

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

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Key Words

Bartholin's glands • Cysts • Abscesses •
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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 gonorrhoea</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].

References

- 1 Sosnik H, Sosnik K, Halon A: The pathomorphology of Bartholin's gland. Analysis of surgical data. *Pol J Pathol* 2007;58:99–103.
- 2 Antvorskov JC, Josefsen K, Engkilde K, Funda DP, Buschard K: Dietary gluten and the development of type 1 diabetes. *Diabetologia* 2014;75:1770–1780.
- 3 Omole F, Simmons BJ, Hacker Y: Management of Bartholin's duct cyst and gland abscess. *Am Fam Physician* 2003;68:135–140.
- 4 Schwarzlos G, Bolz M, Muller H: Primary carcinoma of Bartholin's glands with HPV 18 detection. *Zentralbl Gynakol* 1997;119:133–135.
- 5 Felix JC, Cote RJ, Kramer EE, Saigo P, Goldman GH: Carcinomas of Bartholin's gland. Histogenesis and the etiological role of human papillomavirus. *Am J Pathol* 1993;142:925–933.
- 6 Peled N, David Y, Yagupsky P: Bartholin's gland abscess caused by *Brucella melitensis*. *J Clin Microbiol* 2004;42:917–918.
- 7 Bleker OP, Smalbraak DJ, Schutte MF: Bartholin's abscess: the role of *Chlamydia trachomatis*. *Genitourin Med* 1990;66:24–25.
- 8 Tanaka K, Mikamo H, Ninomiya M, Tamaya T, Izumi K, Ito K, Yamaoka K, Watanabe K: Microbiology of Bartholin's gland abscess in Japan. *J Clin Microbiol* 2005;43:4258–4261.

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.

- 9 Pinsky BA, Baron EJ, Janda JM, Banaei N: Bartholin's abscess caused by hypermucoviscous *Klebsiella pneumoniae*. *J Med Microbiol* 2009;58:671–673.
- 10 Berger SA, Gorea A, Peyser MR, Edberg SC: Bartholin's gland abscess caused by *Neisseria sicca*. *J Clin Microbiol* 1988;26:1589.
- 11 Touzot F, De Pontual L, Letamendia-Richard E, Fayad F, Nathanson M, Lachassinne E, Gaudelus J: Acute bartholinitis caused by *Pseudomonas aeruginosa* in an 18-month-old infant. *Arch Pediatr* 2004;11:1070–1072.
- 12 Jung N, Lehmann C, Hellmann M, Seifert H, Valter MM, Hallek M, Fätkenheuer G, Kochanek M: Necrotizing pneumonia caused by Panton-Valentine leucocidin-producing *Staphylococcus aureus* originating from a Bartholin's abscess. *Infect Dis Obstet Gynecol* 2008;2008:491401.
- 13 Parvathi S, Imara AS, Thoduka TG: Bartholinitis caused by *Streptococcus pneumoniae*: case report and review of literature. *Indian J Pathol Microbiol* 2009;52:265–266.
- 14 Sneath PH, Stevens M: *Actinobacillus rossii* sp. nov., *Actinobacillus seminis* sp. nov., nom. rev., *Pasteurella bettii* sp. nov., *Pasteurella lymphangitidis* sp. nov., *Pasteurella mairi* sp. nov., and *Pasteurella trehalosi* sp. nov. *Int J Syst Bacteriol* 1990;40:148–153.
- 15 Cummins AJ, Atia WA: Bartholin's abscess complicating food poisoning with *Salmonella panama*: a case report. *Genitourin Med* 1994;70:46–48.
- 16 Kessous R, Aricha-Tamir B, Shezaf B, Steiner N, Moran-Gilad J, Weintraub AY: Clinical and microbiological characteristics of Bartholin gland abscesses. *Obstet Gynecol* 2013;122:794–799.
- 17 Altstiel T, Coster R: Bartholin cyst presenting as inguinal hernia. *S D J Med* 1993;46:7–8.
- 18 Cevik M, Savas M, Guldur ME, Boleken ME: Urinary retention as the presentation of Bartholin's duct cyst in a neonate. *J Pediatr Adolesc Gynecol* 2012;25:e65–67.
- 19 Balepa L, Baeyens L, Nemeč E, Verhas M: First detection of sentinel node in adenocarcinoma of Bartholin's gland. *J Gynecol Obstet Biol Reprod (Paris)* 2004;33:649–651.
- 20 Mayeaux EJ Jr, Cooper D: Vulvar procedures: biopsy, bartholin abscess treatment, and condyloma treatment. *Obstet Gynecol Clin North Am* 2013;40:759–772.
- 21 Koc O, Sengul N, Gurel S: Perineal leiomyoma mimicking complex Bartholin mass. *Int Urogynecol J* 2010;21:495–497.
- 22 Hwang TL, Hung YC, Chang HW: Adenoid cystic carcinoma of Bartholin's gland. *Taiwan J Obstet Gynecol* 2012;51:119–120.
- 23 Ng SM, Nunns D, Lamb M: Bartholin's gland squamous cell carcinoma. *J Obstet Gynaecol* 2012;32:318–319.
- 24 Kacerovska D, Nemcova J, Petrik R, Michal M, Kazakov DV: Lymphoepithelioma-like carcinoma of the Bartholin gland. *Am J Dermatopathol* 2008;30:586–589.
- 25 Gonzalez-Bugatto F, Anon-Requena MJ, Lopez-Guerrero MA, Baez-Perea JM, Bartha JL, Hervias-Vivancos B: Vulvar leiomyosarcoma in Bartholin's gland area: a case report and literature review. *Arch Gynecol Obstet* 2009;279:171–174.
- 26 Ray K, Rocconi RP, Novak L, Straughn JM Jr: Recurrence of endometrial adenocarcinoma in a prior Bartholin's cyst marsupialization incision. *Gynecol Oncol* 2006;103:749–751.
- 27 Khoury-Collado F, Elliott KS, Lee YC, Chen PC, Abulafia O: Merkel cell carcinoma of the Bartholin's gland. *Gynecol Oncol* 2005;97:928–931.
- 28 Ohno T, Nakano T, Abe A, Sano T, Niibe Y, Oka K: Mucinous adenocarcinoma of Bartholin gland treated with radiation therapy: a case report. *Jpn J Clin Oncol* 2001;31:226–230.
- 29 Fujiwaki R, Takahashi K, Nishiki Y, Ryuko K, Kitao M: Rare case of transitional cell carcinoma originating in Bartholin's gland duct. *Gynecol Obstet Invest* 1995;40:278–280.
- 30 Konefka T, Senkus E, Emerich J, Dudziak M: Epithelioid sarcoma of the Bartholin's gland primarily diagnosed as vulvar carcinoma. *Gynecol Oncol* 1994;54:393–395.
- 31 Finan MA, Barre G: Bartholin's gland carcinoma, malignant melanoma and other rare tumours of the vulva. *Best Pract Res Clin Obstet Gynaecol* 2003;17:609–633.
- 32 Tjalma WA, Van de Velde AL, Schroyens WA: Primary non-Hodgkin's lymphoma in Bartholin's gland. *Gynecol Oncol* 2002;87:308–309.
- 33 Sheard JD, Vijayanand R, Herrington CS, Giannoudis A, Shaw G: High-grade squamous intraepithelial neoplasia in a Bartholin's gland cyst associated with HPV 16 infection. *Histopathology* 2000;37:87–88.
- 34 Hastrup N, Andersen ES: Adenocarcinoma of Bartholin's gland associated with extramammary Paget's disease of the vulva. *Acta Obstet Gynecol Scand* 1988;67:375–377.
- 35 Jones MA, Mann EW, Caldwell CL, Tarraza HM, Dickersin GR, Young RH: Small cell neuroendocrine carcinoma of Bartholin's gland. *Am J Clin Pathol* 1990;94:439–442.
- 36 Hjorto SP, Pehrson C, Gernow A: Nodular hyperplasia of the Bartholin gland. *Ugeskr Laeger* 2010;172:969–970.
- 37 Gocmen A, Inaloz HS, Sari I, Inaloz SS: Endometriosis in the Bartholin gland. *Eur J Obstet Gynecol Reprod Biol* 2004;114:110–111.
- 38 Koenig C, Tavassoli FA: Nodular hyperplasia, adenoma, and adenomyoma of Bartholin's gland. *Int J Gynecol Pathol* 1998;17:289–294.
- 39 Enghardt M, Valente PT, Day DH: Papilloma of Bartholin's gland duct cyst: first report of a case. *Int J Gynecol Pathol* 1993;12:86–92.
- 40 Freedman SR, Goldman RL: Mucocele-like changes in Bartholin's glands. *Hum Pathol* 1978;9:111–114.
- 41 Yamazhan M, Ertas IE, Kandiloglu G, Ozeren M: Cellular blue nevus of the vulva mimicking Bartholin's gland abscess in a 15-year-old girl: a case report. *Arch Gynecol Obstet* 2012;285:1009–1011.
- 42 Kozawa E, Irisawa M, Heshiki A, Kimura F, Shimizu Y: MR findings of a giant Bartholin's duct cyst. *Magn Reson Med Sci* 2008;7:101–103.
- 43 Berger MB, Betschart C, Khandwala N, DeLancey JO, Haefner HK: Incidental bartholin gland cysts identified on pelvic magnetic resonance imaging. *Obstet Gynecol* 2012;120:798–802.
- 44 Eppel W, Frigo P, Worda C, Bettelheim D: Ultrasound imaging of Bartholin's cysts. *Gynecol Obstet Invest* 2000;49:179–182.
- 45 Hill DA, Lense JJ: Office management of Bartholin gland cysts and abscesses. *Am Fam Physician* 1998;57:1611–1616,1619–1620.
- 46 Gennis P, Li SF, Provataris J, Shahabuddin S, Schachtel A, Lee E, Bobby P: Jacobi ring catheter treatment of Bartholin's abscesses. *Am J Emerg Med* 2005;23:414–415.
- 47 Lashgari M, Keene M: Excision of Bartholin duct cysts using the CO2 laser. *Obstet Gynecol* 1986;67:735–737.
- 48 Wechter ME, Wu JM, Marzano D, Haefner H: Management of Bartholin duct cysts and abscesses: a systematic review. *Obstet Gynecol Surv* 2009;64:395–404.
- 49 Duun S: Adenoid cystic carcinoma of Bartholin's gland--a review of the literature and report of a patient. *Acta Obstet Gynecol Scand* 1995;74:78–80.
- 50 Reedy MB, Capen CV, Baker DP, Petersen WG, Kuehl TJ: Hyperbaric oxygen therapy following radical vulvectomy: an adjunctive therapy to improve wound healing. *Gynecol Oncol* 1994;53:13–16.
- 51 Hsu ST, Wang RC, Lu CH, Ke YM, Chen YT, Chou MM, Ho ES: Report of two cases of adenoid cystic carcinoma of Bartholin's gland and review of literature. *Taiwan J Obstet Gynecol* 2013;52:113–116.
- 52 Kraemer B, Guengoer E, Solomayer EF, Wallwiener D, Hornung R: Stage I carcinoma of the Bartholin's gland managed with the detection of inguinal and pelvic sentinel lymph node. *Gynecol Oncol* 2009;114:373–374.