Clinical Pathology of Bartholin's Glands: A Review of the Literature

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Key Words

Bartholin's glands • Cysts • Abscesses •
Vulval lubrication • Female reproductive system

Abstract

The Bartholin's glands are located symmetrically at the posterior region of the vaginal opening and play an important role in the female reproductive system. These two pea-sized glands are involved in mucus secretion and vaginal lubrication. Cyst formation in the glands is common and results from mucus build-up in gland ducts. It is important to monitor such cysts because they may occur in the form of carcinomas. Larger cysts and abscesses are found in the lower vestibular region and typically present with erythema and edema. Biopsy is an effective method for distinguishing between Bartholin's gland cysts and differential diagnosis. While smaller cysts may be asymptomatic and may be left untreated, larger cysts require medical attention. Several treatment options are available, including marsupialization and CO₂ laser. Healing and recovery depend on the severity of infection and course of treatment.

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Introduction

The Bartholin's glands are essential organs of the female reproductive system. The glands were first described in the 17th century by the Danish anatomist, Casper Bartholin. The organs' main function is to secrete mucus to ensure vaginal and vulval lubrication. The Bartholin's glands are prone to infections and abscess formation, which may result in vestibular pain and dyspareunia. The cause of these infections is associated with bacterial cultures, though other complications may cause Bartholin's cyst, abscess or malignancy. Bartholin's gland neoplasm may correlate to the individual's blood type antigen as studies have revealed diagnosis of Bartholin's carcinoma in patients with rare blood types [1]. This article will review the literature of Bartholin's anatomy, physiology, and pathology as well as treatment options for diseases of the Bartholin's glands.

Anatomy, Physiology, and Embryology

The Bartholin's glands, also called greater vestibular glands, are two pea-sized glands located at the posterior region of the vaginal opening. The glands have an oval shape with an average size of 0.5 cm and are located lateral to the bulbocavernosus muscle. The glands are homologous to the male bulbourethral or Cowper's glands. The glands are connected to ducts, approximately 2.5 cm in width, situated between the labia minora and the hymenal edge [2]. Through these ducts, the glands drain the mucus into the vaginal vestibule. The ducts open at the 4 and 8 o'clock position at the vaginal vestibule on each side of the vaginal opening [3]. Embryologically, the Bartholin's glands originate from the urogenital sinus and therefore, utilize the external pudendal artery as a blood source [2]. The gland is innervated by the pudendal nerve. The lymphatic drainage of Bartholin's glands includes superficial inguinal and pelvic nodes.

Table 1. Bacteriology of Bartholin's gland cyst and abscess

Bacterial agents: aerobes	Bacterial agents: anaerobes
<i>Brucella melitensis</i> [6]	<i>Bacteroides</i> species
<i>Chlamydia trachomatis</i> [7]	<i>Pasteurella bettii</i> [14]
<i>Escherichia coli</i> [8]	<i>Salmonella panama</i> [15]
<i>Hypermucoviscous Klebsiella pneumonia</i> [9]	
<i>Neisseria gonorrhea</i> [7]	
<i>Neisseria sicca</i> [10]	
<i>Pseudomonas aeruginosa</i> [11]	
<i>Staphylococcus aureus</i> : Panton-Valentine	
Leucocidin production [12]	
<i>Streptococcus</i> species [13]	

Pathophysiology

Cysts are common complications of the Bartholin's gland, affecting the ductal region due to outlet blockage [2]. When the Bartholin's gland duct orifice becomes obstructed, the glands produce a build-up of mucus. This build-up leads to a cystic dilation of the duct and cyst formation. Infection of this cyst is likely to result in Bartholin's gland abscess. Duct cyst is not required for the development of abscess. The abscesses are almost three times more common than duct cysts [3]. Bartholin's abscess cultures often show polymicrobial infection.

Lesions in the Bartholin's gland can occur in the form of carcinomas, a rare type of gynecological tumor that accounts for 2–7% of vulvar carcinomas. This type of vulvar growth is carefully monitored among postmenopausal women who are more prone to Bartholin's malignancy [4]. The median age at which Bartholin's gland cancer is diagnosed is 57 years old and carcinoma incidence is highest among women in their 60's. The 2 common types, adenocarcinoma and squamous cell carcinoma, account for 80–90% of primary cases. The remaining 10–20% of cases include transitional, adenoid-cystic or undifferentiated carcinomas [5]. Human papillomavirus is only related to squamous cell lesions. Benign tumors are rarer than carcinomas.

Large proportions of Bartholin's gland abscess are bacterial culture positive with *Escherichia coli* being a common pathogen (table 1). When determining antibacterial treatment options, it is essential to correlate the microbiological findings with their anti-biogram [16].

Clinical Manifestations and Symptoms

Bartholin's duct cyst may be asymptomatic if the cyst is small and not inflamed. However, a small cyst may be observed by physicians as a small mass in the region of the Bartholin's gland. A painless mass may be present without surrounding cellulitis, while abscesses commonly present with cellulitis and lymphangitis. Larger cysts and abscess tend to cause severe vulvar pain and swelling such that the patient experiences difficulty in walking, sitting and engaging in sexual intercourse (dyspareunia). During examination, an abscess presents as a tender mass in the lower vestibular region surrounded by erythema and edema. When the abscess grows large enough to extend to the upper labia, it may

Table 2. Pathology of Bartholin's Glands

Classification	Histomorphology
Cancer of Bartholin's gland	adenoid cystic carcinoma [22] squamous cell carcinoma [23] lymphoepithelioma-like carcinoma [24] vulvar leiomyosarcoma [25] endometrial adenocarcinoma [26] Merkel cell carcinoma [27] mucinous adenocarcinoma [28] transitional cell carcinoma [29] epithelioid sarcoma [30] malignant melanoma [31] Non-Hodgkin's lymphoma [32] human papillomavirus type 16 [33] Paget's disease [34] small cell neuroendocrine [35]
Benign	nodular hyperplasia [36] endometriosis [37] adenoma and adenomyoma [38] papilloma [39] mucocele [40]
Abscess	cellular blue nevus [41]

result in skin rupture and spontaneous drain [3]. The patient may experience a sudden relief of pain after a discharge, highly suggesting presence of spontaneous rupture. Cysts can present in form of inguinal hernia [17].

In neonate, Bartholin's duct cyst associated with hydroureteronephrosis and contralateral renal cyst can cause urinary retention [18]. In the case of Bartholin's gland cancer, painless mass is also present in the vulva-region. Mass fixated to the underlying tissue is often suspected for malignancy. First detection of sentinel node may lead to diagnosis of adenocarcinoma of Bartholin's gland [19].

Diagnosis

Diagnosis of Bartholin's gland carcinoma is established upon histological examination. Women over the age of 40 are recommended to undergo drainage and biopsy to eliminate possible occurrence of carcinoma. Due to the rarity of Bartholin's cancer, a biopsy is recommended over excision [20]. In cases where Bartholin's cancer is suspected, diagnostic criteria is as follows. The tumor must be primarily located in the labia, the surrounding skin must remain undamaged, and there must be at least a small amount of glandular epithelium present. When Bartholin gland carcinomas are present, metastatic disease is likely due to the vulva's extensive vascular and lymphatic network [2].

Differential Diagnosis

Several labia and vaginal lesions can imitate Bartholin's gland diseases. In such situations, differential diagnosis should be considered for the abscess or mass. Differential diagnosis include different types of cysts (inclusion, Gartner, Skene's, sebaceous, vestibular mucosa, canal of Nuck), leiomyomas fibroma, hernia, hidradenoma, hematomas, lipomas, endometriosis, syringoma,

accessory breast tissue, folliculitis, urethral diverticula, hidradenitis suppurativa, chancroid, gonorrhea, syphilis, vaginitis, warts or Bartholin's gland cyst, abscess or cancer [21] (table 2).

Radiology

Magnetic resonance imaging and computed tomography may be utilized to examine large Bartholin's duct cysts in addition to a physical examination [42]. Asymptomatic cysts may also be examined through magnetic resonance imaging scans [43]. High definition ultrasound imaging is also used to reveal presence of Bartholin's cyst [44].

Treatment

Asymptomatic Bartholin's gland cysts can be left untreated without detrimental consequences. Simple and quick method of providing relief for a patient is an incision and drainage of the infected area followed by a suture closure; however, this method is prone to recurrence of cyst or abscess formation [45]. Sitz baths are recommended for abscesses that tend to spontaneously rupture.

A "Word" catheter is a common, more conservative method for treating Bartholin's cyst and abscess that helps prevent recurrence. The catheter consists of an inflatable balloon tip filled with saline solution. The treatment requires a small incision to be made at the infected area and a Word catheter balloon to be placed inside the cyst or abscess cavity. The catheter is left inside for 4–6 weeks to ensure epithelialization and Sitz baths are recommended to aid the healing process. Catheter treatment is not advised for treatment of deep cysts and abscesses [21]. Foley catheter and Jacobi ring are also methods of fistulization that may be used [46].

Marsupialization is an alternative treatment method for Bartholin's glands cysts that allows for a less invasive method of cyst drainage. Small hemostats are used to clasp the cyst and a vertical incision about 1.5–3 cm long is made to drain the infected gland cavity. Saline solution can be used to moisten the area followed by eversion of the cyst wall with absorbable suture. In the presence of an abscess, marsupialization should not be performed. Complications such as hematoma, dyspareunia and infection may occur [3].

Due to disadvantage of recurrence, scarring, persistent drainage, and hemorrhage associated with commonly used treatments, CO₂ laser serves as an advantageous method of avoiding such results. Incision on the cyst is made with CO₂ laser and the wall is vaporized from the inside. In reported cases, the cysts healed with no scar formation and minimal incidence of recurrence [47].

Other methods of treating Bartholin's gland cyst and abscess include silver nitrate gland ablation, laser, needle aspiration with or without alcohol sclerotherapy and gland excision [48]. When treating patients of age 40 or older, careful consideration should be taken in regards to excision of the gland. Medication and antibiotics are used to treat Bartholin's abscesses as the infection is mostly caused by pathogens. Antibiotic therapy may not be necessary for healthy women with uncomplicated abscesses. Antibiotic therapies include Ceftriaxone, Ciprofloxacin, Doxycycline and Azithromycin. This treatment option should be restricted to women who have high risk of complicated infection such as recurrence, pregnancy, immunosuppression, MRSA risk, widespread surrounding cellulitis and gonorrhea or chlamydia infection. Topical or local anesthetics such as lidocaine and bupivacaine are also used to treat abscesses.

Treatment of Bartholin's carcinomas may vary between surgical methods, vulvectomy, or radiotherapy [49]. Hyperbaric oxygen therapy following radical vulvectomy promotes wound healing [50]. Primary adenoid cystic carcinoma is a rare malignancy of Bartholin's cancer. Patients with the cancer can undergo adjuvant external beam radiation or hemivulvectomy [51]. Early stage I of Bartholin's carcinoma can be approached with lymphadenectomy [52].

Conclusion

The Bartholin's glands make up a crucial part of the female reproductive system by allowing for vaginal lubrication. The blockage of the glands' ducts often leads to formation of a cyst and consequently an abscess may develop. Although small cysts may be asymptomatic and can be left untreated, large cysts and abscess require attention and medical treatment. Various methods are available as treatment methods and healing can depend on level of infection, treatment method, and patient's condition.

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