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Case Report

Vaginal calculus formation around eroded vaginal mesh with actinomycosis presenting as postmenopausal bleeding in a post-hysterectomy woman: a rare case report

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ABSTRACT

Vaginal calculi are exceptionally rare and usually develop secondary to foreign bodies, chronic infection, urinary contamination, or eroded synthetic materials. Presentation as post-menopausal bleeding is uncommon and may mimic genital tract malignancy. The coexistence of mesh erosion, actinomycosis, and vaginal calculus formation is exceedingly rare. A 68-year-old postmenopausal multiparous woman presented with bleeding per vaginum. She had undergone abdominal hysterectomy approximately 20 years earlier. Pelvic examination revealed a hard posterior vaginal wall mass suspicious for malignancy. Examination under anesthesia and vaginoscopy demonstrated a vaginal calculus surrounding eroded mesh protruding through the posterior vaginal wall. Complete removal of the calculus and exposed mesh was performed. Histopathological examination revealed actinomycosis without evidence of malignancy. The postoperative course was uneventful. Vaginal calculus formation secondary to mesh erosion with associated actinomycosis should be considered in elderly women presenting with post-menopausal bleeding. Histopathological examination is essential for excluding malignancy and confirming the diagnosis.

Keywords: Vaginal calculus, Mesh erosion, Actinomycosis, Postmenopausal bleeding, Vaginoscopy, Case report

INTRODUCTION

Vaginal calculi are rare clinical entities that develop either primarily due to urinary stasis or secondarily around a nidus such as foreign bodies, non-absorbable sutures, synthetic mesh, or chronic inflammatory tissue.[1,2] Primary vaginal calculi result from intravaginal urinary stasis in the setting of congenital genitourinary anomalies, trauma, fistulae, or obstructions, and are more commonly encountered in younger patients with congenital anomalies or elderly patients with fistulas.[3,4] Secondary vaginal calculi occur due to deposition of urinary salts around a foreign body that serves as the stone's nucleus, and have been reported in association with intrauterine contraceptive devices, vaginal pessaries, non-absorbable sutures, and eroded surgical mesh.[1,5,6] The underlying pathophysiology involves urine stagnation and urease-positive bacterial involvement, leading to alkalization of the physiologically acidic vaginal environment and subsequent mineral deposition.[3,7] Synthetic mesh has been used in pelvic floor reconstructive surgery since the 1950s, with increasing application in urogynecological procedures for stress urinary incontinence and pelvic organ prolapse repair.[8] Despite improved anatomical outcomes, mesh-related complications including erosion, exposure, infection, chronic pain, and dyspareunia remain significant concerns.[9,10] The incidence of mesh erosion varies widely depending on the type of procedure, mesh material, and surgical approach, ranging from 0% to 33% in earlier literature, with more recent meta-analyses

reporting mean erosion rates of approximately 10.3% for prolapse repair.[9] Mesh erosion through the vaginal epithelium represents the most commonly reported mesh-specific complication and can serve as a nidus for chronic inflammation, bacterial colonization, and subsequent calculus formation.[8,10]

Actinomycosis is a chronic granulomatous infection caused by anaerobic gram-positive filamentous bacteria of the genus actinomyces, characterized by suppurative inflammation, sinus tract formation, and the pathognomonic presence of sulfur granules on histopathological examination.[11,12] These organisms are part of the normal flora of the oral cavity, gastrointestinal tract, and female urogenital tract, and typically cause deep-seated infections only when mucosal barriers are breached by trauma, surgery, or foreign bodies.[12] Foreign-body-associated actinomycosis has been well documented in association with intrauterine devices and surgical materials, where the foreign body facilitates colonization and chronic infection by providing a surface for biofilm formation.[11,13] In the context of pelvic floor surgery, actinomyces infection has been reported as a late complication of transvaginal mesh placement, presenting years after the initial procedure with recurrent mesh exposure, persistent vaginal discharge, or chronic pelvic pain.[13,14] The clinical presentation of vaginal calculus with mesh erosion is often nonspecific and may include vaginal discharge, bleeding, dyspareunia, pelvic pain, or the sensation of a vaginal mass.[5,6]

In postmenopausal women, these symptoms frequently raise concern for genital tract malignancy, necessitating thorough evaluation and histopathological confirmation.[1,2] The coexistence of mesh erosion, actinomycosis, and vaginal calculus formation is exceedingly rare, with only isolated case reports documented in the literature.[6,14] We report a rare case of vaginal calculus formation around eroded mesh associated with vaginal actinomycosis presenting as post-menopausal bleeding in a woman with previous abdominal hysterectomy, and discuss the diagnostic challenges and therapeutic implications.

CASE REPORT

A 68-year-old multiparous postmenopausal woman presented to the gynecology outpatient department with complaints of bleeding per vaginum of one-month duration. The bleeding was intermittent, minimal in amount, and not associated with pain, foul-smelling discharge, or urinary symptoms. She had undergone abdominal hysterectomy approximately 20 years earlier for uterine fibroids, and there was no history of mesh placement or pelvic reconstructive surgery to her knowledge. Her obstetric history was significant for three full-term normal vaginal deliveries and one first-trimester abortion managed by dilatation and curettage. She had no history of diabetes mellitus, hypertension, or other chronic medical illnesses, and she was not on any regular medications including hormone replacement therapy.

On general examination, the patient was afebrile with a pulse rate of 74 beats per minute and blood pressure of 154/80 mmHg. Systemic examination revealed no significant abnormalities. Per-vaginal examination revealed a narrow vaginal canal with a hard, irregular, non-tender mass measuring approximately 3 × 2 cm arising from the posterior vaginal wall. The mass was fixed, had an irregular surface, and was covered by intact but erythematous vaginal mucosa. The clinical impression was of a posterior vaginal wall mass suspicious for malignancy. Per-rectal examination was unremarkable. Pelvic ultrasound showed a hyperechoic lesion in the posterior vaginal wall with posterior acoustic shadowing, suggestive of a calcified mass. There was no evidence of pelvic lymphadenopathy or hydronephrosis.

Laboratory investigations revealed a hemoglobin level of 12.55 g/dl, total leukocyte count of 6710/mm³, and HbA1c of 5.37%. Renal and liver function tests were within normal limits. Urine examination showed 15–20 pus cells per high-power field and 20–25 red blood cells per high-power field. Urine culture grew *Escherichia coli* sensitive to commonly used antibiotics. Chest radiograph and electrocardiography were normal. Pap smear was negative for intraepithelial lesion or malignancy. The patient was admitted for further evaluation and management. She was treated with intravenous antibiotics (cefuroxime and metronidazole), tranexamic acid for control of bleeding, and supportive therapy.

After obtaining written informed consent, examination under anesthesia and diagnostic vaginoscopy were performed. Vaginoscopy revealed a healthy vaginal vault with puckering of the posterior vaginal wall. A lobulated, whitish, calcified mass was noted adherent to the posterior vaginal wall (Figure 1A). On closer inspection, exposed synthetic mesh was seen protruding through the eroded vaginal mucosa, with the vaginal calculus formed around the exposed mesh (Figure 1B). The calculus was firm, irregular, and measured approximately 3×2×1.5 cm. There was no evidence of bladder or rectal involvement.

The calculus was carefully dissected from the surrounding vaginal mucosa and completely removed. The exposed mesh was then excised, and the vaginal mucosal defect was repaired using interrupted sutures of 2-0 polyglactin. Biopsy specimens were obtained from the edges of the vaginal mucosa surrounding the mesh erosion site for histopathological examination. The operative procedure was uneventful, and estimated blood loss was minimal. The patient was continued on intravenous antibiotics for 48 hours and then switched to oral antibiotics for one week.

Histopathological examination of the biopsy specimens revealed chronic suppurative inflammation with numerous colonies of filamentous gram-positive organisms consistent with actinomyces species, surrounded by inflammatory cells and characteristic sulfur granules. There was no evidence of dysplasia, malignancy, or

granulomatous disease. The calculus was composed predominantly of calcium phosphate and magnesium ammonium phosphate (struvite) with embedded mesh fibers, consistent with a secondary vaginal calculus.

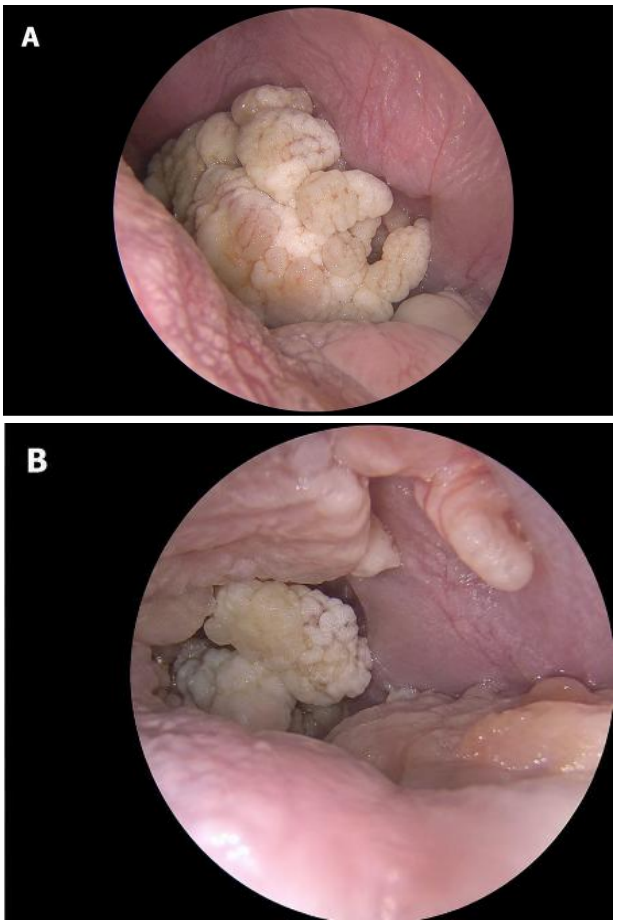

Figure 1: (A) Vaginoscopic image showing a lobulated whitish calcified mass adherent to the posterior vaginal wall and (B) vaginoscopic image demonstrating vaginal calculus surrounding eroded mesh protruding through the posterior vaginal wall.

The postoperative course was uneventful. The patient was discharged on the third postoperative day with advice to complete a six-week course of oral amoxicillin-clavulanate for actinomycosis. At six-week follow-up, the vaginal vault was well healed with no evidence of residual mesh exposure or recurrence. The patient remained asymptomatic at three months follow-up.

DISCUSSION

Vaginal calculi are exceptionally rare clinical entities, with fewer than 100 cases reported in the English literature.[1,2] The present case is unique in that it demonstrates the rare triad of vaginal calculus formation, mesh erosion, and actinomycosis in a postmenopausal woman presenting with bleeding per vaginum. To our knowledge, this is the first reported case of vaginal calculus with actinomycosis occurring around eroded mesh in the posterior vaginal wall following remote abdominal hysterectomy, highlighting the importance of considering rare benign etiologies in the differential diagnosis of postmenopausal bleeding.

The pathogenesis of vaginal calculi is multifactorial and depends on the classification as primary or secondary stones. Primary calculi develop in the setting of urinary stasis within the vagina, typically associated with congenital anomalies, urogenital fistulae, or vaginal outlet obstruction.[3,4] Secondary calculi, as in the present case, form around a foreign body nidus with subsequent deposition of urinary salts.[1,5] The normal acidic vaginal environment is unfavorable for mineral deposition; however, chronic urinary contamination, urease-producing bacterial infection, and the presence of a foreign body can alter local pH and facilitate stone formation.[3,7] In our patient, the eroded synthetic mesh served as the nidus for chronic inflammation and bacterial colonization, with subsequent mineral deposition leading to calculus formation. The urine examination showing significant pyuria and bacteriuria, together with the struvite composition of the calculus, supports the role of chronic urinary contamination and urease-positive bacterial infection in the pathogenesis.

Mesh erosion represents one of the most significant complications of synthetic mesh use in pelvic floor reconstructive surgery. The incidence of mesh erosion varies depending on the surgical approach, mesh material, and patient-related factors, with reported rates of 0–7.3% after midurethral sling procedures and up to 21% after transvaginal prolapse repair.[9] Risk factors for mesh erosion include advanced age, estrogen deficiency, prior surgical scarring, concomitant hysterectomy, diabetes, smoking, and the type of mesh material used.[9,10] In the present case, the patient had undergone abdominal hysterectomy 20 years prior, and although the exact type of mesh and indication for its placement remained unclear from the historical records, the chronic exposure of mesh through the posterior vaginal wall provided the substrate for stone formation. This case underscores the potential for delayed presentation of mesh-related complications, which may manifest decades after the initial surgery.

The association between foreign bodies and actinomycosis is well established. Actinomyces species are commensal organisms of the female genital tract that typically cause deep-seated infections only when tissue barriers are breached.[11,12] The presence of foreign material, such as intrauterine devices or surgical mesh, facilitates colonization by providing a surface for biofilm formation and protecting the organisms from host immune responses.[12,13] Masata et al reported a case of actinomyces infection appearing five years after trocar-guided transvaginal mesh prolapse repair, presenting with recurrent mesh exposure and chronic pelvic pain.[13] Similarly, Mikhail et al identified actinomyces in 11% of explanted transvaginal meshes, although they noted that the organism may act as a commensal rather than a pathogen in many cases.[14] Diedrich et al demonstrated that

bacterial colonization of mesh is common in patients with mesh-related complications, with actinomyces species frequently identified in culture-positive samples.[15] In our patient, the histopathological identification of filamentous gram-positive bacteria with characteristic sulfur granules confirmed the diagnosis of actinomycosis, suggesting that chronic mesh exposure facilitated actinomycotic infection and contributed to the inflammatory milieu that promoted calculus formation.

The clinical presentation of vaginal calculus with mesh erosion is often nonspecific and can mimic more sinister pathology. Patients may present with vaginal discharge, bleeding, dyspareunia, pelvic pain, or a palpable vaginal mass.[5,6] In postmenopausal women, any vaginal bleeding warrants thorough evaluation to exclude endometrial or cervical malignancy, and the presence of a hard, irregular vaginal mass raises particular concern for vaginal carcinoma or metastatic disease.[1,2] In the present case, the hard posterior vaginal wall mass with postmenopausal bleeding initially raised suspicion for malignancy, necessitating examination under anesthesia and biopsy. This highlights the diagnostic challenge posed by such rare benign conditions and emphasizes the importance of histopathological examination in all cases of suspicious vaginal masses.

Vaginoscopy played a crucial diagnostic and therapeutic role in the management of this patient. Direct visualization of the vaginal vault allowed identification of the calculus, assessment of mesh exposure, and planning of surgical intervention. Previous case reports have similarly emphasized the utility of vaginoscopy in the diagnosis and management of vaginal calculi and mesh complications.[1,5] Complete removal of the calculus and exposed mesh, followed by vaginal mucosal repair, resulted in resolution of symptoms and uneventful healing. The additional finding of actinomycosis necessitated prolonged antibiotic therapy with amoxicillin-clavulanate, which is the treatment of choice for actinomycosis.[11,12]

The differential diagnosis of a hard vaginal mass with postmenopausal bleeding includes vaginal malignancy, granulation tissue, chronic foreign-body reaction, recurrent pelvic pathology, and rare benign conditions such as vaginal calculus.[1,2] The present case illustrates that vaginal calculus formation around eroded mesh, although rare, should be considered in the differential diagnosis, particularly in women with a history of pelvic surgery. The absence of malignant cells on histopathological examination provided definitive reassurance and guided appropriate management.

In conclusion, this case demonstrates the rare coexistence of vaginal calculus, mesh erosion, and actinomycosis presenting as postmenopausal bleeding. The delayed presentation, occurring two decades after hysterectomy, highlights the potential for remote complications from retained or eroded surgical mesh. Thorough clinical evaluation, including vaginoscopy and histopathological examination, is essential for accurate diagnosis, exclusion of malignancy, and appropriate management. Surgeons should be aware of the potential for bacterial colonization and calculus formation around exposed mesh, and patients with mesh complications should be counselled regarding the need for complete excision of exposed material to prevent recurrent stone formation.

CONCLUSION

Vaginal calculus formation around eroded mesh associated with actinomycosis is an extremely rare cause of postmenopausal bleeding. Thorough evaluation, histopathological confirmation, and timely surgical intervention are essential for successful management and exclusion of malignancy.

Vaginal calculi are a rare cause of postmenopausal bleeding and should be considered in the differential diagnosis of vaginal masses, particularly in women with a history of prior pelvic surgery. Mesh erosion can act as a nidus for chronic infection, bacterial colonization, and calcification, with related complications potentially presenting decades after the initial surgical procedure. Actinomycosis should be suspected in cases involving chronic foreign bodies, and histopathological examination is essential for confirming the diagnosis. Furthermore, histopathological evaluation is mandatory to exclude malignancy in all suspicious vaginal masses associated with postmenopausal bleeding. Vaginoscopy serves as both a diagnostic and therapeutic modality in the evaluation and management of vaginal calculi and mesh-related complications.

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