Case Report

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MRI in the Evaluation of Accessory Cavitated Uterine Mass: A Case Report

Radiology Section

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ABSTRACT

Accessory Cavitated Uterine Mass (ACUM) is a rare Müllerian anomaly typically seen in adolescents or young women presenting with severe dysmenorrhoea. It can mimic other pelvic pathologies such as adenomyosis or endometriosis. Magnetic Resonance Imaging (MRI) plays a pivotal role in identifying and characterising the lesion preoperatively. The present case report includes a case of a 21-year-old unmarried woman presenting with severe dysmenorrhoea since menarche. MRI revealed a well-defined intramyometrial cystic lesion near the right uterine cornua, which was mildly hyperintense on T1 and heterogeneously hyperintense on T2, without communication to the endometrial cavity-findings consistent with ACUM. The diagnosis was confirmed after laparoscopic excision and histopathological analysis, resulting in complete postoperative symptom relief. ACUM is a rare but treatable cause of severe dysmenorrhoea in young females. MRI offers crucial diagnostic clarity, allowing for early surgical intervention and improved quality of life.

Keywords: Abdominal pain, Dysmenorrhoea, Magnetic resonance imaging, Müllerian anomaly

CASE REPORT

A 21-year-old unmarried female, previously healthy with a normal Body Mass Index (BMI: 21.8 kg/m^2), presented with a history of severe cyclical lower abdominal pain and dysmenorrhoea. The symptoms began with menarche, which occurred at age 13, and progressively worsened over time. She described the pain as sharp and cramping in nature, predominantly localised to the right lower abdomen, beginning on the first day of menstruation and lasting 3-4 days. Over-the-counter analgesics, including Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), provided minimal relief.

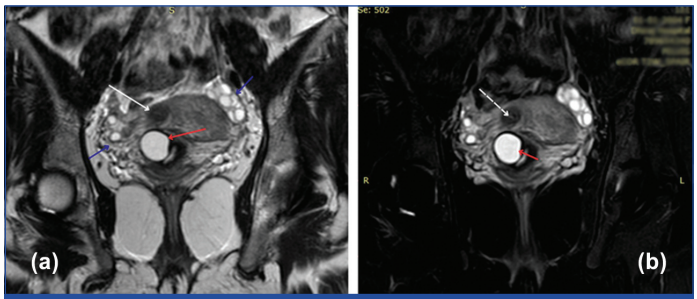
Her general health status was otherwise unremarkable. She denied any history of chronic illnesses such as diabetes, hypertension, tuberculosis, or thyroid dysfunction. There was no family history of endometriosis, uterine anomalies, or early-onset dysmenorrhoea. The patient was not sexually active and had no history of pelvic inflammatory disease, sexually transmitted infections, or gynaecologic interventions. She had regular monthly cycles lasting 4-5 days, with normal flow and no intermenstrual spotting. She denied any gastrointestinal or urinary complaints.

On physical examination, the patient was haemodynamically stable. Her general physical examination was within normal limits, with no signs of pallor, lymphadenopathy, or hirsutism. Abdominal and pelvic examination revealed localised mild tenderness in the right iliac fossa, without palpable masses or organomegaly.

Routine haematological and biochemical investigations were within normal limits. Haemoglobin was 12.8 g/dL, with a total leukocyte count of 6,300/mm^3 and a platelet count of 240,000/mm^3. Inflammatory markers were not elevated, with an Erythrocyte Sedimentation Rate (ESR) of 10 mm/hr and a C-Reactive Protein (CRP) level of less than 3 mg/L. Urinalysis was unremarkable, and serum beta-hCG was negative, ruling out pregnancy.

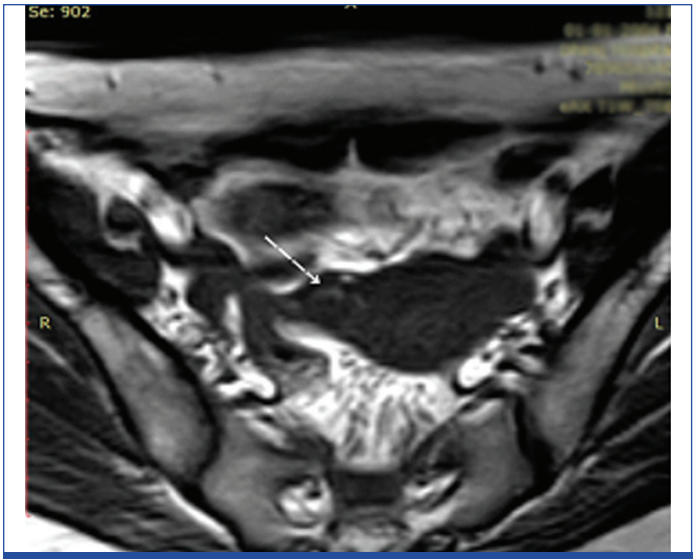
A comprehensive hormonal panel was performed to evaluate any endocrine disorders that might contribute to chronic pelvic pain or dysmenorrhoea. On day 3 of the menstrual cycle, the Follicle-Stimulating Hormone (FSH) was 5.2 mIU/mL, Luteinising Hormone (LH) was 4.8 mIU/mL, and estradiol (E2) was 52 pg/mL, all of which were within normal follicular phase ranges. Mid-luteal phase progesterone was measured at 10.6 ng/mL, confirming ovulation. Thyroid function was normal, with a Thyroid-Stimulating Hormone (TSH) level of 2.3 µIU/mL. Serum prolactin was 14.5 ng/mL. Anti-Müllerian Hormone (AMH) was 4.1 ng/mL, indicating a normal ovarian reserve. These findings supported a normal hypothalamic-pituitary-ovarian axis and helped exclude other common causes of pelvic pain, such as polycystic ovarian syndrome, hypothyroidism, and hyperprolactinaemia.

Transabdominal ultrasonography showed a small, well-defined cystic lesion adjacent to the right uterine cornua, raising suspicion for a congenital uterine anomaly. Pelvic MRI demonstrated a well-circumscribed, round lesion measuring 1.6×1.2×2.2 cm within the right lateral myometrial wall near the uterine cornua. The lesion exhibited mild hyperintensity on T1-weighted images and heterogeneous hyperintensity on T2-weighted images, with a hypointense peripheral rim suggestive of haemorrhagic content. There was no identifiable communication with the endometrial cavity [Table/Fig-1a,2,3]. Both ovaries appeared normal. Additionally, a 2.1×1.8 cm T2 and Short Tau Inversion Recovery (STIR) hyperintense lesion at the cervix was noted, consistent with a Nabothian cyst [Table/Fig-1a,b].

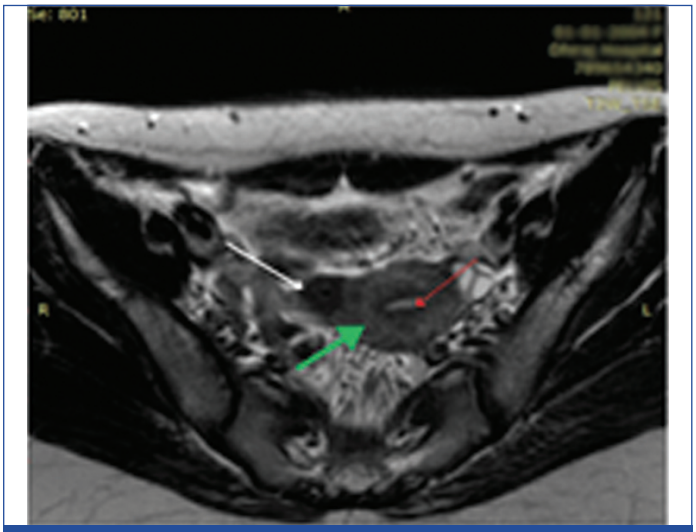


[Table/Fig-1a,b]: T2 and STIR coronal sequences: T2 and STIR shows central hyperintense area - represent blood product (Dashed white Arrow) with surrounding hypointense peripheral rim on T2 WI- represent smooth muscle capsule (White Arrow). Both ovaries seen separately (Blue Arrow). (Red Arrow: Nabothian cyst). (Images from left to right)

Based on the clinical and MRI findings, a diagnosis of ACUM was made. The patient underwent laparoscopic excision of the lesion. Intraoperatively, a bulging mass was identified in the right uterine wall near the insertion of the round ligament. Upon incision, chocolate-colored fluid was evacuated. The mass was completely excised. The excised specimen showed a central haemorrhagic

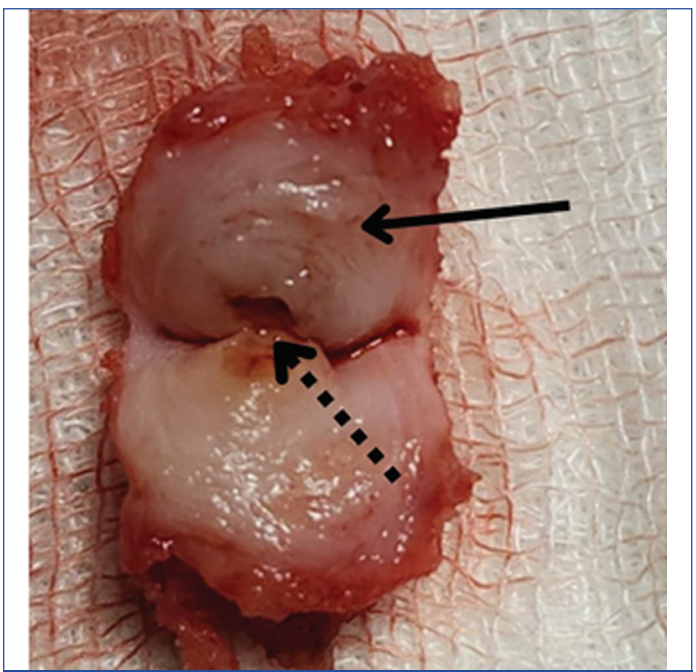


[Table/Fig-2]: T1 Axial image: shows central T1 hyperintense area represent blood product (Dashed white Arrow).



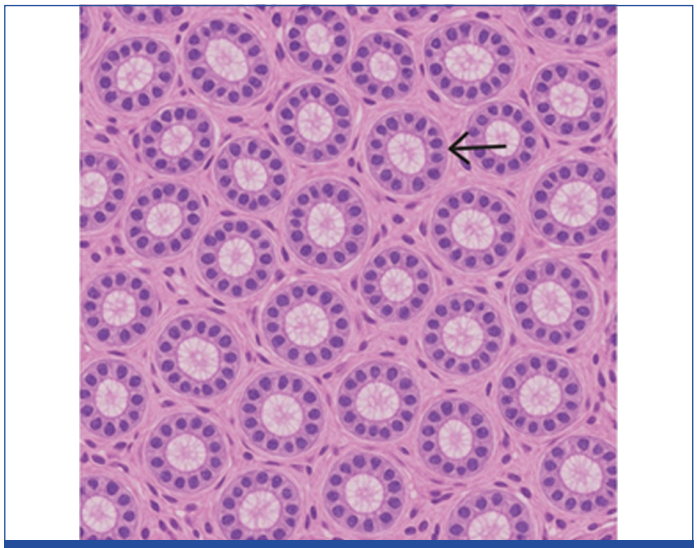
[Table/Fig-3]: T2 axial image: shows no communication of lesion with uterine cavity. (White Arrow: Smooth muscle rim surrounding cavity, Dotted red Arrow: Endometrial cavity, Green arrow: Myometrium).

cavity surrounded by a thick rim of smooth muscle [Table/Fig-4]. No communication with the endometrial cavity was observed.



[Table/Fig-4]: Gross specimen: shows central haemorrhagic cavity (Dotted Black arrow), with surrounding smooth muscle (Black Arrow).

Microscopic examination revealed a cyst lined by endometrial glands and stroma, surrounded by hypertrophied smooth muscle tissue, confirming the diagnosis of ACUM [Table/Fig-5]. The patient had an uneventful postoperative recovery and reported complete resolution of her dysmenorrhoea at follow-up visits. She returned to her academic routine within two weeks and remains symptom-free without recurrence.



[Table/Fig-5]: Histopathological specimen showing cyst lined by endometrial glands (Black Arrow) and stroma surrounded by hypertrophied smooth muscle [Stain: Haematoxylin and Eosin (H&E), 40x magnification].

DISCUSSION

The ACUM is a rare Müllerian anomaly characterised by a cavitated mass containing functional endometrial lining within the myometrium, most often near the round ligament. The rest of the uterus, fallopian tubes, and ovaries are typically normal [1]. ACUM is considered an underdiagnosed entity. It was first clearly described and defined by Acién et al., in 2010 [1]. Acién P et al., suggested that ACUM may represent a variant of Müllerian duct anomalies related to dysfunction or duplication of the gubernaculum during embryogenesis, which leads to an isolated accessory cavity adjacent to the uterus [1]. A 2012 series by Acién P et al., analysing eight cases, was among the earliest efforts to characterise the condition [1]. A recent review of literature and pooled analysis of reported cases estimated that fewer than 100 cases have been documented worldwide, emphasising its extreme rarity [2,3]. In the Indian context, there are only sporadic case reports and small institutional series, with most cases being misdiagnosed preoperatively as degenerating fibroids or adenomyosis [4,5]. No large-scale epidemiological studies have been conducted in India to estimate the true prevalence.

ACUM is believed to originate due to focal duplication or persistence of paramesonephric tissue during embryogenesis. The most accepted theory suggests that this results from dysfunction of the gubernaculum, a structure that guides the proper positioning of the ovaries and Müllerian ducts. Improper resorption or fusion of these duplicated structures leads to the formation of a noncommunicating, endometrial-lined cavity within the myometrium, typically beneath the insertion of the round ligament. This ectopic cavity undergoes cyclical bleeding in response to hormonal stimulation, leading to the accumulation of haemorrhagic content and the characteristic symptoms of severe dysmenorrhoea and chronic pelvic pain, despite regular menstrual cycles and a normal uterine cavity on imaging [1,2]. The clinical presentation is pathognomonic: early-onset severe dysmenorrhoea, cyclical localised pelvic pain, and no relief with conventional medical therapy [6].

The MRI is the gold standard for the non-invasive diagnosis of ACUM due to its superior soft tissue contrast and multiplanar imaging capabilities. The typical MRI features of ACUM include a well-circumscribed intramyometrial mass, usually located near

the uterine cornua or adjacent to the round ligament. The lesion often demonstrates T1 hyperintensity, reflecting haemorrhagic content, and T2 heterogeneity with shading, suggestive of cyclic or chronic bleeding. A hypointense peripheral rim is usually present, representing the surrounding smooth muscle capsule. Critically, there is no communication between the lesion and the endometrial cavity [7-9]. In the present case, MRI demonstrated these classical features, supporting a strong presumptive diagnosis of ACUM and facilitating timely surgical planning and intervention. Several Gynaecological pathologies may mimic ACUM both clinically and radiologically. Important differentials are included in [Table/Fig-6] [7,8,10-13].

Takeuchi H et al., (2012) first highlighted the presentation of severe dysmenorrhoea in young women, with MRI findings confirming ACUM and complete symptom resolution following surgical excision [14]. Similarly, Bhalla A et al., (2020) reported a 19-year-old patient presenting with dysmenorrhoea, where Transvaginal Sonography (TVS) and MRI facilitated preoperative diagnosis; laparoscopic excision led to full symptomatic relief [15]. Pisat S et al., (2021) described a case series of 11 patients aged 13 to 29 years presenting primarily with pelvic pain; all underwent MRI evaluation and subsequent surgical excision, resulting in a cure [16].

Lee JH et al., (2018) described young women aged 15-25 presenting with early-onset severe dysmenorrhoea, where MRI demonstrated a characteristic well-circumscribed haemorrhagic intramyometrial lesion near the round ligament, similar to the present case report patient's lesion in size and location [17]. Their patients also experienced complete symptom resolution following laparoscopic removal, underscoring the efficacy of surgical management [17]. Kumar R et al., (2019) reported comparable clinical and imaging features in a 22-year-old female with refractory dysmenorrhoea and chronic pelvic pain; MRI revealed the classic T1 hyperintense haemorrhagic cystic mass with a peripheral hypointense rim, consistent with ACUM. Postoperative outcomes mirrored those in the present case, with complete symptom relief and an uneventful recovery [18].

Management primarily involves minimally invasive surgical excision, which offers definitive treatment, alleviating pain and preventing recurrent haematometra formation. Hormonal therapies and NSAIDs are often ineffective, as evidenced in the present case and in reported literature [2].

While ACUM predominantly presents with severe dysmenorrhoea and chronic pelvic pain, its implications for fertility remain a critical consideration for Gynaecologists. Currently, there is limited but reassuring evidence that surgical excision of the accessory cavitated mass preserves uterine integrity and does not adversely affect future fertility. Given that ACUM lesions are typically localised and do not communicate with the endometrial cavity, complete laparoscopic

Condition	Age group	Imaging Features (MRI)	Communication with uterine cavity	Histopathology	Key differentiating features
Accessory Cavitated Uterine Mass (ACUM)	Adolescents/young adults (13-30 y)	Well-circumscribed, round or oval intramyometrial lesion located near uterine cornua or round ligament insertion; T1 hyperintense due to subacute haemorrhage; T2 heterogeneous with "shading" effect indicating chronic blood products; peripheral hypointense rim representing smooth muscle capsule; no adjacent myometrial invasion; no enhancement post-contrast except capsule	No	Endometrial lining + surrounding smooth muscle	Normal uterus; no other anomalies; location near round ligament
Cystic adenomyosis	30-50 y	Ill-defined, poorly demarcated myometrial thickening or lesion with multiple small cystic spaces (<5 mm); minimal or absent T1 hyperintensity; T2 shows small hyperintense foci within thickened junctional zone; diffuse or focal junctional zone thickening (>12 mm); variable contrast enhancement; absence of a discrete capsule	No	Scattered endometrial glands within myometrium	Older age group; diffuse lesions; often associated with menorrhagia
Non-communicating rudimentary horn	Adolescents/young adults	Well-defined hemi-uterine structure with muscular wall and central endometrial stripe; T1 hyperintense areas if haematometra present; T2 hyperintense endometrial lining clearly visualised; often asymmetric uterine contour; may show ipsilateral renal agenesis; tubular structure connecting to uterus or broad ligament; possible dilated fallopian tube on ipsilateral side	Usually No	Functional endometrium + myometrium; presence of fallopian tube	Associated uterine anomaly; horn-shaped structure; renal anomalies
Endometrioma	Reproductive age	Ovarian cystic lesion with homogeneous high signal on T1-weighted images (due to blood products); shading sign on T2-weighted images with low signal intensity reflecting chronic haemorrhage; usually well-defined margins; no internal septations; lack of enhancement post-contrast; adjacent ovarian tissue compressed	No	Endometrial tissue with hemosiderin-laden macrophages	Ovarian location; not intramyometrial
Degenerating fibroid (cystic)	>30 years	Well-circumscribed intramural mass with variable signal intensity; areas of cystic degeneration appear hyperintense on T2, hypointense on T1; peripheral rim may enhance after contrast; absence of haemorrhagic signal on T1; possible calcifications seen as signal voids; mass effect on adjacent myometrium; no endometrial lining	No	Degenerating smooth muscle with no endometrial lining	No cyclical pain; absence of endometrial tissue

[Table/Fig-6]: This table compares ACUM with other common differential diagnoses based on detailed MRI features, age group, communication with the uterine cavity, histopathology, and key clinical and imaging distinctions [7,8,10-13].

resection often results in symptom resolution without compromising the main uterine cavity or endometrial function [7,14]. However, long-term fertility outcomes have yet to be comprehensively studied, necessitating close follow-up and individualised fertility counseling.

CONCLUSION(S)

The ACUM, though rare, should be suspected in adolescent females with severe dysmenorrhoea unresponsive to medical therapy and a cystic lesion near the uterine horn. MRI provides crucial information for diagnosis and surgical planning. Early diagnosis followed by laparoscopic excision offers complete symptom relief and avoids unnecessary treatments.

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