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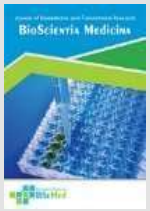

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Giant Gartner's Duct Cyst Mimicking Pelvic Organ Prolapse: A Rare Case Report

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A B S T R A C T

Background: Gartner's duct cysts are benign vaginal cysts originating from embryological remnants. While usually asymptomatic, larger cysts can mimic pelvic organ prolapse, leading to misdiagnosis and delayed treatment. This case emphasizes the importance of accurate diagnosis and appropriate surgical intervention in managing large GDCs. **Case presentation:** A 43-year-old woman presented with a protruding vaginal mass, initially mistaken for pelvic organ prolapse. Examination revealed a large Gartner's duct cyst on the posterior vaginal wall. Surgical excision and marsupialization were performed, confirming the diagnosis. **Conclusion:** This case highlights the importance of thorough evaluation in women presenting with vaginal masses. Large Gartner's duct cysts, though rare, can mimic pelvic organ prolapse, necessitating accurate diagnosis and appropriate surgical intervention.

1. Introduction

Gartner's duct cysts (GDCs) are rare benign vaginal cysts arising from embryological remnants of the Wolffian (mesonephric) duct. These cysts typically occur along the anterolateral walls of the upper vagina, often remaining asymptomatic and discovered incidentally during routine pelvic examinations. The estimated incidence of GDCs in adult women is approximately 1%, with the majority of cases presenting as small, innocuous lesions. Embryologically, GDCs originate from the persistence of the Wolffian duct, which plays a crucial role in the development of the female reproductive system. During embryogenesis, the Wolffian duct normally regresses, but remnants can persist and give rise to GDCs. These cysts are usually lined by a single layer of cuboidal or columnar epithelium and contain clear serous fluid. The clinical presentation of GDCs varies depending on their size and location. Smaller cysts are often asymptomatic and may only be detected during pelvic examinations. However, larger GDCs can cause a range of symptoms, including vaginal pressure, dyspareunia, and urinary complaints. In rare instances, GDCs can grow to substantial sizes, leading to significant discomfort and even mimicking other pelvic conditions, such as pelvic organ prolapse (POP).[1,2]

Pelvic organ prolapse is a common condition characterized by the descent of pelvic organs into the vagina due to weakened pelvic floor support. The symptoms of POP can overlap with those of large GDCs, including a sensation of pressure or a bulge in the vagina. This overlap in symptomatology can pose diagnostic challenges, as differentiating between these two conditions is crucial for appropriate management. The diagnosis of GDCs typically involves a combination of clinical examination and imaging studies. Pelvic examination may reveal a palpable cystic mass in the vagina, while imaging modalities such as ultrasound or magnetic resonance imaging (MRI) can confirm the diagnosis and assess the size and location of the cyst. The management of GDCs depends on the size and symptomatology. Asymptomatic, small cysts may be managed conservatively with observation and reassurance. However, symptomatic or large GDCs often require surgical intervention. Surgical excision is the definitive treatment for GDCs, and it can be performed through various approaches, including transvaginal or transabdominal routes. Marsupialization, a procedure that involves opening and draining the cyst, is another surgical option, particularly for smaller cysts.[2,3]

The prognosis for GDCs is generally excellent. Recurrence after surgical excision is rare, and most patients experience complete resolution of their symptoms. However, long-term follow-up is recommended to monitor for any potential recurrence or complications. In this case report, we present a rare and intriguing case of a giant GDC located on the posterior vaginal wall, mimicking POP. This unusual presentation highlights the importance of considering GDCs in the differential diagnosis of women presenting with vaginal masses. The case also underscores the diagnostic challenges that can arise when the clinical presentation overlaps with other pelvic conditions. The patient in our case presented with a protruding vaginal mass, initially mistaken for POP. However, thorough clinical evaluation and imaging studies revealed a large GDC originating from the posterior vaginal wall. This atypical location of the cyst may have contributed to the initial misdiagnosis. The surgical management of this giant GDC involved complete excision, which resulted in the resolution of the patient's symptoms and a favorable outcome.[3,4] This case emphasizes the importance of accurate diagnosis and appropriate surgical intervention in managing large GDCs.

2. Case Presentation

A 43-year-old woman, gravida 2, para 2 (G2P2), presented to our gynecology clinic with a chief complaint of a protruding mass from her vagina. The mass had been present for approximately one year and had gradually increased in size from that of a peanut to that of a lemon. The patient reported associated discomfort and interference with her daily activities due to the mass. She denied any history of pelvic surgery, trauma, abnormal bleeding, or vaginal discharge. Her menstrual cycles were reported as regular, with a normal flow and no dysmenorrhea. She had a history of two prior full-term vaginal deliveries. Upon initial physical examination, the patient was found to be in good general health with stable vital signs. A thorough systemic examination revealed no abnormalities. Pelvic examination revealed a large, non-tender, fluctuant mass protruding from the vaginal introitus. The mass was estimated to be approximately 8 cm x 8 cm in size. It was irreducible, meaning it could not be manually pushed back into the vagina, and did not change in size with straining or coughing, which are typical maneuvers used to assess for pelvic organ prolapse. A speculum examination was performed to visualize the vaginal canal and cervix. The mass was observed to be originating from the posterior vaginal wall, an unusual location for Gartner's duct cysts, which are more commonly found on the anterolateral walls. The cervix was visualized high in the vaginal vault, appearing normal and without lesions.

A bimanual pelvic examination was then conducted to assess the uterus and adnexa. The uterus was found to be normal in size, anteverted (tilted forward), and mobile. There were no palpable adnexal masses.

The examination did not reveal any evidence of pelvic organ prolapse, such as cystocele (prolapse of the bladder into the vagina) or rectocele (prolapse of the rectum into the vagina). To further evaluate the mass and rule out other pelvic pathologies, transvaginal ultrasound imaging was performed. The ultrasound confirmed the presence of a well-defined cystic lesion measuring 6.5 cm x 4.5 cm x 3.7 cm, originating from the posterior vaginal wall. The cyst was filled with fluid and contained internal echoes, which are characteristic of Gartner's duct cysts. The ultrasound also confirmed the absence of pelvic organ prolapse and revealed no other abnormalities in the pelvic organs. Based on the comprehensive clinical evaluation, including the physical examination and imaging findings, a diagnosis of a giant Gartner's duct cyst was made. The unusual location of the cyst on the posterior vaginal wall and its significant size, mimicking pelvic organ prolapse, made this a rare and intriguing case. The patient was thoroughly counseled about the diagnosis, the benign nature of the cyst, and the recommended treatment plan, which involved surgical excision of the mass.

Table 1. Clinical presentation and findings of the patient with giant Gartner's duct cyst.

Finding	**Description**
Age	43 years old
Gravidity (G)	2
Parity (P)	2
Mass size	8 cm x 8 cm
Mass characteristics	Protruding, non-tender, fluctuant, irreducible, unchanged with Valsalva
Location	Posterior vaginal wall
Cervix position	High in the vaginal vault
Uterus size	Normal
Uterus position	Anteverted and mobile
Pelvic organ prolapse	No
Adnexal masses	No
Transvaginal ultrasound	Well-defined cystic lesion (6.5 cm x 4.5 cm x 3.7 cm) on posterior vaginal wall
Diagnosis	Giant Gartner's duct cyst mimicking pelvic organ prolapse

The patient was scheduled for surgical excision of the Gartner's duct cyst under regional anesthesia. The procedure was meticulously planned to ensure complete removal of the cyst while minimizing the risk of complications. The patient was placed in the lithotomy position, and a thorough vaginal preparation was performed. A posterior colpotomy incision was made, extending from the vaginal introitus to the apex of the cyst. The incision was deepened through the vaginal mucosa and underlying tissues, carefully avoiding injury to the rectum. The cyst was then identified and isolated from the surrounding tissues using blunt and sharp dissection techniques.

The dissection proceeded circumferentially around the cyst, ensuring complete separation from the vaginal wall and adjacent structures. The cyst was found to be well-encapsulated and filled with clear serous fluid. The base of the cyst was carefully dissected from the underlying tissues, and meticulous

hemostasis was achieved throughout the procedure. Once the cyst was completely freed, it was delivered through the vaginal incision. The cyst wall was then excised, and the remaining vaginal mucosa was reapproximated using absorbable sutures. The vaginal incision was closed in layers, ensuring proper anatomical alignment and minimizing the risk of postoperative complications. The excised cyst was sent for histopathological examination to confirm the diagnosis and rule out any malignant potential. The patient was transferred to the recovery room in stable condition, and her postoperative course was closely monitored.

The excised Gartner's duct cyst was carefully examined by a pathologist. The cyst measured 13 cm x 7 cm x 2 cm and was filled with clear serous fluid. The cyst wall was smooth and glistening, with no evidence of papillary projections or solid components. Microscopic examination of the cyst wall revealed a lining of a single layer of cuboidal epithelium, which is characteristic of Gartner's duct cysts. The epithelial cells were uniform in size and shape, with no atypia or mitotic activity. The underlying stroma consisted of fibro collagenous tissue with mild chronic inflammation, consistent with the benign nature of the cyst. The histopathological findings confirmed the diagnosis of a Gartner's duct cyst and ruled out any malignant transformation. The absence of atypia or mitotic activity in the epithelial cells indicated a low risk of recurrence.

The patient's postoperative course was uneventful. She was discharged from the hospital on the first postoperative day with instructions for wound care and follow-up. She was advised to avoid strenuous activity and sexual intercourse for six weeks to allow for proper healing. At her six-week follow-up visit, the patient reported complete resolution of her symptoms, including the discomfort and interference with daily activities caused by the cyst. The surgical site had healed well, with no evidence of infection or dehiscence. Pelvic examination revealed a well-healed vaginal incision with no residual mass. The patient was reassured about the benign nature of the cyst and the low risk of recurrence. She was advised to continue routine gynecological care and to report any new or recurrent symptoms promptly. The successful surgical excision of the giant Gartner's duct cyst and the patient's complete recovery underscores the importance of accurate diagnosis and appropriate surgical intervention in managing this rare condition.

3. Discussion

Gartner's duct cysts (GDCs) are an intriguing and relatively uncommon phenomenon in gynecological practice, arising from the intricate dance of embryological development. With an estimated incidence of 1% in adult women, these cysts offer a unique window into the complex processes that shape the female reproductive system. Their origin lies in the remnants of the Wolffian (mesonephric) duct, a transient structure that plays a pivotal role in the early stages of fetal development. During embryogenesis, the Wolffian duct plays a pivotal role in the sexual differentiation of the fetus. In male embryos, under the influence of the sex-determining region Y (SRY) gene, the Wolffian duct develops into the epididymis, vas deferens, seminal vesicles, and ejaculatory ducts, forming the male reproductive tract. However, in female embryos, the absence of the SRY gene triggers a cascade of events leading to the regression of the Wolffian duct and the development of the Mullerian (paramesonephric) duct, which ultimately gives rise to the fallopian tubes, uterus, cervix, and upper vagina.[5,6]

Despite the regression of the Wolffian duct in females, remnants of this embryonic structure can persist in various locations along the female reproductive tract. These remnants, known as Gartner's duct remnants, can be found in the broad ligament, a fold of the peritoneum that supports the uterus, fallopian tubes, and ovaries. They can also be found in the cervix, the lower, narrow end of the uterus that opens into the vagina. However, the most common location for Gartner's duct remnants is along the anterolateral walls of the upper vagina. The persistence of these remnants is thought to be due to incomplete regression of the Wolffian duct during

embryogenesis. The exact mechanisms underlying this incomplete regression are not fully understood, but it is believed to involve complex interactions between genetic and environmental factors.[6,7]

Gartner's duct cysts (GDCs) are intriguing clinical entities that originate from embryological remnants of the Wolffian (mesonephric) duct. The Wolffian duct plays a pivotal role in the development of the male reproductive system, but in females, it typically regresses during embryogenesis. However, remnants of the Wolffian duct can persist in the female reproductive tract, particularly along the anterolateral walls of the vagina. These remnants can subsequently give rise to GDCs, which are benign cystic lesions lined by a single layer of cuboidal or columnar epithelium and filled with clear serous fluid. The precise mechanisms underlying the formation of GDCs remain elusive, but several theories have been proposed to explain their pathogenesis. One prevailing hypothesis suggests that GDCs develop due to the accumulation of fluid within the persistent Wolffian duct remnants. This fluid accumulation may be triggered by various factors, including hormonal influences, chronic inflammation, or obstruction of the cyst's drainage.[7,8]

Hormonal influences, particularly estrogen, have been implicated in the development and growth of Gartner's duct cysts (GDCs). The presence of estrogen receptors (ERs) in the epithelial lining of GDCs suggests a direct role for estrogen in the pathogenesis of these cysts. Estrogen is a steroid hormone that plays a crucial role in the development and maintenance of the female reproductive system. It exerts its effects by binding to ERs, which are intracellular receptors that regulate gene expression. The identification of ERs in the epithelial lining of GDCs suggests that estrogen may stimulate the proliferation and secretory activity of the epithelial cells. This estrogen-induced proliferation can lead to an increase in the number of epithelial cells lining the cyst, contributing to its growth. Additionally, estrogen may enhance the secretory activity of the epithelial cells, leading to increased fluid accumulation within the cyst and further enlargement.[8,9]

The hormonal influence on GDCs may explain why these cysts are more commonly diagnosed in reproductive-aged women when estrogen levels are highest. During the menstrual cycle, estrogen levels fluctuate, peaking just before ovulation. These fluctuations may also explain why some women experience changes in the size of their GDCs during the menstrual cycle. Several studies have investigated the relationship between estrogen and GDCs. Immunohistochemical studies have consistently demonstrated the presence of ERs in the epithelial lining of GDCs. These findings provide strong evidence for the direct effect of estrogen on the growth and development of these cysts. In addition to estrogen, other hormones may also play a role in the pathogenesis of GDCs. Progesterone, another key hormone in the female reproductive system, has been shown to have inhibitory effects on the growth of GDCs. This may explain why GDCs are less common in postmenopausal women when estrogen levels decline and progesterone levels are relatively low.

The hormonal regulation of GDCs is complex and involves a delicate balance between estrogen and progesterone. While estrogen may promote the growth of GDCs, progesterone may counteract this effect. This hormonal interplay may explain the variable clinical presentation of GDCs, with some women experiencing asymptomatic, small cysts while others develop large, symptomatic cysts. Understanding the hormonal influences on GDCs is crucial for developing effective management strategies. Hormonal therapy, such as oral contraceptives or gonadotropin-releasing hormone (GnRH) agonists, may be considered in select cases to suppress estrogen levels and potentially reduce the size of GDCs. However, further research is needed to determine the efficacy and safety of hormonal therapy in the management of GDCs. Hormonal influences, particularly estrogen, play a significant role in the development and growth of GDCs. The presence of ERs in the epithelial lining of GDCs suggests a direct effect of estrogen on the proliferation and secretory activity of the epithelial cells. This hormonal influence may explain the higher

incidence of GDCs in reproductive-aged women and the fluctuations in cyst size during the menstrual cycle.[9,10]

Chronic inflammation is another potential factor contributing to the formation of GDCs. The presence of inflammatory cells and mediators within the cyst wall and surrounding tissues suggests an ongoing inflammatory process. This inflammation may be triggered by various stimuli, such as infection, trauma, or irritation. The inflammatory response can lead to increased vascular permeability, fluid exudation, and the accumulation of inflammatory cells, all of which can contribute to the formation and growth of the cyst. Obstruction of the cyst's drainage is another plausible mechanism for the development of GDCs. The Wolffian duct remnants may have rudimentary drainage channels that can become obstructed due to fibrosis, inflammation, or other factors. This obstruction can impede the outflow of fluid from the cyst, leading to its gradual accumulation and enlargement. The size of GDCs can vary considerably, ranging from small, asymptomatic lesions to large, symptomatic masses. The factors influencing the growth of GDCs to substantial sizes remain unclear, but a combination of hormonal influences, chronic inflammation, and obstruction of the cyst's drainage may play a role. In some cases, GDCs can reach several centimeters in diameter, causing significant discomfort and mimicking other pelvic conditions, such as pelvic organ prolapse. Another theory regarding the pathogenesis of Gartner's duct cysts (GDCs) suggests that these cysts may arise due to the proliferation of epithelial cells lining the remnants of the Wolffian duct. This proliferation could be triggered by various factors, including hormonal influences and other growth-promoting signals. The resulting cystic structure is typically lined by a single layer of cuboidal or columnar epithelium, a hallmark characteristic of GDCs.[11,12]

Hormonal fluctuations, particularly those involving estrogen, have been implicated in the development and growth of GDCs. Estrogen receptors have been identified in the epithelial cells lining GDCs, suggesting that these cells are responsive to estrogen stimulation. Elevated estrogen levels, such as those occurring during pregnancy or hormone replacement therapy, may promote the proliferation of these epithelial cells, leading to the formation or enlargement of GDCs. The presence of estrogen receptors in GDCs also raises the possibility of using hormonal therapies to manage these cysts. Anti-estrogen medications, such as tamoxifen or aromatase inhibitors, could potentially inhibit the growth of GDCs or even cause regression in some cases. However, further research is needed to investigate the efficacy and safety of hormonal therapies for GDCs.[12,13]

The exact mechanisms underlying the development and growth of Gartner's duct cysts (GDCs) remain incompletely understood. However, several growth factors and signaling pathways have been implicated in the proliferation of epithelial cells lining the Wolffian duct remnants, potentially contributing to the formation and expansion of these cysts. Epidermal growth factor (EGF): EGF is a potent mitogen that stimulates cell proliferation, differentiation, and survival. It binds to the epidermal growth factor receptor (EGFR), triggering a cascade of intracellular signaling events that promote cell growth. Studies have shown that EGF and EGFR are overexpressed in various cysts and tumors, suggesting their potential role in the development of GDCs. Transforming growth factor-beta (TGF-beta): TGF-beta is a multifunctional cytokine that regulates cell growth, differentiation, and apoptosis. It can have both tumor-suppressive and tumor-promoting effects, depending on the cellular context and the stage of tumor development. In some cases, TGF-beta has been shown to promote the proliferation of epithelial cells and contribute to the formation of cysts. Fibroblast growth factor (FGF): FGF is a family of growth factors that play a crucial role in embryonic development, wound healing, and angiogenesis. FGFs bind to fibroblast growth factor receptors (FGFRs), activating intracellular signaling pathways that promote cell proliferation and survival. Aberrant FGF signaling has been implicated in the

development of various cancers, and it may also contribute to the growth of GDCs. Mitogen-activated protein kinase (MAPK) Pathway: The MAPK pathway is a key signaling cascade that regulates cell proliferation, differentiation, and survival. It is activated by various growth factors, including EGF and FGF, and transmits signals from the cell surface to the nucleus, where it regulates gene expression. Dysregulation of the MAPK pathway has been linked to the development of various cysts and tumors, and it may also play a role in the growth of GDCs. Phosphoinositide 3-Kinase (PI3K)/AKT Pathway: The PI3K/AKT pathway is another critical signaling cascade that regulates cell growth, survival, and metabolism. It is activated by various growth factors and cytokines, including insulin and insulin-like growth factor 1 (IGF-1). Activation of the PI3K/AKT pathway leads to the phosphorylation and activation of AKT, a serine/threonine kinase that promotes cell survival and proliferation. Aberrant activation of the PI3K/AKT pathway has been implicated in the development of various cancers, and it may also contribute to the growth of GDCs. In addition to these growth factors and signaling pathways, other factors such as hormonal influences, chronic inflammation, and genetic predisposition may also play a role in the development and growth of GDCs. Hormonal fluctuations, particularly during puberty and pregnancy, have been associated with an increased incidence of GDCs. Chronic inflammation, resulting from infection or irritation, can also stimulate cell proliferation and contribute to cyst formation. Genetic factors may predispose certain individuals to the development of GDCs, although the specific genes involved have not been identified.[13-15] While the exact mechanisms underlying the development of GDCs remain unclear, genetic and environmental factors may also play a role. Genetic predisposition, inherited mutations, or variations in genes involved in cell growth and differentiation could increase the susceptibility to GDC formation. Additionally, exposure to certain environmental factors, such as toxins or infections, may trigger the proliferation of epithelial cells lining the Wolffian duct remnants. Chronic inflammation has been implicated in the pathogenesis of various cystic lesions, including Gartner's duct cysts (GDCs). The presence of inflammatory cells, such as lymphocytes and macrophages, within the walls of GDCs suggests a potential role for inflammation in their development and growth. This inflammatory process can be triggered by various factors, including infection, trauma, or irritation.[15,16]

Inflammatory mediators, such as cytokines and chemokines, play a crucial role in the inflammatory cascade. These signaling molecules can stimulate cell proliferation, angiogenesis (the formation of new blood vessels), and tissue remodeling, all of which can contribute to the formation and growth of GDCs. For instance, interleukin-6 (IL-6), a pro-inflammatory cytokine, has been found to be elevated in the cyst fluid of GDCs, suggesting its involvement in the inflammatory process. The exact mechanisms by which chronic inflammation contributes to the development of GDCs are not fully understood. However, several hypotheses have been proposed. One hypothesis suggests that chronic inflammation can lead to the accumulation of fluid within the remnants of the Wolffian duct, resulting in cyst formation. Another hypothesis proposes that inflammation can stimulate the proliferation of epithelial cells lining the ductal remnants, leading to cyst enlargement. The presence of inflammatory cells in the walls of GDCs further supports the role of inflammation in their pathogenesis. Lymphocytes, a type of white blood cell, are involved in the immune response and can release inflammatory mediators that contribute to tissue damage and repair. Macrophages, another type of white blood cell, are responsible for phagocytosis (engulfing and destroying cellular debris) and can also release inflammatory mediators. The infiltration of these inflammatory cells into the cyst wall suggests an ongoing inflammatory process that may contribute to the persistence and growth of GDCs. In addition to the direct effects of inflammatory mediators on cell proliferation and tissue remodeling, chronic

inflammation can also create a microenvironment that promotes cyst formation. For example, inflammation can lead to increased vascular permeability, allowing fluid and inflammatory cells to leak into the surrounding tissues. This can create a favorable environment for cyst formation and growth. Furthermore, chronic inflammation can also impair the normal drainage of the Wolffian duct remnants, leading to fluid accumulation and cyst formation. The inflammatory process can cause fibrosis (scarring) and obstruction of the ductal openings, preventing the normal outflow of fluid and contributing to cyst enlargement. The role of infection in the pathogenesis of GDCs is also worth considering. While most GDCs are sterile, meaning they do not contain any infectious organisms, some studies have reported the presence of bacteria in a small percentage of cases. The presence of bacteria can trigger an inflammatory response, leading to the release of inflammatory mediators and the recruitment of inflammatory cells. This inflammatory response can contribute to the formation and growth of GDCs, even in the absence of overt infection.[14-16]

Obstruction of the normal drainage of fluid from the Wolffian duct remnants is a key factor in the pathogenesis of Gartner's duct cysts (GDCs). The Wolffian duct, also known as the mesonephric duct, is an embryonic structure that plays a crucial role in the development of the female reproductive system. During embryogenesis, the Wolffian duct normally regresses, but remnants can persist in the anterolateral walls of the vagina. These remnants can retain their secretory function, producing fluid that normally drains into the vaginal canal. However, various factors can obstruct the normal drainage of fluid from these remnants, leading to the accumulation of fluid within the duct and subsequent dilation. This dilation can eventually result in the formation of a cystic structure, known as a Gartner's duct cyst. The size of the cyst can vary depending on the degree of obstruction and the amount of fluid accumulation. Several mechanisms have been proposed to explain the obstruction of Wolffian duct remnants and the subsequent development of GDCs. One possible mechanism is inflammation. Inflammation can lead to fibrosis and scarring of the ductal epithelium, narrowing the lumen and impeding fluid drainage. Chronic inflammation, in particular, has been implicated in the pathogenesis of GDCs, as it can cause progressive fibrosis and stenosis of the duct. Another potential mechanism is external compression. The Wolffian duct remnants are located in close proximity to other pelvic structures, such as the bladder, urethra, and rectum. Enlargement or displacement of these structures can compress the ductal remnants, obstructing fluid flow and promoting cyst formation. Pelvic surgeries, trauma, or tumors can also cause external compression and contribute to the development of GDCs. In addition to inflammation and external compression, other factors may also play a role in the obstruction of Wolffian duct remnants. These factors include congenital anomalies of the ductal system, hormonal influences, and the presence of intraluminal debris or mucus plugs. Congenital anomalies, such as atresia or stenosis of the duct, can impede fluid drainage from birth. Hormonal fluctuations, particularly during puberty and pregnancy, may stimulate the secretory activity of the ductal epithelium, leading to increased fluid production and potential obstruction. Intraluminal debris or mucus plugs can also obstruct the ductal lumen, preventing fluid outflow and promoting cyst formation.[16,17]

The clinical significance of understanding the mechanisms of obstruction in GDCs lies in the potential for prevention and early intervention. By identifying and addressing the underlying causes of obstruction, it may be possible to prevent the formation or progression of GDCs. For example, if chronic inflammation is identified as a contributing factor, anti-inflammatory treatment may be considered to reduce the risk of fibrosis and stenosis of the ductal remnants. Similarly, if external compression is suspected, measures to relieve the compression, such as surgical intervention or pelvic floor physical therapy, may be beneficial.

Furthermore, understanding the mechanisms of obstruction can also aid in the development of targeted therapies for GDCs. For instance, if hormonal influences are found to play a significant role, hormonal modulation may be explored as a potential treatment option. Additionally, if intraluminal debris or mucus plugs are identified as the primary cause of obstruction, minimally invasive procedures to remove the obstruction may be considered. Obstruction of the normal drainage of fluid from Wolffian duct remnants is a crucial step in the pathogenesis of GDCs. Various factors, including inflammation, external compression, congenital anomalies, hormonal influences, and intraluminal debris, can contribute to this obstruction. The clinical presentation of GDCs is highly variable and depends on several factors, including the size, location, and number of cysts. The majority of GDCs are small, measuring less than 2 cm in diameter, and asymptomatic. These cysts are often discovered incidentally during routine pelvic examinations or imaging studies.[17,18]

However, in some cases, GDCs can grow to substantial sizes, exceeding 5 cm in diameter. These larger cysts are more likely to cause symptoms, such as vaginal pressure, discomfort, dyspareunia (painful intercourse), and urinary complaints. The symptoms may be exacerbated by activities that increase intra-abdominal pressure, such as coughing, sneezing, or lifting heavy objects. In rare instances, GDCs can reach massive proportions, as exemplified by the case presented in this report. The patient in this case had a GDC measuring 8 cm x 8 cm, which is considered a giant GDC. Such large cysts can cause significant morbidity and may even mimic other pelvic conditions, such as pelvic organ prolapse. The diagnosis of GDCs typically involves a combination of clinical examination and imaging studies. Pelvic examination may reveal a palpable cystic mass in the vagina, which is usually non-tender and mobile. The location of the cyst can vary, but it is most commonly found on the anterolateral walls of the upper vagina. Imaging studies, such as ultrasound or MRI, are essential for confirming the diagnosis and assessing the size, location, and characteristics of the cyst. Ultrasound is a readily available and non-invasive modality that can accurately delineate the cystic nature of the lesion and its relationship to surrounding structures. MRI, on the other hand, provides superior soft tissue contrast and can be helpful in differentiating GDCs from other pelvic masses.[16-18]

The management of GDCs depends on several factors, including the size, symptomatology, and patient preference. Asymptomatic, small cysts may be managed conservatively with observation and reassurance. Regular follow-up examinations are recommended to monitor for any changes in size or symptoms. However, symptomatic or large GDCs often require surgical intervention. Surgical excision is the definitive treatment for GDCs and offers several advantages. It allows for complete removal of the cyst, histopathological confirmation of the diagnosis, and resolution of symptoms. The surgical approach can be tailored to the individual case, with options including transvaginal, transabdominal, or laparoscopic excision. Marsupialization, a procedure that involves opening and draining the cyst, is another surgical option, particularly for smaller cysts. This technique is less invasive than excision and may be preferred in certain situations, such as during pregnancy or in patients with significant comorbidities. However, marsupialization carries a higher risk of recurrence compared to excision. The prognosis for GDCs is generally excellent. Recurrence after surgical excision is rare, and most patients experience complete relief of their symptoms. However, long-term follow-up is recommended to monitor for any potential recurrence or complications.[19,20]

4. Conclusion

This case report highlights the importance of considering Gartner's duct cysts in the differential diagnosis of women presenting with vaginal masses. While rare, large Gartner's duct cysts can mimic pelvic organ prolapse, leading to potential misdiagnosis and delayed treatment. Thorough clinical evaluation, including imaging studies, is crucial for accurate diagnosis and appropriate management. Surgical

excision is the definitive treatment for symptomatic Gartner's duct cysts, offering excellent outcomes and resolution of symptoms.

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