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CASE REPORT **OPEN ACCESS**

Vaginal Cysts as Incidental Findings: A Descriptive Case Series and Surgical Management

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A B S T R A C T

Background: Vaginal cysts are uncommon benign lesions that often present as incidental findings during routine gynecological examinations. Although usually asymptomatic, they may cause dyspareunia, dysuria, or vaginal discomfort when they enlarge. Despite their clinical significance, there is limited literature on the optimal management approaches for different types of vaginal cysts. This case series aims to describe the clinical presentation, diagnostic approach, and surgical management of different types of vaginal cysts to enhance clinical understanding and guide management decisions.

Case Presentation: We report three cases of vaginal cysts in women aged 29, 38, and 43 years who presented to Sri Sathya Sai Institute of Higher Medical Sciences, Bangalore, between November 2024 and January 2025. The presenting symptoms varied from dyspareunia and infertility concerns to dysuria and sensation of a vaginal mass. Imaging studies, including ultrasonography and magnetic resonance imaging, confirmed the diagnosis. All patients underwent surgical excision under anesthesia with various techniques including enucleation and hydrodissection. Histopathological examination revealed Müllerian cyst in one case, while others presented with different cyst types. All patients experienced uneventful postoperative courses with complete resolution of symptoms during follow-up.

Conclusion: This case series highlights the importance of a thorough clinical examination, appropriate imaging modalities, and histopathological analysis in accurately diagnosing vaginal cysts. Complete surgical excision offers good outcomes with minimal complications and should be considered the standard of care in symptomatic cases or when diagnostic uncertainty exists. A tailored surgical approach based on cyst location, size, and suspected etiology is recommended for optimal outcomes.

Keywords: Vaginal cysts, Müllerian cysts, surgical excision, gynecological findings, female genital tract anomalies.

INTRODUCTION

Vaginal cysts represent a diverse group of relatively uncommon benign lesions of the vaginal wall with a reported incidence of approximately 1-2% in gynecological patients[1]. Despite their relative rarity, vaginal cysts constitute an important differential diagnosis for various gynecological complaints and may present diagnostic challenges due to their variable clinical presentation and anatomical location. These cysts can originate from various embryological structures including Müllerian ducts, urogenital sinus, mesonephric ducts, or acquired causes such as trauma, surgical interventions, or inflammatory processes[2].

The embryological development of the female genital tract involves the complex interaction of paramesonephric (Müllerian) ducts, mesonephric (Wolffian) ducts, and the urogenital sinus. Müllerian ducts give rise to the fallopian tubes, uterus, and upper third of the vagina, while the lower two-thirds of the vagina develop from the urogenital sinus. Remnants or abnormalities in the fusion of these embryological structures can lead to the formation of various types of vaginal cysts[3]. Understanding this embryological basis is essential for appropriate classification and management of these lesions.

Most vaginal cysts are asymptomatic and discovered incidentally during routine pelvic examinations or imaging studies performed for unrelated conditions. However, larger cysts may cause symptoms such as dyspareunia, vaginal discomfort, urinary symptoms including dysuria or frequency, or the sensation of a vaginal mass[4]. The clinical presentation often depends on the size, location, and type of the cyst, as well as the presence of complications such as infection or rupture.

The differential diagnosis of vaginal cysts includes Bartholin's gland cysts, Gartner's duct cysts (of mesonephric origin), Müllerian cysts (of paramesonephric origin), epidermal inclusion cysts, endometriotic cysts, traumatic inclusion cysts, and other rare presentations such as cysts of urethral origin[5]. Accurate diagnosis relies on a combination of clinical examination, imaging studies, and ultimately, histopathological evaluation. Clinical examination may reveal the location and characteristics of the cyst, while imaging studies such as ultrasonography, computed tomography (CT), or magnetic resonance imaging (MRI) can provide additional information about the internal structure, extent, and relationship to surrounding structures.

Management options for vaginal cysts range from observation for asymptomatic small cysts to surgical excision for symptomatic or larger lesions[6]. The choice of management depends on several factors, including the size and location of the cyst, severity of symptoms, patient preference, and diagnostic certainty. Surgical options include marsupialization, which involves creating a permanent opening in the cyst wall to allow drainage, and complete excision, which aims to remove the entire cyst wall to prevent recurrence.

Despite the clinical significance of vaginal cysts, there is a paucity of literature on the optimal management approaches for different types of vaginal cysts. Most published literature consists of case reports or small case series, with limited consensus on the best surgical approach for specific types of cysts. This case series presents three cases of vaginal cysts with different clinical presentations, highlighting the diagnostic approach and surgical management at our institution. By sharing our experience, we aim to contribute to the existing literature and provide insights into the effective management of these lesions.

CASE PRESENTATION

Case 1

A 29-year-old nulliparous woman presented to our gynecology department with complaints of dyspareunia for one year and anxiety about conception after four months of attempting to conceive. She described the dyspareunia as deep and positional, particularly pronounced during certain sexual positions. The patient had no significant past medical or surgical history, and her menstrual cycles were regular with normal flow. She denied any history of sexually transmitted infections, pelvic inflammatory disease, or previous vaginal trauma.

On examination, her vital signs were stable with a blood pressure of 110/70 mmHg, pulse rate of 76 beats per minute, respiratory rate of 16 breaths per minute, and temperature of 36.8°C. Abdominal examination revealed a soft, non-tender abdomen with no palpable masses or organomegaly. Pelvic examination revealed a 3×3 cm cystic mass on the left lateral vaginal wall posterior to the labia minora. The mass was non-tender, fluctuant, and did not transilluminate. The cervix and remaining vaginal walls appeared healthy on speculum examination. Bimanual examination revealed a normal-sized, anteverted uterus with bilateral fornices free and non-tender. No adnexal masses were palpable.

Laboratory investigations showed hemoglobin of 11.8 g/dL, white blood cell count of 6,800/mm³, platelet count of 215,000/mm³, and blood group A positive. Urine routine examination was within normal limits. Transvaginal ultrasonography revealed a normal uterus and ovaries with no evidence of pathology. A well-defined anechoic cystic lesion measuring approximately 2.5×2.5 cm was visualized in the left lateral vaginal wall.

For further characterization, magnetic resonance imaging (MRI) of the abdomen and pelvis was performed, which initially suggested a Bartholin gland cyst measuring 2.6×2.3 cm in the lower vagina on the left side near the introitus, posterior to the labia minora. The cyst appeared hyperintense on T2-weighted images and hypointense on T1-weighted images, consistent with serous fluid content. No solid components or septations were observed within the cyst.

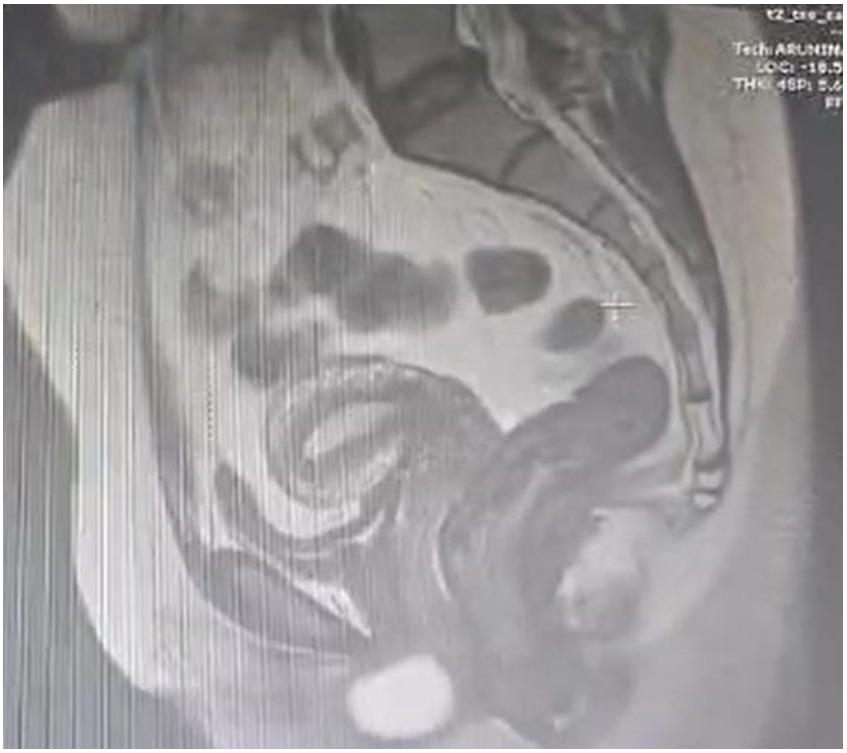
After thorough counseling regarding management options, the patient opted for surgical excision. The procedure was performed under spinal anesthesia with the patient in the lithotomy position. The surgical field was prepared with povidone-iodine solution and draped in a sterile manner. A vertical incision was made over the bulge of the cyst, and careful dissection was carried out to separate the cyst wall from the surrounding vaginal tissue. The cyst was enucleated intact, taking care to avoid rupture, and the specimen was sent for histopathological examination. The surgical bed was inspected for hemostasis, and the incision was closed with 2-0 rapid vicryl sutures using interrupted stitches.

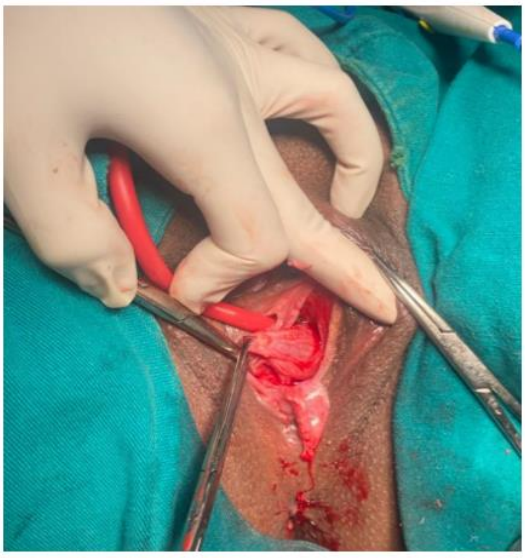
Intraoperative findings revealed a 3×4 cm vaginal cyst located in the upper two-thirds of the left lateral vaginal wall, which was larger and in a different location than initially suggested by the preoperative MRI. The cyst contained clear,

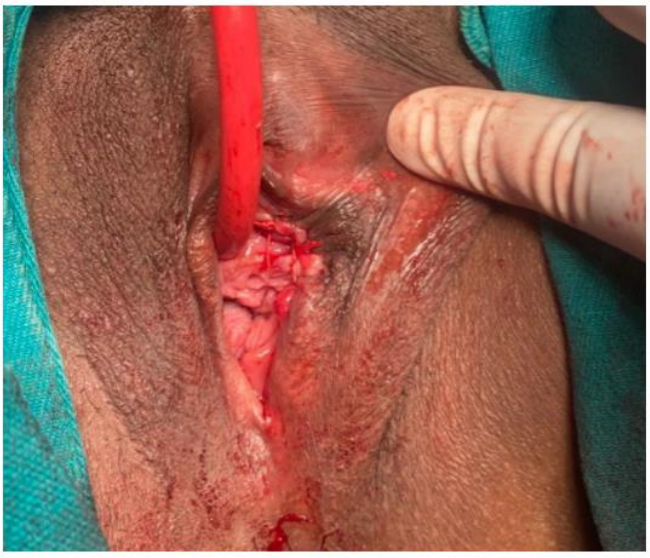
viscous fluid. Histopathological examination confirmed a Müllerian cyst, characterized by a wall lined with columnar epithelium resembling endocervical epithelium.

The patient had an uneventful postoperative recovery and was discharged on the second postoperative day. She was prescribed oral analgesics and advised to maintain perineal hygiene. At the two-week follow-up, the surgical site had healed well with no evidence of infection or recurrence. The patient reported resolution of dyspareunia during her six-week follow-up visit and subsequently conceived three months after the procedure.

Images for Case 1







Case 2

A 38-year-old para 2 post-hysterectomy woman presented with complaints of a mass per vagina, dysuria, and burning micturition for six months. She had undergone total abdominal hysterectomy for symptomatic uterine fibroids two years prior to presentation. The patient described a progressive increase in the size of the vaginal mass, associated with discomfort during walking and sitting. The urinary symptoms included frequency, urgency, and a burning sensation during micturition, without any frank episodes of urinary tract infection.

Her past medical history was significant for type 2 diabetes mellitus, which was well-controlled with oral hypoglycemic agents. She had no history of other chronic illnesses or allergies. Her surgical history included the aforementioned hysterectomy and a cesarean section for her second delivery ten years prior.

On examination, her vital signs were stable. Abdominal examination revealed a well-healed transverse Pfannenstiel scar from the previous hysterectomy. The abdomen was soft and non-tender with no palpable masses. Pelvic examination showed a 4×3 cm cystic mass arising from the anterior vaginal wall, approximately 3 cm from the vaginal introitus. The mass was smooth, fluctuant, and minimally tender on palpation. The vaginal vault appeared healthy with no evidence of prolapse or discharge.

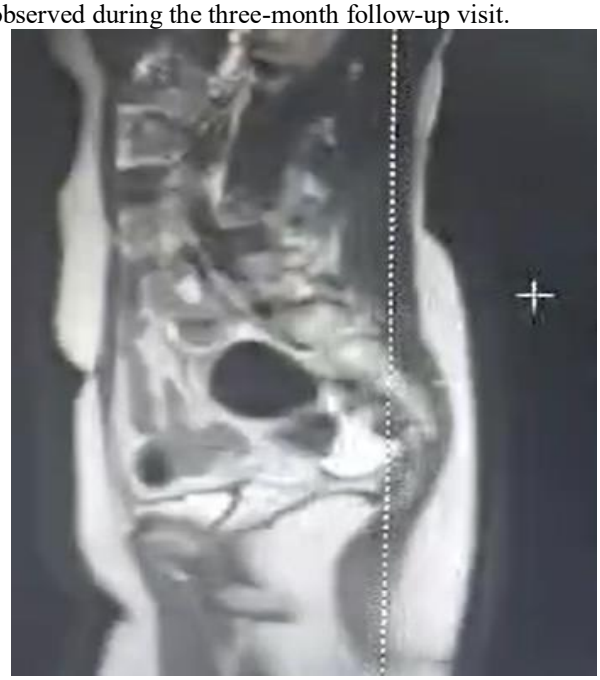
Laboratory investigations showed hemoglobin of 12.1 g/dL, white blood cell count of 7,200/mm³, platelet count of 232,000/mm³, and blood group AB positive. Urine routine examination was within normal limits, with no evidence of infection. Serum creatinine was 0.8 mg/dL, and HbA1c was 4.6%, indicating good glycemic control.

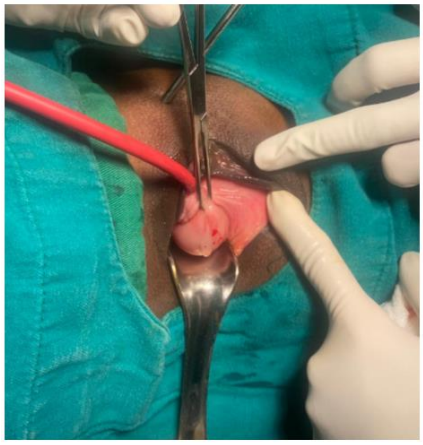
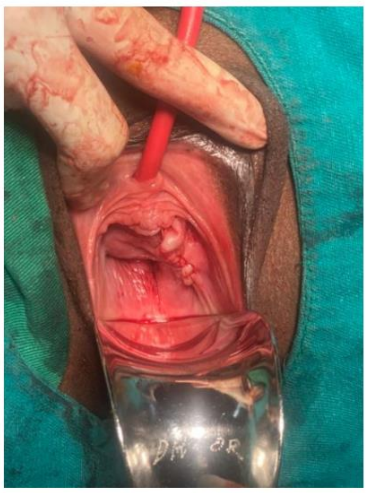
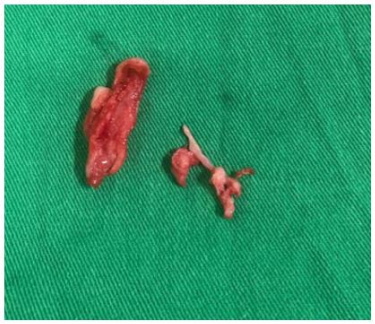
Ultrasonography of the abdomen and pelvis showed post-hysterectomy status with normal bilateral adnexa. A well-defined cystic lesion was visualized in the pelvic cavity measuring 40×27 mm, without internal septations, wall thickening, or solid components. For better delineation of the lesion, MRI of the abdomen and pelvis was performed, which confirmed post-hysterectomy status with normal bilateral adnexa and a lower vaginal wall cyst measuring 4.4×1.5 cm. The cyst appeared hyperintense on T2-weighted images and hypointense on T1-weighted images, with no evidence of restricted diffusion or contrast enhancement.

After discussing the diagnosis and management options, the patient opted for surgical excision. The procedure was performed under spinal anesthesia with the patient in the lithotomy position. The surgical field was prepared with povidone-iodine solution and draped in a sterile manner. A vertical incision was made over the anterior vaginal wall overlying the cyst. During dissection, accidental rupture of the cyst occurred, with the release of thick, sebaceous content. Despite the rupture, meticulous dissection was continued, and the entire cyst wall was carefully enucleated. The specimen was sent for histopathological examination. The surgical bed was inspected for hemostasis, and the vaginal wall was closed in layers with 2-0 vicryl sutures.

Histopathological examination revealed an epidermal inclusion cyst, characterized by a wall lined with stratified squamous epithelium and containing keratinous material. This finding was consistent with the sebaceous content observed during surgery and supported the hypothesis of an inclusion cyst related to previous surgical intervention.

The patient's postoperative course was uneventful, and she was discharged on the second postoperative day with oral analgesics and advice regarding perineal hygiene. At the two-week follow-up, the surgical site had healed well with no evidence of infection or wound dehiscence. The patient reported complete resolution of urinary symptoms and vaginal discomfort. No recurrence was observed during the three-month follow-up visit.



Case 3

A 43-year-old para 3 woman presented with complaints of burning micturition for six months. She described the burning sensation as occurring primarily at the end of micturition, associated with urinary frequency and occasional dysuria. She also reported noticing a bulge in the vagina during her routine hygiene, though it did not cause any significant discomfort. The patient had no history of recurrent urinary tract infections, hematuria, or vaginal discharge.

Her past medical history was significant for hypertension, which was well-controlled with amlodipine 5 mg daily. She had no history of diabetes, thyroid disorders, or other chronic illnesses. Her obstetric history included three vaginal deliveries, with the last delivery occurring 12 years prior to presentation. She had undergone a tubal ligation procedure following her last delivery.

On examination, her vital signs were stable with a blood pressure of 130/80 mmHg. Abdominal examination revealed a soft, non-tender abdomen with a visible tubal ligation scar. Pelvic examination showed a 3×4 cm cystic mass arising from the right vaginal wall, approximately 4 cm from the vaginal introitus. The mass was smooth, fluctuant, and non-tender. The cervix was high up, hypertrophied, with erosion and a Nabothian cyst at the 12 o'clock position. Bimanual examination confirmed the vaginal wall cyst and revealed no adnexal masses or tenderness.

Laboratory investigations showed hemoglobin of 11.3 g/dL, white blood cell count of 6,500/mm³, platelet count of 198,000/mm³, and blood group A positive. Urine routine examination showed 2-3 pus cells per high-power field but no growth on culture. Serum creatinine was 0.6 mg/dL, and liver function tests were within normal limits.

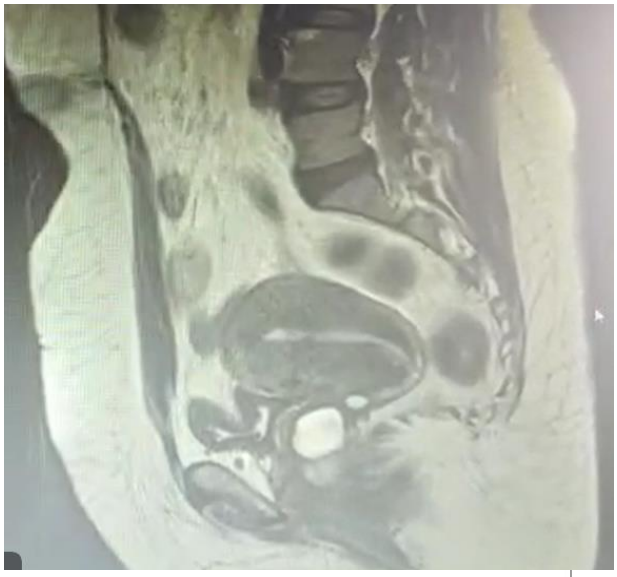
Ultrasonography of the abdomen and pelvis, along with transvaginal sonography, revealed a normal-sized uterus with endometrial thickness of 12 mm and a well-defined cystic structure measuring 38×23×10 mm with internal echoes in the posterior vaginal wall, initially interpreted as likely a Bartholin cyst. No adnexal masses or free fluid was observed.

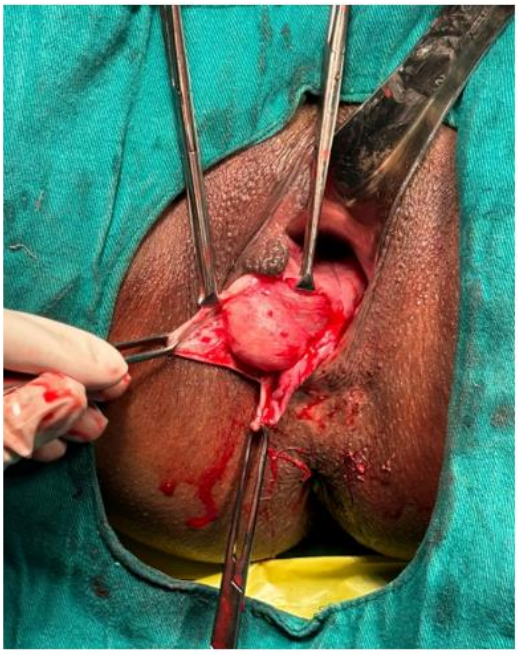
Due to the patient's history of hypertension, a two-dimensional echocardiography was performed as part of the preoperative evaluation, which showed grade I (A>E) left ventricular diastolic dysfunction, trivial mitral and tricuspid regurgitation, and an estimated right ventricular systolic pressure of 20 mmHg. These findings were not considered contraindications for surgery.

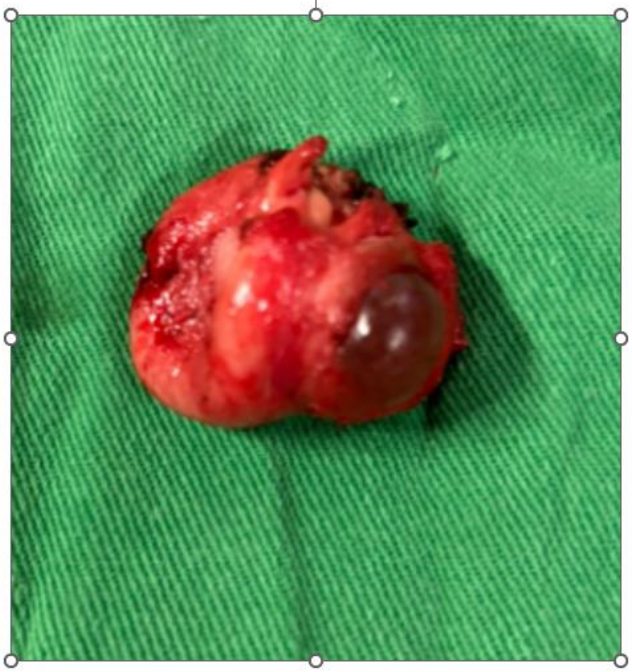
After thorough counseling, the patient consented to surgical excision. The procedure was performed under general anesthesia with the patient in the lithotomy position. The surgical field was prepared with povidone-iodine solution and draped in a sterile manner. To facilitate dissection and minimize the risk of cyst rupture, hydrodissection was performed by injecting a solution of normal saline with adrenaline (1:200,000) into the tissue plane surrounding the cyst. A vertical incision was made on the vaginal wall overlying the cyst, and careful dissection was carried out to separate the cyst wall from the surrounding vaginal tissue. The cyst was successfully enucleated intact, and the specimen was sent for histopathological examination. The cyst bed was sutured with 1-0 vicryl, and the vaginal mucosa was closed with 2-0 rapid vicryl using interrupted stitches.

Histopathological examination revealed a Gartner's duct cyst, characterized by a wall lined with low cuboidal to columnar epithelium, which is consistent with its mesonephric origin. This finding contradicted the initial ultrasonographic impression of a Bartholin cyst, highlighting the importance of histopathological confirmation for definitive diagnosis.

The patient's postoperative course was uneventful, and she was discharged on the third postoperative day. She was prescribed oral analgesics and antibiotics for five days, along with advice regarding perineal hygiene. At the two-week follow-up, the surgical site had healed well with no evidence of infection or wound complications. The patient reported significant improvement in her urinary symptoms, with complete resolution by the six-week follow-up visit. No evidence of recurrence was observed during the subsequent follow-up visits.







DISCUSSION

Vaginal cysts represent a heterogeneous group of benign lesions that can originate from various embryological or acquired sources. This case series illustrates three distinct presentations of vaginal cysts with varying clinical manifestations, highlighting the importance of a comprehensive diagnostic approach and appropriate surgical management tailored to the specific type of cyst.

Embryological Considerations and Classification

The development of the female genital tract involves complex interactions between multiple embryological structures, and abnormalities in this process can lead to various cystic lesions. Understanding the embryological origin of vaginal cysts is crucial for their proper classification and management[11]. Based on their origin, vaginal cysts can be broadly classified into the following categories:

1. **Müllerian cysts**: Arising from remnants of the paramesonephric ducts, these cysts typically contain serous fluid and are lined with columnar epithelium resembling that of the endocervix or fallopian tubes. They commonly occur in the anterolateral wall of the upper vagina and constitute approximately 30% of all vaginal cysts[12].
2. **Gartner's duct cysts**: Derived from remnants of the mesonephric ducts, these cysts are typically found in the anterolateral wall of the vagina and are lined with cuboidal or low columnar epithelium. They may be associated with other urinary tract anomalies, particularly when large or extensive[13].

3. **Bartholin gland cysts**: Strictly speaking, these are not true vaginal cysts but rather vulvovaginal cysts that arise from obstruction of the Bartholin gland ducts. They are located at the posterolateral aspect of the vaginal introitus and may become infected, forming Bartholin abscesses[14].
4. **Epidermal inclusion cysts**: These acquired cysts result from the implantation of superficial epithelial elements into deeper tissues following trauma, surgical procedures, or episiotomy. They contain keratinous material and are lined with stratified squamous epithelium[15].
5. **Other rare types**: These include endometriotic cysts, traumatic inclusion cysts, and cysts of urethral origin such as those arising from periurethral glands[16].

In our case series, we encountered three different types of vaginal cysts: a Müllerian cyst in the first case, an epidermal inclusion cyst in the second case, and a Gartner's duct cyst in the third case. This diversity underscores the importance of histopathological examination in establishing a definitive diagnosis.

Clinical Presentation and Diagnosis

The clinical presentation of vaginal cysts varies depending on their size, location, and the presence of complications. While many remain asymptomatic and are discovered incidentally during routine gynecological examinations, larger cysts may cause symptoms such as dyspareunia, vaginal discomfort, or urinary symptoms. In a retrospective analysis of 41 cases of vaginal cysts, Pradhan and Tobon reported that approximately 40% of patients were symptomatic at presentation[17].

In our first case, a 29-year-old woman presented with dyspareunia and infertility concerns. The dyspareunia could be attributed to the location of the cyst on the lateral vaginal wall, which might have been compressed or irritated during sexual intercourse. Although the relationship between vaginal cysts and infertility is not well-established, resolution of dyspareunia following cyst excision might have indirectly contributed to successful conception by allowing more comfortable sexual activity.

The second case featured a 38-year-old post-hysterectomy woman with urinary symptoms and a palpable vaginal mass. The anterior location of the cyst near the urethra likely contributed to her urinary symptoms, including dysuria and frequency. Post-hysterectomy vaginal cysts may develop from trapped epithelial tissue during surgical closure, forming inclusion cysts[18]. The sebaceous content observed during excision is consistent with an epidermal inclusion cyst, which can develop following surgical procedures or trauma. This case illustrates how previous gynecological surgery can contribute to the development of vaginal cysts, a consideration that should be incorporated into the differential diagnosis for women with relevant surgical history.

The third case involved a 43-year-old woman with urinary symptoms and a cystic mass arising from the right vaginal wall. Similar to the second case, the proximity of the cyst to the urethra might explain her urinary symptoms. Interestingly, although ultrasonography suggested a Bartholin cyst, histopathological examination revealed a Gartner's duct cyst. This discrepancy highlights the limitations of imaging in definitively determining the type of vaginal cyst and emphasizes the importance of histopathological confirmation.

Diagnostic evaluation of vaginal cysts typically includes clinical examination, imaging studies, and histopathological analysis. Clinical examination can provide information about the size, location, and characteristics of the cyst, which may suggest a particular etiology. For instance, Bartholin gland cysts are characteristically located at the posterolateral aspect of the vaginal introitus, while Müllerian and Gartner's duct cysts are more commonly found in the anterolateral vaginal wall[19].

Imaging studies play a crucial role in further characterizing vaginal cysts and planning appropriate management. Ultrasonography is often the first-line imaging modality due to its availability, safety, and cost-effectiveness. It can provide information about the size, location, and internal characteristics of the cyst, such as the presence of septations or solid components. However, as demonstrated in our third case, ultrasonography has limitations in definitively determining the type of vaginal cyst based on imaging characteristics alone[20].

Magnetic resonance imaging (MRI) offers superior soft-tissue resolution and can provide more detailed information about the relationship of the cyst to surrounding structures. MRI can also help distinguish between different types of vaginal cysts based on signal intensity characteristics. For instance, Müllerian cysts typically appear hyperintense on T2-weighted images and hypointense on T1-weighted images, consistent with serous fluid content, while endometriotic cysts may show high signal intensity on T1-weighted images due to blood products[21]. In our first case, MRI suggested a Bartholin gland cyst, but intraoperative findings and histopathology confirmed a Müllerian cyst, illustrating the occasional discrepancy between imaging and histopathological diagnoses.

Histopathological examination remains the gold standard for definitive diagnosis of vaginal cysts. The epithelial lining of the cyst provides valuable information about its origin. Müllerian cysts are lined with columnar epithelium resembling endocervical or fallopian tube epithelium, Gartner's duct cysts with cuboidal or low columnar epithelium, and epidermal inclusion cysts with stratified squamous epithelium[22]. In all three of our cases, histopathological examination played a crucial role in establishing the definitive diagnosis, often contradicting the initial impression based on clinical examination or imaging.

Management Approaches

The management of vaginal cysts depends on several factors, including the size and location of the cyst, severity of symptoms, patient preference, and diagnostic certainty. Asymptomatic small cysts may be managed conservatively with observation and periodic follow-up. However, symptomatic cysts, large cysts, or those with diagnostic uncertainty typically warrant surgical intervention[23].

Surgical options for vaginal cysts include marsupialization and complete excision. Marsupialization involves creating a permanent opening in the cyst wall to allow continuous drainage and is particularly suitable for Bartholin gland cysts. However, for true vaginal cysts, complete excision is generally preferred to prevent recurrence and to obtain tissue for histopathological examination[24].

In our case series, all three patients underwent complete surgical excision of their vaginal cysts. This approach was chosen due to the presence of symptoms, the relatively large size of the cysts, and the need for histopathological confirmation. The surgical technique varied slightly depending on the location and characteristics of the cyst. In the first case, a straightforward vertical incision and enucleation were performed. In the second case, despite accidental rupture during dissection, the entire cyst wall was carefully removed to prevent recurrence. In the third case, hydrodissection was employed to facilitate dissection and minimize the risk of cyst rupture.

All patients in our series had favorable outcomes following surgery, with resolution of symptoms and no recurrence during the follow-up period. This supports the efficacy of complete surgical excision in the management of symptomatic vaginal cysts, as reported in previous studies[25]. In a series of 120 cases of vulvovaginal cysts, Junaid and Thomas reported a recurrence rate of less than 5% following complete excision, compared to approximately 20% following marsupialization[26].

The choice of anesthesia for vaginal cyst excision depends on several factors, including the size and location of the cyst, patient factors, and surgeon preference. In our series, spinal anesthesia was used in the first two cases, while general anesthesia was employed in the third case. Both approaches allowed adequate anesthesia and patient comfort during the procedure, suggesting that the choice can be individualized based on specific circumstances.

Future Directions and Research Opportunities

Despite the clinical significance of vaginal cysts, there are limited large-scale studies or randomized controlled trials evaluating different management approaches. Most of the available literature consists of case reports or small case series, highlighting the need for more comprehensive research in this area. Future studies could focus on comparing different surgical techniques, evaluating long-term outcomes, and identifying factors associated with recurrence.

Additionally, advancements in minimally invasive approaches, such as laparoscopic or robot-assisted excision for deep vaginal cysts extending into the pelvis, may offer advantages in terms of visualization, precision, and postoperative recovery[27]. The role of newer imaging modalities, such as 3D ultrasonography or fusion imaging, in the preoperative assessment of vaginal cysts also warrants further investigation.

CONCLUSION

This case series highlights the diverse clinical presentations and management approaches for vaginal cysts, emphasizing several key points for clinical practice. First, vaginal cysts can present with a variety of symptoms depending on their size and location, ranging from dyspareunia to urinary symptoms. A high index of suspicion should be maintained in women presenting with these symptoms, particularly those with a history of gynecological surgery or trauma.

Second, while clinical examination and imaging studies provide valuable information about the characteristics and extent of vaginal cysts, histopathological examination remains essential for definitive diagnosis. As demonstrated in our cases, there can be discrepancies between the preoperative impression based on clinical examination or imaging and the final histopathological diagnosis. This underscores the importance of obtaining tissue for histopathological analysis, even in cases where the diagnosis seems straightforward.

Third, complete surgical excision offers excellent outcomes for symptomatic vaginal cysts, with resolution of symptoms and low recurrence rates. The surgical approach can be tailored based on the size and location of the cyst, with techniques such as hydrodissection employed to facilitate dissection and minimize the risk of rupture. Both spinal and general anesthesia are suitable options, with the choice individualized based on specific circumstances.

Finally, this case series adds to the limited literature on the management of vaginal cysts and provides insights into the effective diagnosis and treatment of these lesions. Future research should focus on larger prospective studies evaluating different management approaches and long-term outcomes to establish evidence-based guidelines for the optimal management of vaginal cysts.

Healthcare providers should maintain a high index of suspicion for vaginal cysts in women presenting with dyspareunia, urinary symptoms, or vaginal discomfort, especially those with a history of gynecological surgery or trauma. A comprehensive diagnostic approach, including clinical examination, appropriate imaging, and histopathological analysis, is essential for accurate diagnosis and appropriate management. Surgical excision should be considered the standard of care for symptomatic vaginal cysts, with the specific technique tailored to the individual case for optimal outcomes.

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