



Case report

Staphylococcus lugdunensis causing Epididymo-orchitis with scrotal pyocele



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ABSTRACT

Staphylococcus lugdunensis, originally identified in 1988, is a coagulase negative staphylococcus (CNS) that has become a significant human pathogen. It has been found as a source of skin and soft tissue infection, endocarditis, urogenital tract infection, joint infection, and meningeal infection. Rarely, it manifests as scrotal infections or complications. Correct identification of the bacterial organism and prompt treatment is crucial in these cases, as delayed intervention can lead to complications requiring orchiectomy. We describe a rare case of a young male who presented with scrotal pain and swelling and was found to have epididymo-orchitis with scrotal pyocele on imaging. He underwent scrotal exploration with incision and drainage and did not require an orchiectomy. Wound cultures grew *S. lugdunensis*, and the patient clinically improved after being treated with appropriate antibiotics. To our knowledge, this is the first reported case of scrotal abscess and epididymo-orchitis with pyocele formation caused by *S. lugdunensis*.

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Introduction

Scrotal pyocele presents as a complication of epididymo-orchitis and requires urgent distinction from other urologic emergencies such as Fournier's gangrene. Epididymo-orchitis with scrotal pyocele is most commonly caused by sexually transmitted infections and genito-urinary infections. *Neisseria gonorrhoea*, *Chlamydia trachomatis* and *Escherichia coli* are the most common causative microorganisms [1].

Staphylococcus lugdunensis is a normal flora in the inguinal and perineal region and is known to cause skin and soft tissue infections [2]. However, it is rarely found to be a cause of scrotal infections or its complications. In such cases, it is imperative to correctly identify this microorganism and initiate prompt treatment to avoid delayed interventions that can eventually lead to orchiectomy. We present the first reported case of scrotal abscess and epididymo-orchitis with pyocele formation caused by *S. lugdunensis*.

Case presentation

A 31-year-old homosexual male presented to the emergency department at an outlying facility with a three-day history of progressively worsening scrotal pain and swelling after he tried to squeeze a boil located on his right upper scrotum. He first noticed the swelling on the right side of the scrotum around the boil, which subsequently spread to also involve the left half of the scrotum. He denied any history of perineal shaving or waxing prior to the boil formation. The patient reported associated symptoms of fever, chills, nausea, vomiting and pain during bowel movements. Review of systems was negative for any dysuria, hematuria, urethral discharge, pain with sexual activity or anogenital trauma. Past medical history was significant for left varicocele. The patient had a total of three lifetime partners and reported being sexually abstinent for the last four months prior to admission. He denied any history of immunosuppression, sexually transmitted infections or any insertive anal sexual activity. He also denied alcohol or recreational drug use but reported smoking marijuana and 5–6 cigarettes daily. His family history was negative for malignancy.

On presentation, the patient was afebrile, tachycardic and normotensive. A physical exam revealed bilateral inguinal lymphadenopathy and an enlarged, erythematous, tender scrotum with fluctuation on the right side and pus discharge from the right upper scrotum. The pain was partially relieved upon physically lifting the testicles. A cremasteric reflex could not be appreciated

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due to scrotal swelling. A digital rectal exam was unremarkable. Serum analysis was significant for leukocytosis (WBC of $21.74 \times 10^3/\text{mCL}$), elevated C-reactive protein (CRP of 21.61 mg/dL) and elevated erythrocyte sedimentation rate (ESR of 39 mm/h). Urinalysis and blood cultures drawn on admission were unremarkable. A nucleic acid amplification test on a urine specimen for gonorrhea and chlamydia in addition to HIV testing resulted negative. A spectral doppler testicular ultrasound (US) (Fig. 1) revealed bilateral epididymo-orchitis, a complex $10.7 \times 3.4 \times 1.5$ cm right scrotal fluid collection suggesting an abscess and a right pyocele measuring $2.6 \times 5.2 \times 0.5$ cm. A computed tomography (CT) (Fig. 2) of the pelvis with contrast did not demonstrate any gas foci within the pyocele or scrotal abscess. The patient was initiated on empiric coverage with cefazolin, and Urology service was consulted.

He then underwent right scrotal exploration with incision, drainage and debridement of scrotal abscess, and excision of all the necrotic tissue and layers, including tunica vaginalis. Tissue and pus specimens were obtained and sent for culture and pathology. Wound culture grew *Staphylococcus lugdunensis* and mixed anaerobes. Histopathology reported acute on chronic inflammation with necrosis. Postoperatively, the patient showed clinical improvement and was discharged home on a ten-day course of cephalexin and metronidazole after discussion with Infectious disease services. His wound was noted to be healing well on outpatient follow up visits.

Discussion

Staphylococcus lugdunensis, originally identified in 1988, is a coagulase negative staphylococcus (CNS) found to be a normal skin flora with high carriage in the perineal region [2]. It has become a significant human pathogen, which has made it increasingly important to correctly identify this organism from staphylococcus aureus and other CNS species as they have similar virulent properties [3].

S. lugdunensis speciation is possible by performing clumping factor assays such as latex agglutination or tube coagulation along with testing for positive ornithine decarboxylase and pyrrolidonyl arylamidase activity or polymerase chain reaction for specific

conserved genes. However, the matrix-assisted laser desorption/ionization time of light mass spectrometry (MALDI-TOF MS) technique is now the method of choice for identification, as it has close to 100 % sensitivity and specificity [3]. We utilized the MALDI-TOF technique to identify *S. lugdunensis* in our patient.

This organism has been found as a source of skin and soft tissues infections, endocarditis, urogenital tract infections, septic joints, meningitis and hidradenitis suppurativa [4,5]. To our knowledge, this is the first reported case of scrotal abscess and epididymo-orchitis with pyocele formation caused by *S. lugdunensis*. A review of literature using PubMed and Google Scholar revealed 6 other published case reports on *S. lugdunensis* involving the scrotum (Table 1).

Scrotal abscess due to *Staphylococcus lugdunensis* infection has also been reported in some large center studies. In a retrospective analysis of *S. lugdunensis*, isolates collected between 1993–2003, Hellbacher et al. aimed to characterize the wide spectrum of infections caused by *S. lugdunensis*. Out of 12 patients who had an abscess with *S. lugdunensis*, only 1 case of scrotal abscess was identified [11]. In a similar study, Vandenesch et al. reported a total of 63 patients with *S. lugdunensis* skin or soft tissue infections, of which 2 cases involved the scrotum [12]. Our patient did not display any specific risk factors, such as immunosuppression, high risk sexual behavior, urethral instrumentation or any surgical procedure in the inguinal region that would predispose him to *S. lugdunensis* infection. The spread of infection in our case was likely due to the entry of pathogens into the scrotal sac from skin breakdown after the patient attempted to squeeze a boil on the scrotum.

The most common causes of epididymo-orchitis with scrotal pyocele are genito-urinary tract and sexually transmitted infections [13,14]. In our patient, this was ruled out with a normal urinalysis and negative gonorrhea, chlamydia and HIV testing.

Given the presentation, it is also important to distinguish scrotal pyocele from Fournier's gangrene. Fournier's gangrene should be suspected in patients with immunosuppression, diabetes mellitus or alcohol misuse, who present with rapid progression of scrotal necrosis, crepitus on exam and hemodynamic instability. A diagnostic finding of Fournier's gangrene includes the detection of gas within the subcutaneous tissue of the



Fig. 1. Spectral doppler testicular ultrasound (US) showing right pyocele formation.



Fig. 2. CT pelvis with contrast showing right peritesticular pyocele and right scrotal abscess. No gas foci noted within the pyocele or scrotal abscess.

Table 1
Case reports of *Staphylococcus lugdunensis* involving the scrotum.

No.	Year	Age	Risk factors	Imaging findings	Diagnosis	<i>S. lugdunensis</i> identification	Orchiectomy	Complication	Reference
1	2020	67	Intermittent self-urethral catheterization Urine culture positive for <i>E. coli</i> and <i>Klebsiella pneumoniae</i>	Spectral doppler ultrasound reported right complex hydrocele, heterogeneous right testis and epididymis. CT did not show any abscess.	Epididymo-orchitis	Intra-op wound culture	Right orchiectomy	Testicular abscess and testicular ischemic necrosis	[1]
2.	2019	52	Penile injection of cocaine, HCV related chronic liver disease	Scrotal US showed altered echogenicity, hypervascularization with hypoechoic areas involving the right and left testis. A left hydrocele was present. CT reported phlogosis and edema of the scrotum, with an unrecognizable right testis.	Fournier's gangrene	Wound culture	Right orchiectomy	-	[6]
3.	2019	57	HBV related hepatocellular cancer, history of radiation, on tenofovir and sorafenib therapy	CT abdomen/pelvis reported emphysema around testicles, perineal tissue and the right lower abdomen wall.	Fournier's gangrene	Pus and necrotic tissue culture	-	-	[7]
4.	2016	44	Self-administered rectal enema	Scrotal US reported normo-echogenic testes, and normal arteriovenous blood flow	Fournier's gangrene	Wound culture	No	None	[8]
5.	2015	56	Vasectomy (route of entry was likely scrotal skin related to vasectomy procedure)	-	<i>S. lugdunensis</i> bacteremia and endocarditis	Blood culture, mitral valve tissue sample on autopsy	-	Mitral valve endocarditis, septic cerebral and pulmonary embolism and infarction, cardiac arrest, death	[9]
6.	2000	67	-	-	Scrotal wound	Blood culture	No	Bacteremia, Mitral valve endocarditis	[10]

scrotum on ultrasound or CT scan [15]. Clinically, our patient did not show signs of Fournier's gangrene, and CT pelvis did not demonstrate any gas foci within the pyocele or scrotal abscess, which therefore ruled out Fournier's gangrene.

Initial management requires empiric antibiotic coverage with beta-lactam or third generation cephalosporin and the removal of the source of infection [3,13]. An intraoperative evaluation of the testes should be performed to determine the need for orchiectomy [14]. We empirically covered our patient with cefazolin and later

transitioned him to a 10-day course of cephalexin and metronidazole based on the results of the surgical culture. Surgical exploration showed viable right testis and spermatic cord and therefore, our patient did not require an orchiectomy.

We present the first reported case of scrotal abscess and epididymo-orchitis with pyocele formation caused by *S. lugdunensis* in an immunocompetent patient. It is important to know that *S. lugdunensis* has become an increasing virulent organism causing deep seated infection in the scrotum, as well as other soft

tissue infections. Correct identification of the bacterial organism and prompt treatment is crucial in these cases, as delayed intervention can lead to complications requiring orchiectomy.

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Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Abuzar Ali Asif wrote the initial manuscript. Nirali Shah conceptualized the study. Abuzar Ali Asif and Nirali Shah performed data designing and image collection. Francis J. McBee Orzulak reviewed the final manuscript. All authors agree with the final version of the manuscript.

Author statement

Abuzar A. Asif: Conceptualization, Writing- original draft preparation Nirali Shah: Writing- Review & Editing, Investigation. Francis J. McBee Orzulak: Supervision, Visualization.

Declaration of Competing Interest

The authors report no declarations of interest.

References

- [1] Hackett B, Sletten Z, Bridwell RE. Testicular abscess and ischemia secondary to epididymo-orchitis. *Cureus* 2020;12(7):e8991, doi:<http://dx.doi.org/10.7759/cureus.8991>.
- [2] van der Mee-Marquet N, Achard A, Mereghetti L, Danton A, Minier M, Quentin R. *Staphylococcus lugdunensis* infections: high frequency of inguinal area carriage. *J Clin Microbiol* 2003;41(4):1404–9, doi:<http://dx.doi.org/10.1128/jcm.41.4.1404-1409.2003>.
- [3] Parthasarathy S, Shah S, Raja Sager A, Rangan A, Durugu S. *Staphylococcus lugdunensis*: review of epidemiology, complications, and treatment. *Cureus* 2020;12(6):e8801, doi:<http://dx.doi.org/10.7759/cureus.8801>.
- [4] Katoulis AC, Koumaki D, Liakou AI, Vrioni G, Koumaki V, Kontogiorgi D, et al. Aerobic and anaerobic bacteriology of hidradenitis suppurativa: a study of 22 cases. *Skin Appendage Disord* 2015;1(2):55–9, doi:<http://dx.doi.org/10.1159/000381959>.
- [5] Edelstein S, Ben Shachar I, Ben-Amram H, Biswas S, Marcus N. Assisted reproductive technology as a transcutaneous route for bacterial contamination of ovarian endometrioma with coagulase-negative *Staphylococcus*: case report and review of the literature. *Infect Dis Obstet Gynecol* 2019;2019:4149587, doi:<http://dx.doi.org/10.1155/2019/4149587>.
- [6] Zingaro MD, Boni A, Vermandois J, Paladini A, Lepri E, Ursi P, et al. Fournier's gangrene and intravenous drug abuse: an unusual case report and review of the literature. *Open Med (Warsaw, Poland)* 2019;14:694–710, doi:<http://dx.doi.org/10.1515/med-2019-0114>.
- [7] Kang HW, Yun SJ, Kim WJ. Necrotizing fasciitis associated with sorafenib treatment. *IDCases* 2019;18:e00611, doi:<http://dx.doi.org/10.1016/j.idcr.2019.e00611>.
- [8] Serkan AKAN. A rare cause of rapidly progressive Fournier's Gangrene: *Staphylococcus lugdunensis*. *J Microbiol Infect Dis* 2016;6(3):132–5.
- [9] Schandiz H, Olav Hermansen N, Jørgensen T, Roald B. *Staphylococcus lugdunensis* endocarditis following vasectomy—report of a case history and review of the literature. *APMIS* 2015;123(8):726–9, doi:<http://dx.doi.org/10.1111/apm.12396>.
- [10] Patel R, Piper KE, Rouse MS, Uhl JR, Cockerill 3rd FR, Steckelberg JM. Frequency of isolation of *Staphylococcus lugdunensis* among staphylococcal isolates causing endocarditis: a 20-year experience. *J Clin Microbiol* 2000;38(11):4262–3, doi:<http://dx.doi.org/10.1128/JCM.38.11.4262-4263.2000>.
- [11] Hellbacher C, Törnqvist E, Söderqvist B. *Staphylococcus lugdunensis*: clinical spectrum, antibiotic susceptibility, and phenotypic and genotypic patterns of 39 isolates. *Clin Microbiol Infect* 2006;12(1):43–9, doi:<http://dx.doi.org/10.1111/j.1469-0691.2005.01296.x>.
- [12] Vandenesch F, Eykyn SJ, Etienne J, Lemozy J. Skin and post-surgical wound infections due to *Staphylococcus lugdunensis*. *Clin Microbiol Infect* 1995;1(2):73–4, doi:<http://dx.doi.org/10.1111/j.1469-0691.1995.tb00449.x>.
- [13] Martin CD, Sulava E, Bloom A. More than just torsion: an unusual case of testicular pain. *Mil Med* 2020;185(5-6):e900–3, doi:<http://dx.doi.org/10.1093/milmed/usz316>.
- [14] Slavis SA, Kollin J, Miller JB. Pyocele of scrotum: consequence of spontaneous rupture of testicular abscess. *Urology* 1989;33(4):313–6, doi:[http://dx.doi.org/10.1016/0090-4295\(89\)90274-4](http://dx.doi.org/10.1016/0090-4295(89)90274-4).
- [15] Mirochnik B, Bhargava P, Dighe MK, Kanth N. Ultrasound evaluation of scrotal pathology. *Radiol Clin North Am* 2012;50(2), doi:<http://dx.doi.org/10.1016/j.rcl.2012.02.005> 317–vi.