

# Cavernosal Abscess due to *Streptococcus Anginosus*: A Case Report and Comprehensive Review of the Literature

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## Key Words

Corpus cavernosum • Penile abscess • Cavernosal abscess • Necrotizing cavernositis • *Streptococcus anginosus*

## Abstract

Corpus cavernosum abscesses are uncommon with only 23 prior reports in the literature. Several precipitating factors for cavernosal infections have been described including injection therapy for erectile dysfunction, trauma, and priapism. Common causal organisms include *Staphylococcus aureus*, *Streptococci*, and *Bacteroides*. We report a unique case of a corpus cavernosum abscess due to proctitis with hematological seeding and review the literature on cavernosal abscesses.

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extension [10], priapism [2, 11], and even hematological seeding from periodontal abscesses [12–14]. Diabetic patients are at greater risk for penile abscesses, likely due to microvascular disease and relative immune system suppression. Typical causative organisms include *Staphylococcus aureus*, *Streptococci*, *Bacteroides*, and *Enterococci*, though cases involving *Mycobacterium tuberculosis*, *Escherichia coli*, *Klebsiella*, *Actinomyces*, and other anaerobes have been described. Most cavernosal abscesses are treated with incision and drainage in addition to systemic antibiotics, though several authors have reported successful treatment with aspiration alone [1, 8, 15]. We report a case of corpus cavernosum abscess caused by *Streptococcus anginosus* in the setting of proctitis, with surgical treatment complicated by abscess recurrence and cutaneous fistula formation.

## Case Report

A 48-year-old previously healthy man presented to the emergency department with a 3-week history of right groin pain and a 1-week history of fevers, chills and night sweats. Abdominal and pelvic CT scan with intravenous contrast showed perirectal stranding suggestive of proctitis, so he was discharged on oral ciprofloxacin and metronidazole. Three days later, he noted penile swelling and a fever to 40.4°C and he returned to the emergency department. He denied any abdominal pain, hematuria, genital lesions, or difficulty urinating. The patient reported a history of untreated erectile dysfunction for the past year, but denied new sexual partners, genital trauma, or past sexually transmitted infections.

## Introduction

Abscesses of the corpus cavernosum are uncommon infections that usually present with several days of progressive penile pain and swelling. While many corpus cavernosum abscesses have no identifiable trigger, cases have been reported in association with intracavernous injection therapy [1–5], foreign bodies [6], perianal [7] or perineal abscess drainage [8, 9], intra-abdominal abscess

**Table 1.** Abscess aspirate culture data

Initial presentation	Recurrence (3 months later)
4+ <i>Streptococcus anginosus</i> (SMG) 1+ Yeast 1+ Gram negative rods 1+ Coagulase-negative <i>Staphylococcus</i> 2+ Mixed anaerobes	2+ <i>Streptococcus constellatus</i> (SMG) 1+ Methicillin resistant <i>Staphylococcus aureus</i> 2+ Beta-hemolytic <i>Streptococcus</i> , Group B 2+ Anaerobic gram negative rods



**Fig. 1.** Axial CT shows a right corpus cavernosum abscess.

Upon arrival to the emergency department, he was afebrile, but tachycardic. Digital rectal exam demonstrated an enlarged, non-tender prostate. Mild penile swelling at the right base was observed with induration and tenderness along the right penile shaft. There was no overlying erythema or ulceration and testicular exam was normal. Laboratory tests were notable for leukocytosis ( $26.3 \times 10^9/\text{ml}$ ) with 8% bands and a mild normocytic anemia. Chemistries including lactate, lipase and urinalysis were unremarkable. Rapid HIV testing was non-reactive.

Repeat CT scan of the abdomen and pelvis showed multiple new splenic infarcts and a fluid collection within the right corpus cavernosum with punctate pockets of gas suggestive of an abscess (fig. 1). The presence of splenic infarcts raised concern for an intravascular source of infection (e.g. endocarditis) with potential embolic seeding of the right corporal body. However, transesophageal echo was negative for vegetations. Empiric therapy with intravenous meropenem and clindamycin was initiated.

Bedside aspiration of the right corporal body returned 10 ml of purulent fluid that grew *Streptococcus anginosus*, yeast, coagulase negative *Staphylococcus*, and mixed anaerobes (table 1). Urine cultures yielded no growth, but blood cultures grew mi-

croaerophilic *Streptococcus*. The patient underwent incision and drainage of the corpus cavernosum abscess under general anesthesia with the placement of a Penrose drain. When aspirate sensitivities returned, his therapy was narrowed to intravenous ceftriaxone and oral metronidazole. The Penrose drain was removed after 5 days and he completed a 6-week course intravenous ceftriaxone and oral metronidazole as an outpatient out of concern for an intravascular source of infection.

Two months later, the patient developed a cutaneous draining fistula tract in the area of the prior drain. He was taken back to the operating room for perineal and right corporal body exploration with closure of the fistula tract. However, his postoperative course was complicated by worsening pain, redness, and swelling around the operative site. Pelvic CT scan demonstrated a recurrent abscess in the right corpus cavernosum. Repeat drainage was performed and aspirate cultures grew several organisms, including *Streptococcus constellatus* (table 1). He was discharged on ampicillin-sulbactam and trimethoprim-sulfamethoxazole for an additional 3 weeks. Although the recurrent abscess and fistula tract resolved, the patient did report erectile dysfunction and right testicular numbness at follow-up.

## Discussion

While many abscesses of the corpus cavernosum are idiopathic [15–21], cases have been described in association with priapism [2, 11], alprostadil or papaverine injections [1–5], trauma [9], tuberculosis [22, 23], penile prosthesis placement [6], and intra-abdominal abscesses [10]. There have also been case reports of cavernosal abscesses following perineal [8, 9] and perianal [7] abscess drainage, presumably via extension through Buck's fascia. Although the corpora cavernosa are not typical sites of hematological spread of infection, Pearle et al. [12] reported a case of cavernosal abscess secondary to a dental abscess with *S. anginosus* bacteremia. Similarly, Charles et al. [14] described an abscess of the corpus cavernosum due to either fellatio or a periodontal abscess with associated *S. constellatus* bacteremia. Sater et al. [13] also reported a case of cavernosal abscess with dental caries as the presumed source.

**Table 2.** Summary of cavernosal abscess cases reported in the literature

Author	Age	Presentation	Localization	Medical history	Etiology	Organism(s)	Intervention	Outcome
Kropman et al. [1]	56	penile pain and swelling	unilateral	ED, bladder	papaverine	<i>S. aureus</i>	aspiration	abscess recurrence with repeat aspiration, minimal residual induration
Schwarzer et al. [2]	63	penile swelling and pain	bilateral	DM, ED	papaverine injection; priapism	<i>S. aureus</i>	bilateral corporotomy; debridement, suction drains	severe fibrosis of both corpora
Shamloul et al. [3]	53	fever, penile pain and swelling	unilateral	none	papaverine	<i>Bacteroides sp.</i>	I&D	resolution
Vives et al. [4]	44	Painful penile ulcer	unilateral	none	papaverine	<i>Bacteroides sp., Peptococcus sp.</i>	I&D	deviation, ED
Nalesnik et al. [5]	40	fever, penile swelling	unilateral	DM, ED	alprostadil injection	Group B <i>Streptococcus</i>	I&D	resolution
Peppas et al. [6]	57	penile mass at post-operative site	unilateral	DM, ED	penile prosthesis; chronic groin rashes	<i>C. albicans</i>	removal of penile prosthesis, irrigation with abx, I&D	recurrent abscess
Sivaprasad et al. [7]	58	penile swelling, discharge from bilateral cavernosa	bilateral	DM	perianal abscess drainage	<i>Actinomyces</i>	bilateral cavernotomy and debridement	ED
Thanos et al. [8]	45	fever, scrotal pain	unilateral	perineal s/p drainage 1 year prior	perineal abscess	<i>E. coli</i> ; anaerobic <i>Streptococci</i>	CT-guided aspiration with pigtail catheter placement	resolution
Niedrach et al. [9]	33	painful penile mass	unilateral	depression	superficial scrotal abrasions leading to testicular abscess s/p orchectomy	beta-hemolytic <i>Streptococci</i> , <i>Diphtheroids</i> , gamma-hemolytic <i>Streptococci</i> , <i>E. corrodens</i> , <i>Bacteroides</i> , <i>Fusibacterium</i>	I&D	resolution
Frank et al. [10]	59	penile pain, fever, dysuria	bilateral	recurrent sarcoma of small bowel s/p resection with radiation and small bowel fistula	lipo-intraabdominal abscess	<i>Enterococcus sp.</i>	bilateral corporotomy	recurrent cavernous abscess and public osteomyelitis; ED
Sood et al. [11]	24 days	neonatal priapism, penile swelling	bilateral	none	stasis from idiopathic priapism	<i>Klebsiella sp.</i>	aspiration and irrigation with gentamicin saline solution	anatomically normal at 9 months.

**Table 2.** (continued)

Author	Age	Presentation	Localiza- tion	Medical history	Etiology	Organism(s)	Intervention	Outcome
Pearle et al. [12]	42	fever, penile pain and swelling	bilateral	DM	peridontal abscess	<i>S. anginosus</i> (blood); alpha-hemolytic <i>Streptococci</i> , <i>Peptostreptococcus</i> , <i>Fusibacterium</i>	I&D	delayed scrotal abscess, ED
Sater et al. [13]	38	fever, painful penile mass	unilateral	none	dental caries	Sterile	I&D	deviation, ED, abscess recurrence requiring drainage
Charles et al. [14]	46	penile swelling	unilateral	none	fellatio vs. peridontal abscess	<i>S. constellatus</i> (blood), Actinomyces, <i>Fusibacterium</i> , <i>P. bivia</i> , <i>E. corrodens</i> , <i>S. anginosus</i> , <i>Peptostreptococcus</i>	debridement of ruptured abscess	ED
Moskovitz et al. [15]	43	fever, painful mass	unilateral	DM	idiopathic	beta-hemolytic <i>Streptococci</i>	ultrasound-guided aspiration	resolution
Sagar et al. [16]	19	penile swelling	unilateral	none	idiopathic	<i>S. aureus</i>	I&D	mild deviation
Kumar et al. [17]	22	penile swelling	unilateral	none	idiopathic	<i>S. aureus</i>	aspiration	resolution
Ehara et al. [18]	54	penile pain	bilateral	ED	idiopathic	Sterile, <i>S. aureus</i> upon recurrence	I&D	recurrence with abscess rupture leading to total penectomy and perineal urethrotomy resolution
Palacios et al. [19]	54	urinary retention, penile swelling, fever	unilateral	repeated UTIs	idiopathic	Sterile	I&D	ED, abscess resolution
Pascual et al. [20]	60	penile and scrotal swelling	unilateral	none	idiopathic	<i>Enterococcus sp.</i>	I&D	deviation, ED
Koksal et al. [21]	33	painful erection, weak urinary stream, penile tenderness	bilateral	none	idiopathic	<i>S. aureus</i>	I&D	mild deviation
Yaehia et al. [22]	73	weak urinary stream for 1 year	unilateral	none	idiopathic	<i>M. tuberculosis</i>	I&D	no further urinary
Murali et al. [23]	40	progressive painless mass	bilateral	none	idiopathic	<i>M. tuberculosis</i>	I&D	difficulty ED

ED = erectile dysfunction; DM = diabetes mellitus; I&D = incision and drainage.

The *Streptococcus milleri* group (SMG) bacteria, including *S. anginosus*, *S. constellatus*, and *S. intermedius*, are known for their ability to cause deep tissue abscesses [24, 25]. Systemic SMG infections are often associated with breakdown in gastrointestinal epithelium, as in dental abscesses [26], ingested foreign bodies [24], and gastrointestinal malignancies [27–29]. Murarka et al. [30] reported a case of liver abscess secondary to disseminated *S. anginosus* from sigmoid diverticulitis. Our patient had evidence of proctitis on CT scan, which was the likely source of *S. anginosus* bacteremia with possible intravascular infection subsequently seeding the corpus cavernosum.

A review of the literature revealed 23 reported cases of cavernosal abscess (table 2). The patients' mean age was 45 years (range 19–73 years). Penile pain and swelling were the most common presenting symptoms and one-third of abscesses were bilateral. Although over one-third of cases were spontaneous, other etiologies included intracavernous injection (22%), associated perianal/perineal/intra-abdominal abscess (13%), and dental infections with hematologic spread (13%). There were also individual cases attributable to a penile prosthesis, priapism, and genital trauma. The most common causal organisms were *S. aureus* (25%), *Streptococci* (21%), *Fusibacteria* (13%) and *Bacteroides* (13%). Diabetic patients accounted for 25% of reported cases. However, half of diabetic patients also used intracavernous injection therapy for erectile dysfunction, further increasing their risk for abscess formation.

Corpus cavernosum abscesses are generally treated with incision and drainage followed by broad-spectrum antibiotics. While most patients regain normal anatomical and erectile function following abscess drainage, many do experience penile deviation [16, 20, 21], erectile dysfunction [7, 10, 12, 14, 20], or abscess recurrence [6, 10, 13, 18]. Shamloul et al. [3] reported a case of cavernositis in which the patient presented within 36 hours of symptom onset, and abscess drainage resulted in no loss of erectile function. This case suggests that early diagnosis and treatment of cavernosal abscess may improve the likelihood of preserved erectile function, as there is less cavernosal necrosis and fibrosis prior to surgical intervention.

Although traditional therapy for cavernosal abscesses has focused on surgical drainage, less invasive interventional techniques may offer a lower risk for long-term sequelae. Thanos et al. [8] described a case of a cavernosal abscess that was successfully treated with CT-guided aspiration and pigtail catheter placement as

well as broad-spectrum antibiotics. The procedure was performed under local anesthesia with minimal trauma to the corpus cavernosum. They reported complete resolution of the abscess with no resultant erectile dysfunction. Kropman et al. [1] and Moskovitz et al. [15] also reported abscess resolution with aspiration followed by systemic antibiotics. This conservative approach is particularly appealing in light of the risk of erectile dysfunction, penile deviation, and fibrosis of the corpus cavernosum with aggressive surgical intervention. However, given the risk of cavernosal fibrosis and abscess recurrence with incomplete evacuation of the abscess, incision and drainage remains the mainstay of therapy.

### Conclusion

Abscess of the corpus cavernosum is an uncommon infection that is frequently idiopathic, but may also be a result of intracavernosal injection, perineal abscess extension, and septic metastases. It should be considered in the differential for acute onset of penile pain and swelling, particularly in diabetic patients. Prompt diagnosis and treatment may reduce the risk of long-term sequelae that result from cavernosal fibrosis. Surgical drainage is the most widely accepted treatment, but carries a substantial risk of erectile dysfunction and penile deviation.

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