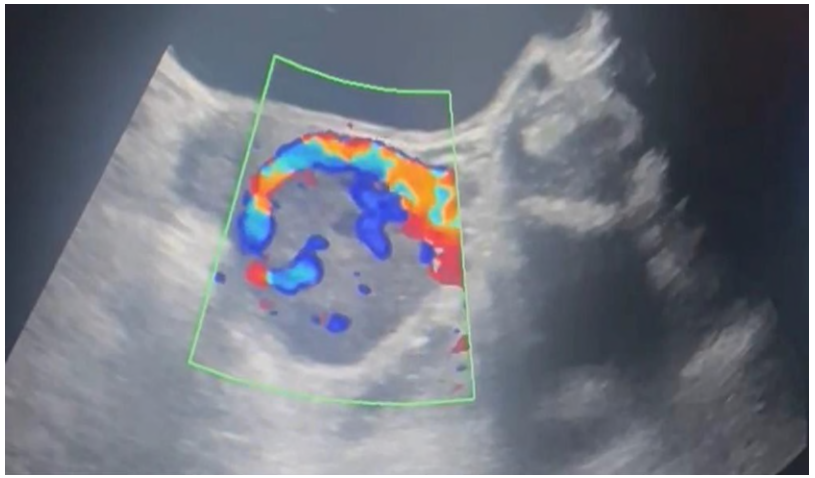
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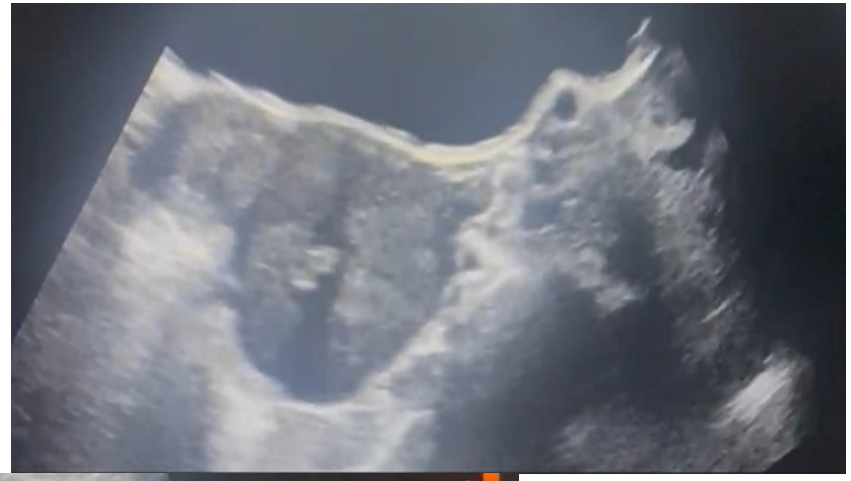
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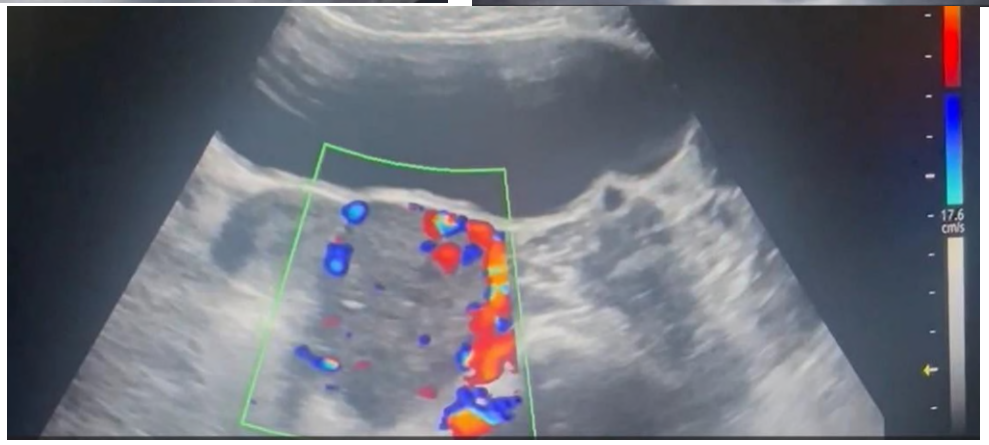


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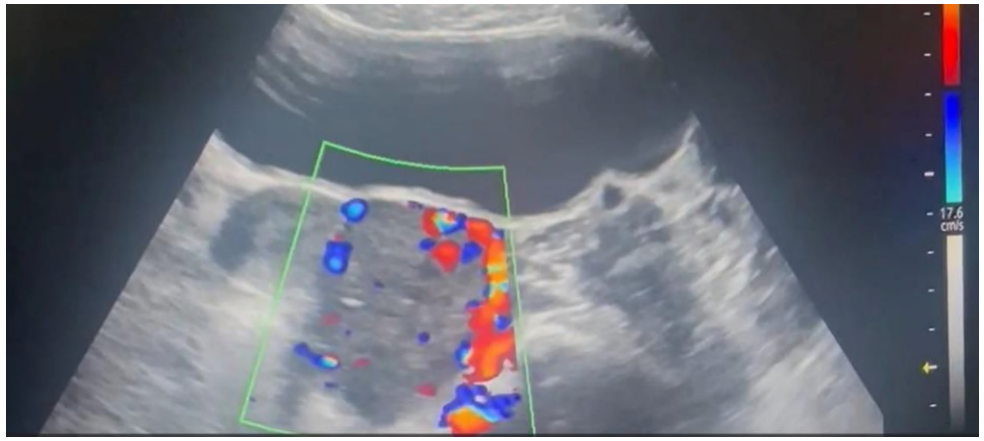
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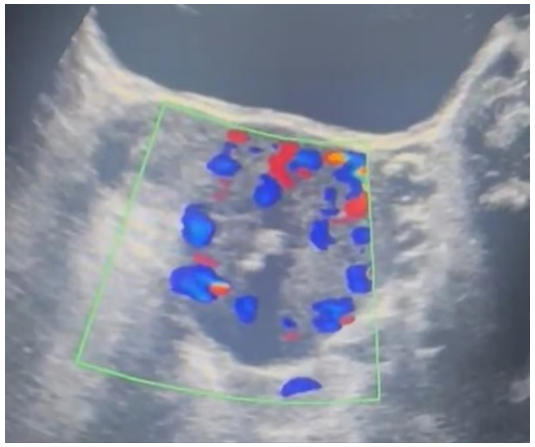


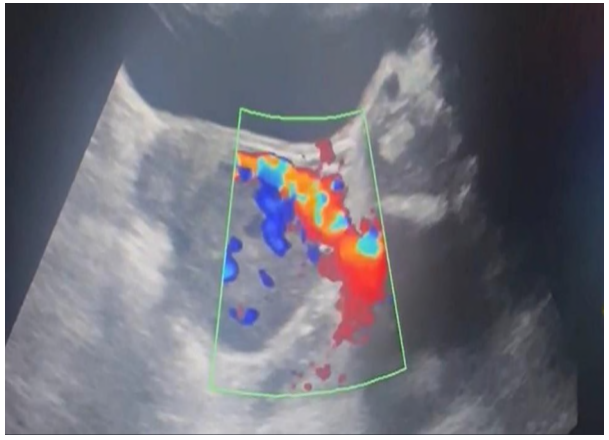

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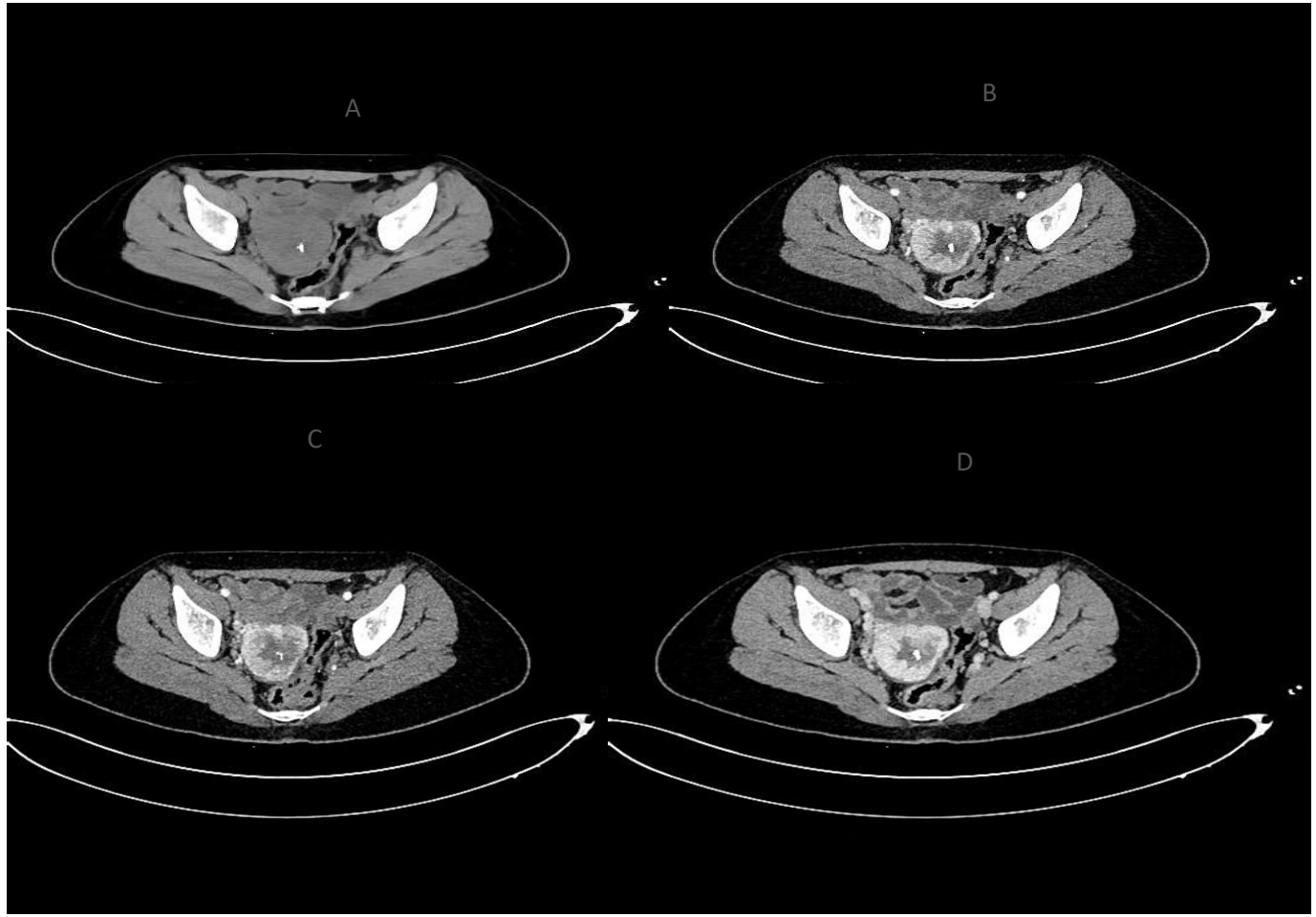
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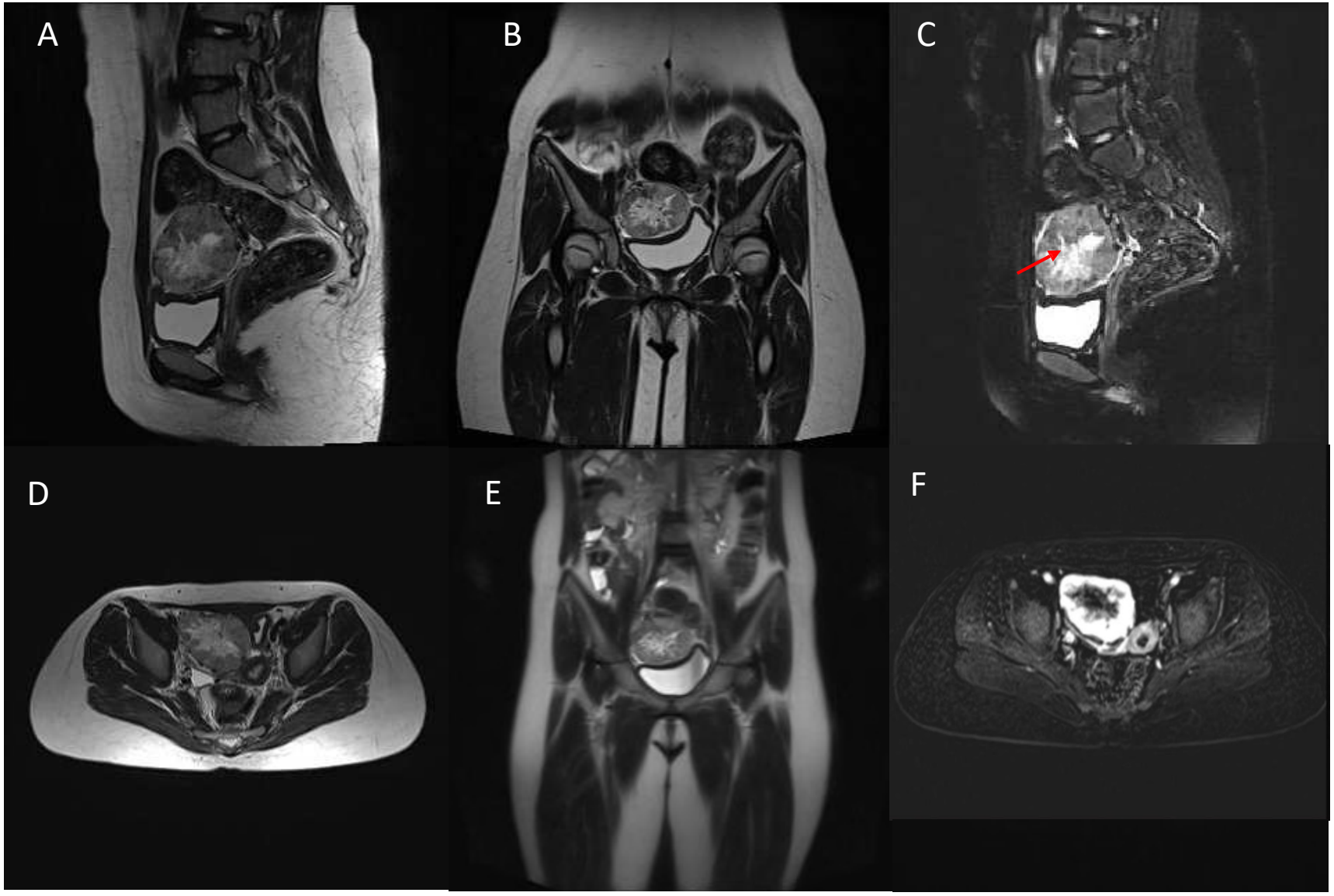



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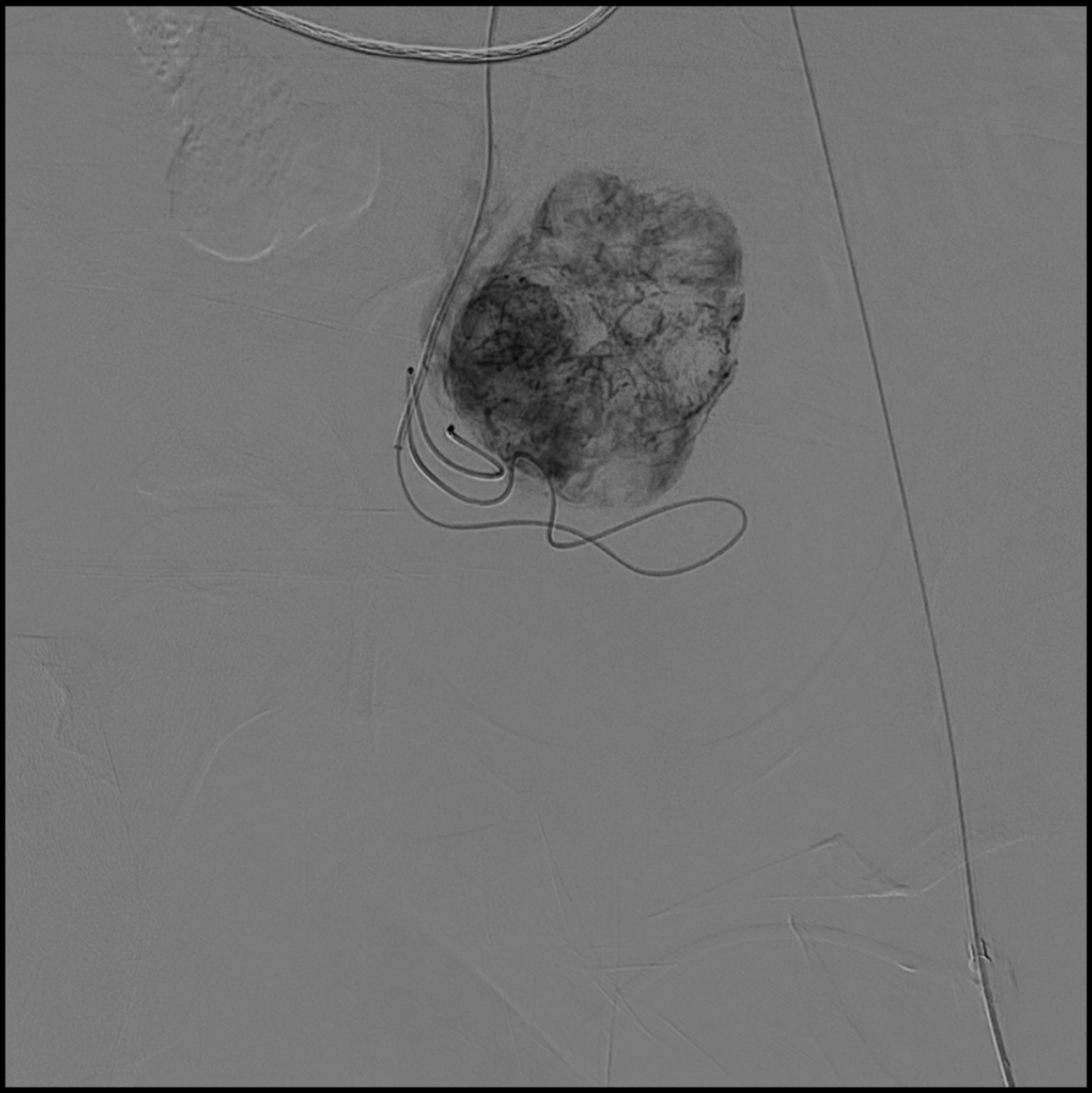



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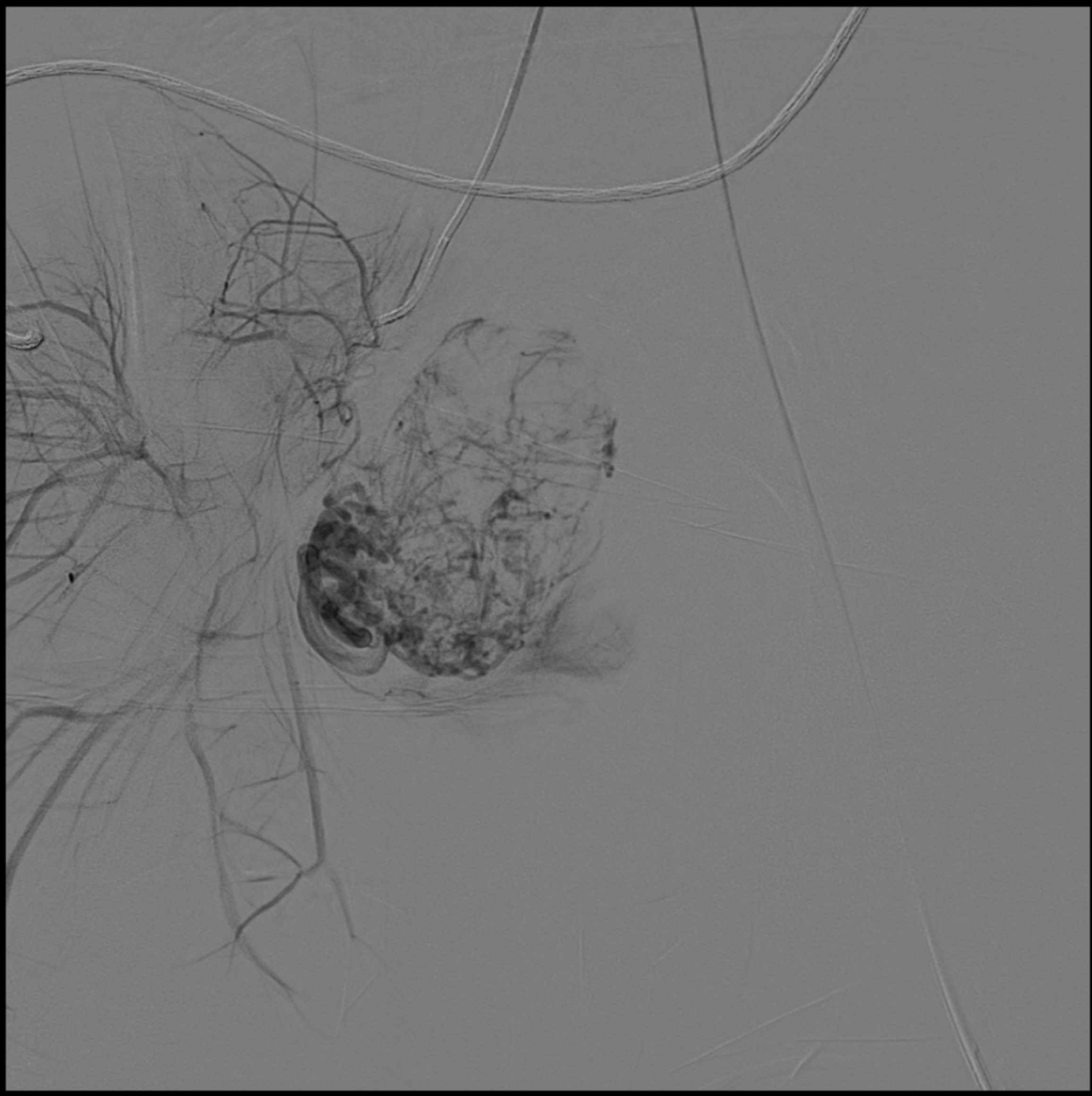


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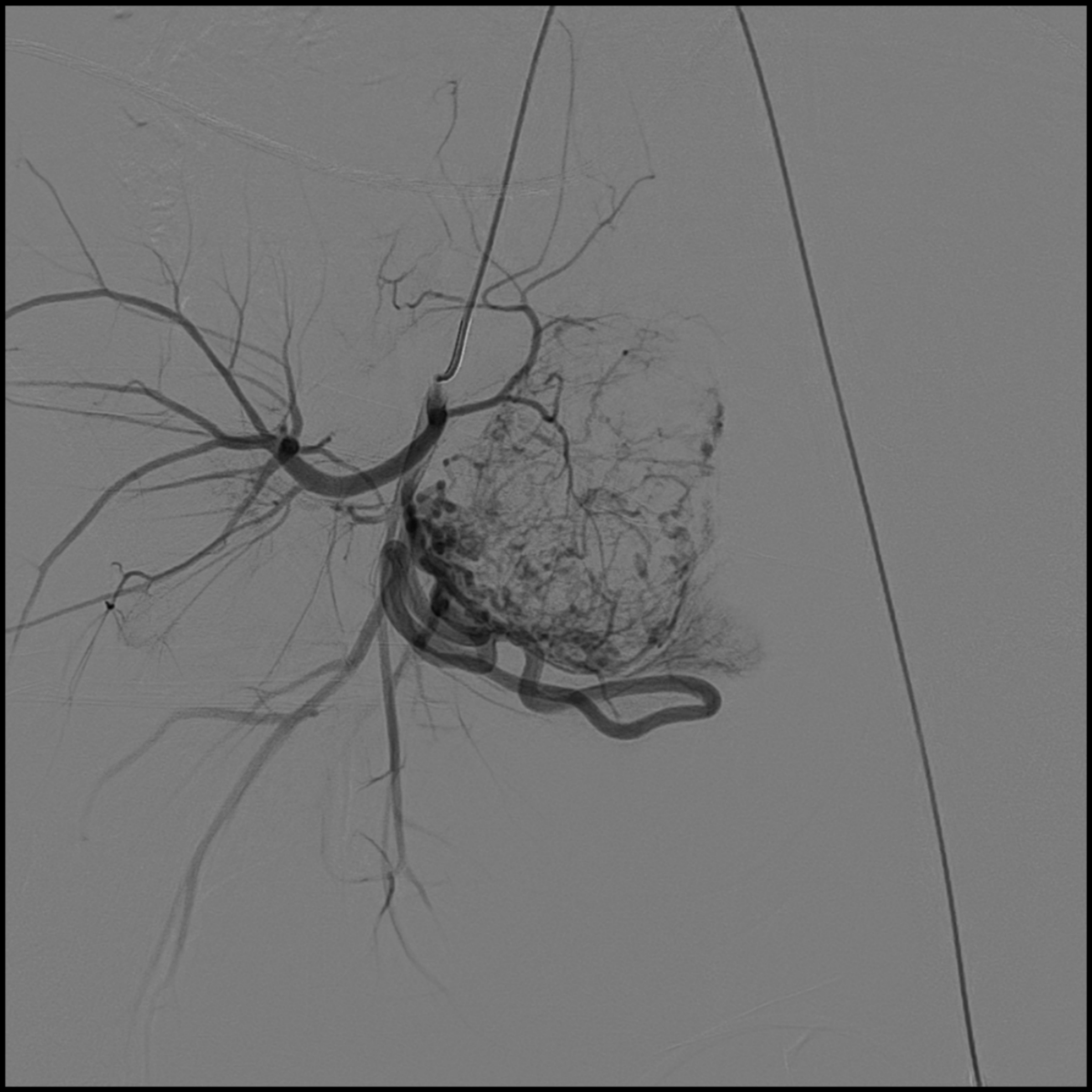
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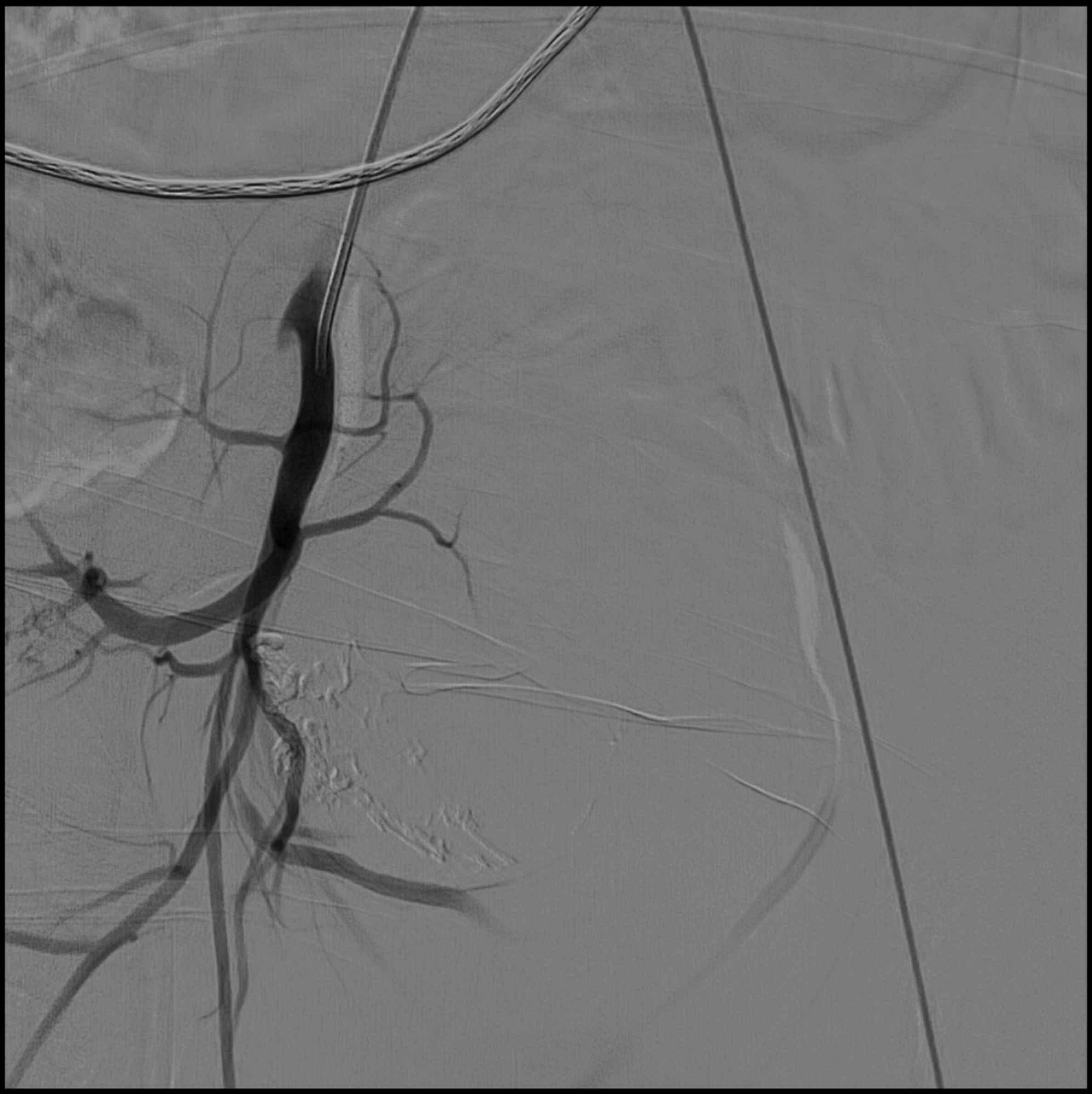
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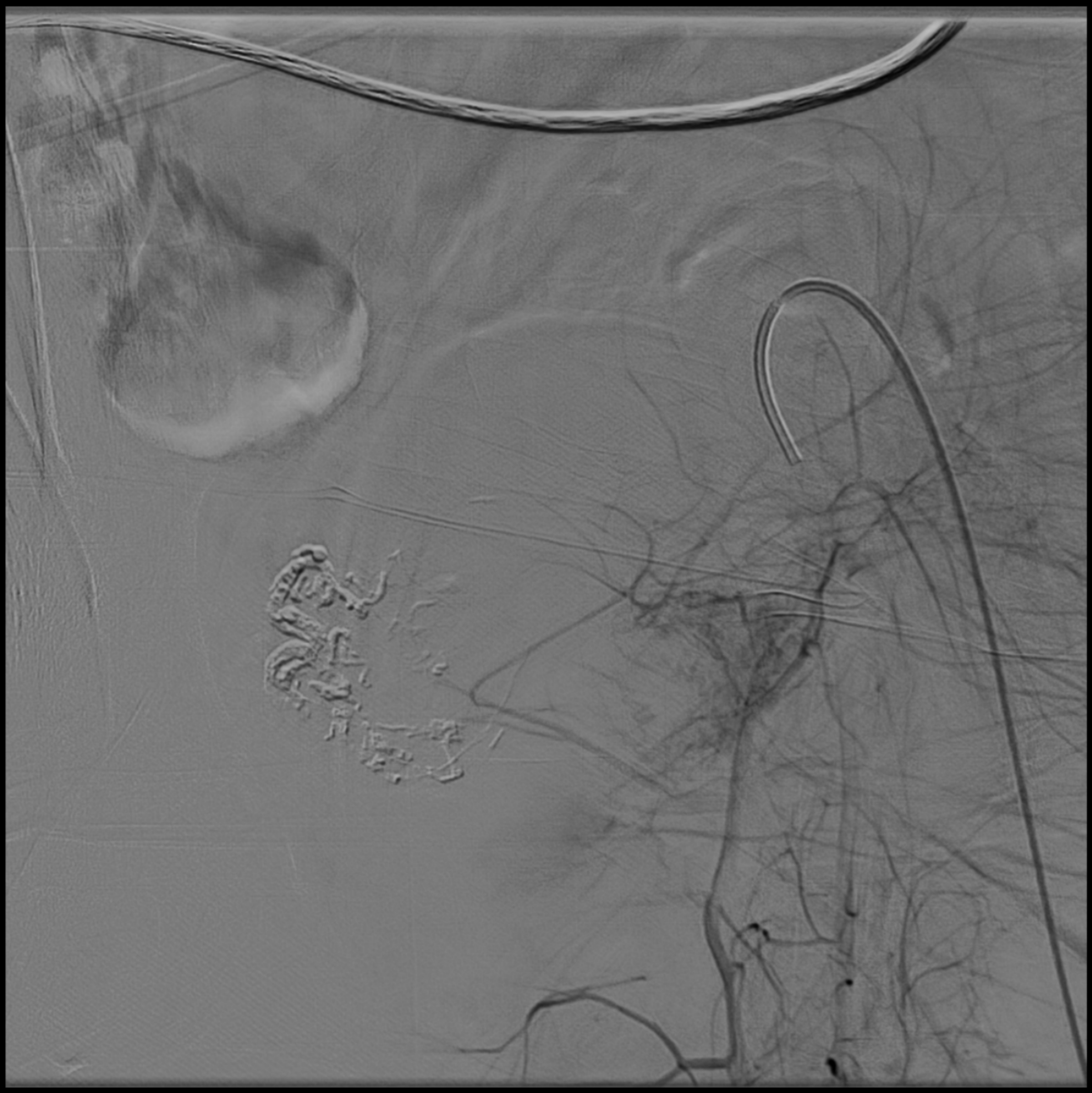


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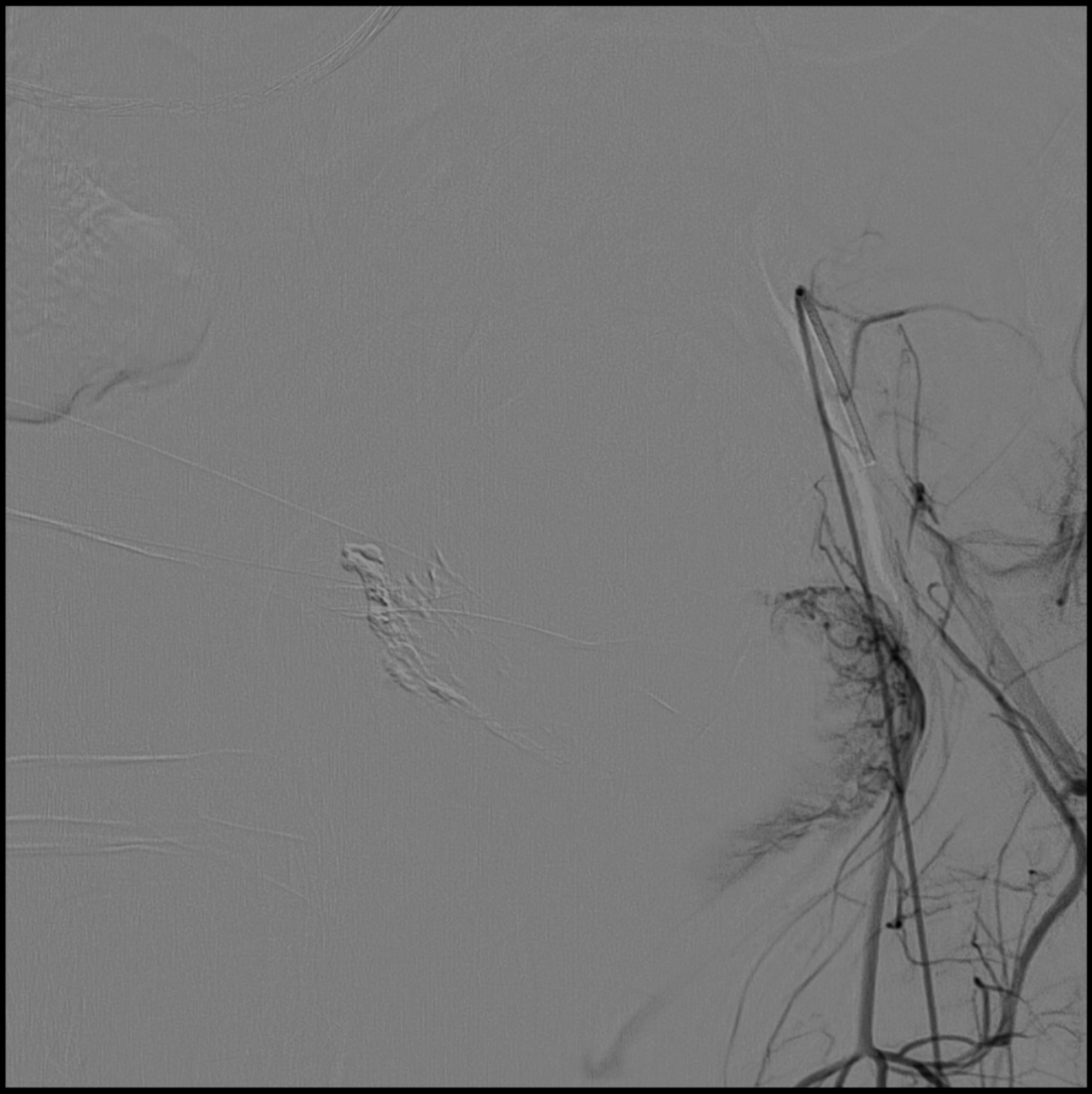






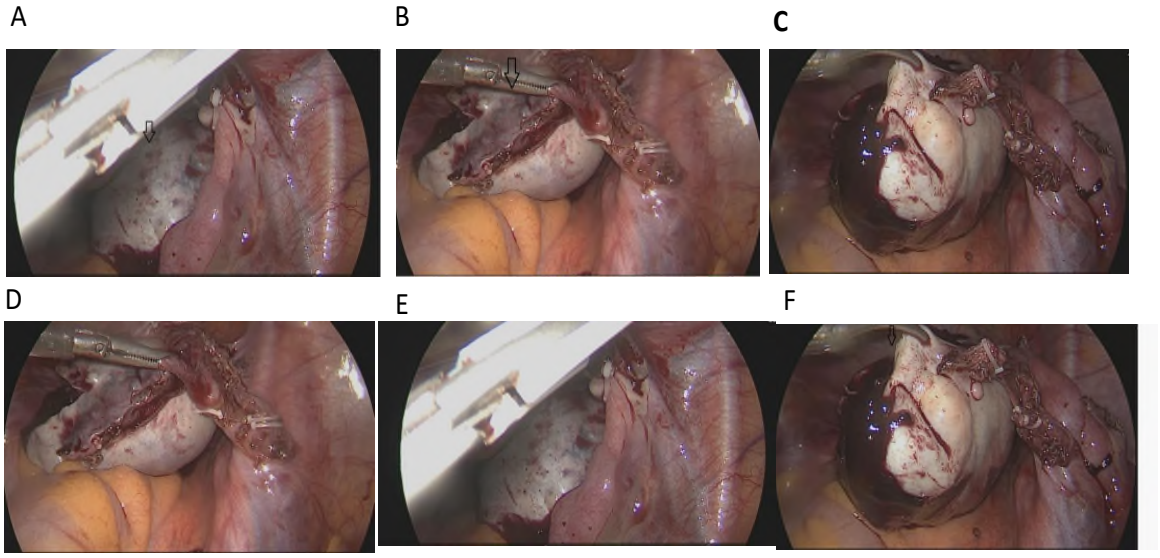
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Macroscopically, the resected specimen was an otherwise encapsulated mass, with focal homorrhages and prominent vasculature was evident. The approximate 5x6 cm mass originating from the right ovary was observed. A piece was taken from the mass and sent frozen. According to the verbal information obtained from the pathologist no clear distinction could be made between sex cord stromal tumor and germ cell tumor in the pathology. The intra-abdominal lymph nodes were examined, and no pathological lymph nodes were found. Omentectomy was performed on the patient. The right fallopian tube was freed from surrounding tissues, and both ends were ligated with Hemoclips and excised with Ligasure. Interventional Radiology team already embolized abnormal vascularization and collaterals were present around the right ovary and tumor, and these vessels were ligated with Hemoclips and excised with Ligasure, freeing the tissues around the right salpingo-oophorectomy. Excised pieces were removed with the help of an endobag. Subsequently, the left ovary was evaluated and appeared normal. Approximately 1 cm piece was taken from the left ovary for biopsy. Bleeding control was performed, and layers were closed in an appropriate manner. The procedure concluded without complications. The biopsy result came back as right ovarian origin Sclerosing stromal tumor . And the left ovary came back normal.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

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