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Research Article

Uterine Arteriovenous Malformations: Clinical Presentation and Management Outcomes.

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Abstract

Uterine arteriovenous malformations (AVMs) are rare but potentially life-threatening vascular anomalies that can cause abnormal uterine bleeding, often following pregnancy, cesarean section, or uterine instrumentation. This case series evaluates the clinical presentation, management, and outcomes of four patients diagnosed with uterine AVM. Among these, one patient conceived spontaneously after previous uterine artery embolization (UAE) and remained asymptomatic at 5 months of gestation. Another patient presented with abnormal vaginal bleeding managed successfully with hormonal therapy (primulet N), resulting in lesion resolution. Two other patients, both with histories of miscarriage and dilation & curettage, presented with heavy bleeding and anemia; one underwent UAE, while the other responded to combined medical management with hormonal therapy. All patients achieved symptom resolution without recurrence during follow-up. These findings suggest that uterine AVMs can be effectively managed with individualized treatment strategies, including conservative medical therapy and UAE, depending on hemodynamic stability, severity of bleeding, and fertility desires.

Keywords: Uterine arteriovenous malformation, abnormal uterine bleeding, uterine artery embolization, medical management.

Introduction

Uterine arteriovenous malformations (AVMs) are rare vascular anomalies characterized by abnormal direct connections between arteries and veins within the myometrium, bypassing the capillary network. These lesions can be congenital or acquired, with the latter often occurring after uterine trauma, cesarean sections, curettage procedures, or complicated pregnancies. Acquired AVMs are increasingly recognized due to advances in imaging modalities such as Doppler

ultrasonography, computed tomography angiography (CTA), and magnetic resonance imaging (MRI).[1-4]

Clinically, uterine AVMs can present with a spectrum of symptoms ranging from mild irregular bleeding to severe, life-threatening hemorrhage. Hemodynamic instability and severe anemia are common complications in patients presenting with acute bleeding episodes. While some cases remain asymptomatic and are detected incidentally, prompt diagnosis is essential to prevent morbidity and to preserve fertility, particularly in women of reproductive age.[5-8]

Management of uterine AVMs remains individualized, depending on the patient's clinical stability, reproductive plans, and the size and location of the lesion. Historically, hysterectomy was considered the definitive treatment, especially in women with uncontrolled bleeding or completed family planning. However, the advent of uterine artery embolization (UAE) has provided a minimally invasive alternative, offering effective hemostasis while preserving uterine integrity and fertility potential.[9-12]

Conservative medical management, including hormonal therapy with combined oral contraceptives or progestin therapy, has been reported to reduce bleeding and induce lesion regression in select cases. Such management is particularly relevant for hemodynamically stable patients, those desiring future fertility, or patients with small AVMs. Literature reports variable success rates, and the decision to pursue medical versus interventional therapy requires careful assessment.

This case series aims to describe the clinical presentations, management strategies, and outcomes of four patients diagnosed with uterine AVMs in a tertiary care setting. The series highlights both interventional and medical management approaches and emphasizes individualized care based on clinical circumstances.

Methodology

This is a retrospective observational case series conducted at Regional Headquarter Hospital, Skardu. Four female patients diagnosed with uterine AVMs were included. Ethical approval was obtained from the institutional review board, and informed consent was obtained from all participants for publication.

Inclusion Criteria:

- Women aged 20–45 years
- Diagnosis of uterine AVM confirmed by Doppler ultrasonography and/or CTA

- Clinical presentation with abnormal uterine bleeding or incidental AVM detection

Exclusion Criteria:

- Congenital AVMs associated with systemic vascular anomalies
- Patients with concurrent coagulopathies or malignancies
- Incomplete clinical or imaging data

Data Collection:

Demographic data, obstetric and gynecological history, clinical presentation, laboratory parameters (including hemoglobin levels), imaging findings, management strategy (medical therapy or UAE), and follow-up outcomes were recorded.

Management Approach:

- **Uterine Artery Embolization (UAE):** Patients with significant bleeding or hemodynamic compromise were referred for UAE. Embolization was performed using standard interventional radiology techniques.
- **Medical Management:** Hemodynamically stable patients were treated with hormonal therapy, including combined oral contraceptive pills (COCP) or progestin therapy (primulet N), typically for 3–6 months. Follow-up imaging was performed to confirm lesion resolution.

Outcome Measures:

- Resolution of abnormal uterine bleeding
- Lesion regression on imaging
- Preservation of fertility and subsequent pregnancy outcomes

Statistical Analysis:

Descriptive statistics were used to summarize the clinical characteristics, management, and outcomes. Due to the small sample size, no inferential statistics were performed.

Results

Table 1: Demographic and Clinical Characteristics of Patients with Uterine AVM

Case	Age (yrs)	Gravida/Para	History	Presentation	Hemodynamic Status	Hemoglobin (g/dL)	Management	Outcome
1	32	G3P2A0	Previous 2 C-sections, UAE 8 yrs ago	Asymptomatic, 5 months gestation	Stable	11.5	Observation	Symptom-free, ongoing pregnancy
2	38	P5A0	No comorbidities	Abnormal vaginal bleeding	Stable	12.2	Primulet N for 6 months	Bleeding resolved, lesion regressed
3	29	P0A2	Spontaneous miscarriage, DNC	Heavy bleeding, severe anemia	Stable post-transfusion	7.5	Medical management	Symptom-free, lesion regressed
4	35	P3A2	Last DNC	Off and on heavy bleeding, anemia	Stable	8.2	COCP for 6 months	Symptom-free, lesion resolved

Table 2: Timeline of Patient Management (Case Series)

Case	Presentation	Initial Management	Duration	Follow-Up Outcome
1	5 months gestation, asymptomatic	Observation	Ongoing	Symptom-free pregnancy
2	Abnormal bleeding	Primulet N	6 months	Lesion resolved

Case	Presentation	Initial Management	Duration	Follow-Up Outcome
3	Heavy bleeding, anemia	Medical therapy	3–4 months	Symptom-free, lesion regressed
4	Heavy bleeding post-DNC	COCP	6 months	Symptom-free, lesion resolved

This timeline illustrates that conservative therapy can be effective over a period of 3–6 months, while observation or prior UAE allows safe subsequent pregnancy.

Interpretation:

- Three patients were managed conservatively with medical therapy (hormonal treatment), and one patient underwent prior UAE before subsequent pregnancy.
- All patients achieved symptom resolution without recurrence during follow-up.
- Fertility was preserved in all cases, and one patient had a successful ongoing pregnancy.

Discussion

Uterine AVMs, though rare, pose a significant risk of abnormal uterine bleeding, which can lead to severe anemia and hemodynamic instability. The cases presented highlight diverse clinical scenarios: AVMs occurring after cesarean sections, dilation and curettage, or spontaneous miscarriage. These findings are consistent with literature suggesting that uterine trauma is a common precipitating factor for acquired AVMs.

Conservative medical management using hormonal therapy was effective in three patients, resulting in lesion regression and symptom resolution. These findings support prior studies demonstrating the efficacy of COCP and progestin therapy in hemodynamically stable patients with small to moderate AVMs. Medical therapy offers the advantages of being minimally invasive, cost-effective, and preserving fertility.[14-17]

The first case illustrates the long-term success of UAE in managing AVMs and the potential for subsequent successful pregnancy. This underscores the importance of individualized treatment, balancing the urgency of hemostasis against fertility preservation. UAE remains a critical intervention for patients with severe bleeding or anemia, but it is not always necessary in stable cases.

Anemia was a common complication in patients presenting with heavy bleeding, emphasizing the need for prompt hematologic management before definitive therapy. Follow-up imaging is essential to confirm AVM regression, particularly in conservatively managed patients.

Overall, the series demonstrates that individualized treatment, guided by hemodynamic status, lesion size, and reproductive plans, can result in favorable outcomes. Conservative management is effective for stable patients, while UAE provides definitive treatment for acute or severe cases.

Uterine arteriovenous malformations (AVMs) are uncommon vascular anomalies that pose a significant risk of abnormal uterine bleeding. The etiology of AVMs can be congenital or acquired, with acquired AVMs commonly resulting from uterine trauma such as cesarean sections, curettage, or spontaneous miscarriages, as illustrated in the present series. Three out of four cases were acquired, highlighting the importance of careful monitoring following uterine instrumentation.[18-20]

The clinical presentation varies from asymptomatic lesions to severe, life-threatening hemorrhage. In this series, the severity ranged from incidental detection in a pregnant patient to severe bleeding with anemia necessitating transfusion. This variability emphasizes the need for individualized assessment, particularly considering patient age, parity, reproductive goals, and hemodynamic status.

Conservative medical management using hormonal therapy was effective in three patients. Combined oral contraceptives (COCP) and progestin therapy (Primulet N) likely facilitated lesion regression by reducing endometrial vascularity and stabilizing uterine hemodynamics. These findings corroborate reports suggesting that hormonal therapy can be a safe and effective first-line option for hemodynamically stable patients.

Uterine artery embolization (UAE) remains the cornerstone intervention for acute or refractory cases. In the first patient, prior UAE successfully managed AVM, allowing for a subsequent healthy pregnancy. This underscores UAE's role not only in achieving hemostasis but also in preserving fertility. Literature reports high technical and clinical success rates of UAE, with pregnancy outcomes comparable to the general population when performed in reproductive-aged women.

Anemia secondary to heavy bleeding was managed efficiently with transfusions and iron supplementation. Prompt correction of hemoglobin levels is crucial before initiating definitive therapy, particularly in patients undergoing interventional procedures.

Follow-up imaging in all patients confirmed regression or resolution of AVM lesions. This demonstrates that both medical therapy and UAE can achieve favorable structural outcomes if applied appropriately. Importantly, no recurrence was observed during follow-up, reinforcing the efficacy of individualized management strategies.

The case series highlights the importance of a stepwise approach: stabilizing the patient hemodynamically, selecting therapy based on severity and fertility goals, and confirming lesion resolution with imaging. Medical therapy can be first-line in mild, stable cases, while UAE is reserved for severe bleeding, anemia, or failed medical management. Such an approach reduces unnecessary interventions while ensuring patient safety and reproductive preservation.

Future research should explore standardized protocols for conservative management, long-term reproductive outcomes after AVM therapy, and the role of newer minimally invasive techniques to further refine patient care.

Conclusion

Uterine AVMs can be successfully managed with individualized strategies, including conservative hormonal therapy and UAE. Symptom resolution and fertility preservation are achievable in most cases when management is tailored to clinical severity and patient preferences. Early diagnosis and appropriate intervention are crucial to prevent complications such as severe anemia or hemorrhage.

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