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Integrative Review of Case Reports of Corpus Cavernosum Abscess.

João Roberto Paladino urologiapaladino@gmail.com
Assistant Physician, Urology Department,
Centro Universitário FMABC,Santo André,
São Paulo,
Brazil.

Alexandre Gomes Sibanto Simões
Assistant Physician, Urology Department,
Centro Universitário FMABC,Santo André,
São Paulo,
Brazil.

Alexandre Kyoshi Hidaka
Urology Resident, Urology Department,
Centro Universitário FMABC, Santo
André, São Paulo,Brazil.

Renan Murata Hayashi
Academic Physician, Centro Universitário FMABC,
Santo André, São Paulo,Brazil.

Alexandre Sacchetti Bezerra a.bezerr@uol.com.br
Assistant Physician, Vascular Surgery Department,
Instituto de Infectologia Emílio Ribas, São Paulo, Brazil.

*Corresponding Authors: Alexandre Sacchetti Bezerra.

ABSTRACT

Purpose: The aim of this report was to conduct a systematic review of corpus cavernosum abscess case reports documenting the etiological agents and outcomes following treatment.

Materials and Methods: We searched the Medline, Embase, and Cochrane databases for English-language articles published until September 2021 and performed a systematic review according to the 2020 PRISMA protocol. The primary outcome was to determine the erectile dysfunction rate, and the secondary outcome was to report the presence or worsening of penile deviation following corpus cavernosum abscess management.

Results: We found 376 reports and included 41 studies with 42 patients in the systematic review analysis. Thirteen cases (30.9%) reported a first episode or worsening of erectile dysfunction after hospital discharge; five cases (11.9%) developed or had an exacerbated penile deviation during the follow-up.

Keywords: Abscess, Infection, Erectile dysfunction.

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I. INTRODUCTION

Penile or corpus cavernosum abscesses are rare infections of the genitourinary system and are secondary to several conditions. The majority of these abscesses, regardless of etiology, are treated with surgical drainage. The outcome of erectile function after surgical drainage ranges from normal to erection with penile deviation to impotence.

The aim of this systematic review was to determine the post-treatment consequences of corpus cavernosum abscesses.

II. MATERIALS AND METHODS

Literature Search

In the present study, a Medline (via PubMed), Embase, and Cochrane database search was carried out until July 2021. The keywords for the search were taken from the Medical Subject Heading terms from the National Library of Medicine, titles, or abstracts through Boolean operators (and/or) including “Abscess” or “Disease, penile.” It should be noted that only studies in the English language were included. Of the total 376 hits, 41 were included based on the inclusion criteria given in PRISMA 2020 workflow.

Inclusion Criteria

The attempt at a systematic review was carried out using the following inclusion criteria: case reports or case series, full texts or abstracts of studies published in English, and online studies published on the Medline (via PubMed), Embase, and/or Cochrane databases up to September 2021.

Exclusion Criteria

The exclusion criteria were non-human studies, review articles, guidelines, systematic reviews or meta-analyses, penile abscess that did not compromise the corpus cavernosum, and incomplete reported data in PRISMA 2020 workflow.

Primary Endpoint

We aimed to determine the erectile dysfunction rate or worsening after corpus cavernosum abscess treatment.

Secondary Endpoint

We also aimed to determine the presence of penile deviation after corpus cavernosum abscess treatment, risk factors, and etiological agents.

Study Selection and Data Extraction

When discrepancy was observed, researchers collaborated in skimming through the paper or con- ference abstract as a case to be reviewed. For each article, the following features were extracted and recorded through the Number software (Apple Inc., CA, USA): author, publication year, age, causative pathogen, medical history and comorbidities, clinical presentation, pharmacological treatment or aspiration or surgical drainage, and outcome.

The references of the articles were comprehensively surveyed to make sure that there were no additional cases remaining unidentified from the primary search.

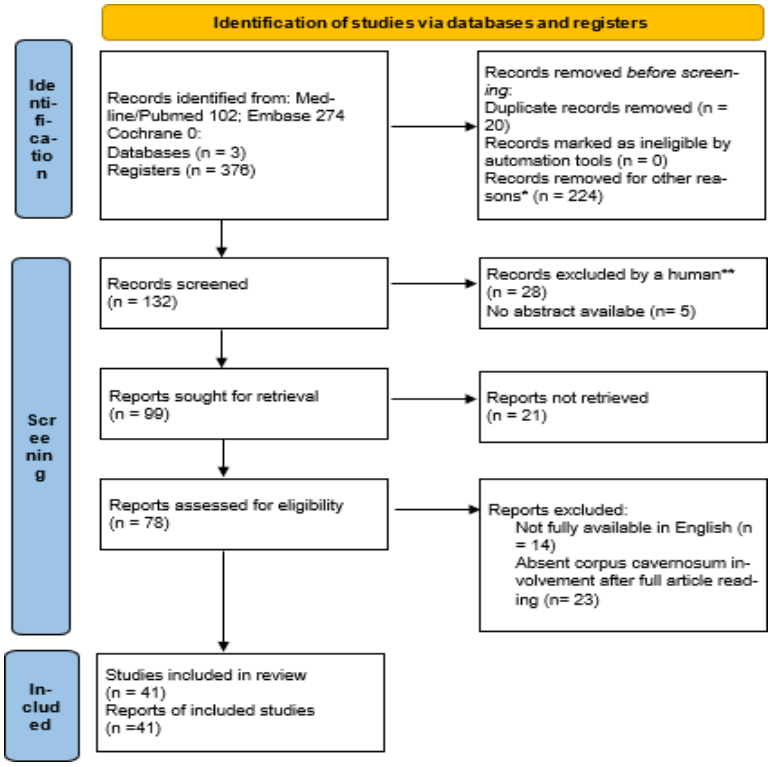

Figure 1: Identification of studies via databases and registers. * Exclusion after title reading due to non-genitourinary site. (E.g.: Brain or lung site)** Exclusion after title and abstract reading due to non-genitourinary site (E.g.: Brain or lung site) and prothesis related infection.

Quality Assessment

Each article was independently surveyed by at least two authors (AKH and JRPJ), with the stan- dardization of the data to be surveyed. The risk of bias through a specific tool was not performed in this review. The parameters are presented in Table 1.

Abbreviature: ED - Erectile Dysfunction; PD - Penlie deviation; CC - continuous ; TUR - Trans urethral resection; CT - Computed tomography

Data synthesis and analysis

Data were summarized using descriptive statistics, with means and standard deviations for contin- uous variables and frequencies and percentages for dichotomous variables.

III. RESULTS

A total of 376 reports were initially found (Fig. 1). A final total of 41 studies with 42 patients were included in the systematic review analysis. All of the included cases are pooled in Table 1.

The patients had a median age of 46 years (range, 24 days to 78 years). The median major axial size of the abscesses was 3.35 cm (range 2-14). Clinical presentations included fever (47.0%), penile pain (61.9%), swelling (76.1%), urethral pustular discharge (16.6%), and voiding symptoms (16.7%).

Diabetes mellitus seemed to be the most common comorbidity (19.0%). The leading causes were idiopathic (20/42, 47.2%), trauma (5/42, 11.9%), intracavernous injection (5/42, 11.9%), perianal abscess (4/42, 9.5%), periodontal causes (3/42, 7.1%), prior penile surgical procedure (2/42, 4.7%), and other causes (3/42, 7.1%).

Eight cases were treated with primary aspiration (19.0%), six (14.2%) with medicament only, two (4,7%) with broad-spectrum antibiotic and phosphodiesterase 5 inhibitors, 27 cases (64.2%) with surgical incision and drainage, one (2.3%) who underwent endoscopic transurethral resection, and three (7.1%) who underwent total or partial penectomy. One (2.3%) case developed Fournier gangrene and, thus, underwent further penectomy.

Thirteen cases (30.9%) reported a first episode or worsening of erectile dysfunction after hospital discharge and five (11.9%) developed or had a worsened penile deviation during the follow-up period.

Author / Year	Age (Years)	Clinical Presentation	Localization	Medical History	Ethiology	Organism(s)	Size (cm)	Intervention	Outcome
Sater et. al. 1989	38	Fever; penile mass	Unilateral	None	Dental Caries	-	3	Surgical drainage	ED + PD
Niedrach et al. 1989	33	Fever; Penile mass	unilateral	Depression	Genital trauma + Orchitis + Scrotal abscess leading to orchiectomy	Mixed Bacterial colonies	2x2	Surgical drainage	Resolution
Yachia et al. 1990	73	Weak urinary stream	unilateral	Orchiectomy due to "swelling"; Uretral stricture	Idiopathic	tuberculous mycobacterium	-	Oral Trimethoprim-Sulfamethoxazole;	Urinary stream resolution
Moskovitz et al. 1992	43	Fever, Disuria, Penile pain and swelling	unilateral	DM;	Idiopathic	Streptococcus B-Hemolytic	3	US guided Aspiration (3ml)	Resolution
Kropman et al. 1993	56	Penile pain and swelling	Unilateral	Multiple Sclerosis; Neurogenic bladder; Previous ED (papaverine); no DM	Intracavernous therapy	Staphylococcus aureus	2,9x1,5 x1,8	Cefuroxime EV; 19 gauge needle Aspiration	Resolution

Sagar et al. 2004	19	Penile pain and swelling	unilateral	none	Idiopathic	S. aureus	-	Surgical drainage (7ml)	slight penile deviation, No ED
Sivaprasad et al. 2005	58	Pustular discharge, penile swelling	Bilateral	DM	perineal abscess	Actinomycetes	-	Bilateral cavernotomy and drainage	Resolution
Weizberg et al. 2007	42	Scrotal pain and swelling	Unilateral	None	Perianal abscess	Prevotella bivia, latex negative Sthaphylococcus, S. Constelallus	4,5 x 4	Surgical Drainage	Not reported
Ehara et al. 2007	54	Penile pain	bilateral	ED	Spontaneous sterile abscess	Sterile	-	Surgical drainage; Penectomy	-
Thanos 2011	45	Penile pain and swelling	Unilateral	Fever, scrotal unilateral pain	Perineal abscess	E. coli	-	CT guided aspiration (120cc)	Resolution
Song et al. 2012	51	Penile pain and swelling		DM, Hypertension; penile petroleum jelly self-injection	Penile fracture	Enterococcus faceais	3,5	Surgical Drainage (10ml)	Resolution
Brennan et al. 2013	56	Penile pain and swelling; pustular uretral discharge	Unilateral	None	Idiopathic	Streptococcus constellatus and intermedium	9,5 x 6,4	Surgical Drainage	Resolution
Dugdale et al. 2013	48	Fever, Penile swelling	unilateral	Untreated ED	Idiopathic	S. anginosus, yeast, coagulase negative Staphylococcus, mixed anaerobes	-	Aspiration and Surgical Drainage	Recurrent abscess; ED, testicular numbness
Ranjan 2013	48	Fever, dysuria, perineal pain	bilateral	DM	Idiopathic	-	-	Bulbar Endoscopic TUR (80ml)	Uretral Stricture
Kumabe et al. 2013	60	Fever, malaise, pustular uretral discharge	Unilateral	Hartmann's Surgery with bladder, seminal vesicle total extirpation and prostatic segmentectomy due sigmoid cancer	Blind-ending Urethra	E. coli	-	Surgical Drainage	Resolution

Paladino et al. 2013	23	Fever, Penile pain and swelling, Painful penile erection	Bilateral	Priapism; Sickle cell disease	Winter procedure 20 days ago;	Coagulase negative Staphylococcus	-	Surgical Drainage	ED; Semirigid penile protheiss
Dempster et al. 2013	32	Penile and scrotal pain and swelling, fever	Unilateral	Mild Asthma	Idiopathic	Sterile	3,5x2,5	Cavernostomy and debridement	ED; penile prothesis
Glandton et al. 2014	60	Pustular discharge, glans nechosis, Voiding symptoms	Bilateral	DM, Hypertension, hepatitis C, Hiperdislipdemia, Smoker	Al-Gorab procedure, Priapism	S. aureus	14	Distal penectomy, CC irrigation, drainage	Resolution
Tuzel et al. 2015	38	Penile pain and swelling	Unilateral	Androgen anabolic steroids (nandrolone and stanzalol past 10 years)	Idiopathic	S. epidermidis	3,2x2,4	Surgical drainage	Mild penile deviation
Siraj et al. 2018	49	Penile pain and swelling	Bilateral	Balanitis 1 month before	Idiopathic	S. anginosus	10 x 6	Several Surgical drainages	Lost follow up
Bakhsh et al. 2020	36	Penile pain and swelling	bilateral	cavernositis	Idiopathic	-		Ceftriaxone 1g 8/8h for 2 weeks + Tadalafil 5mg for 3 months	Resolution
Bakhsh et al. 2020	26	Penile pain and swelling, urethral discharge, disyria and frequency	?	cavernositis and Mild ED	Idiopathic	-	-	Oral Doxicicline + cefuroxime + Intramuscular ceftriaxone 250mg //Tadalafil 5mg + Endovenous Cefuroxime 14 days	Resolution
Gore et al 2020	34	Penile pain and swelling, priapism	bilateral	Neurogenic bladder, Selfcatheterization	Urethral diverticulum rupture after self catheterization	Peptoniphilus asaccharolyticus and Corynebacterium species,	7,8 x 2,9	Surgical Drainage	Partial penectomy and perineal urethrostomy
Roberto et al. 2020	43	Fever, Penile pain and swelling	Bilateral	none	Idiopathic	S. anginosus	-	Surgical drainage	No ED after 5 months

IV. DISCUSSION

Penile abscess with corpus cavernosum involvement is a rare entity whose etiology is still uncertain. Many authors have reported several causal factors, associating it with untreated penile fracture [1- 7], the use of intracavernous therapy for erectile dysfunction [8-12], hematogenous spread after periodontal abscess [13-15], perianal[16-18], or intracavitary abscess [19], or after drainage or surgical treatment of priapism [20-21].

In many other cases, the cause remains uncertain [22-41].

The most common initial clinical presentations are onset of penile swelling, pain, and redness. There have been reports of voiding symptoms, perhaps due to urethral deviation by the cavernous abscess [19,23,28,31,33,38,40,42].

Other cases presented with priapism by mimetic effect to ischemic priapism [6,21,26]. Few patients presented with purulent urethral discharge at the initial presentation [5,16,22-24].

The analysis of intraoperative cultures showed that the most commonly found pathogens were those typically found on the skin. In some reports, these pathogens were found in blood cultures, which may suggest septicemia with the primary manifestation being penile abscess of the corpus cavernosum. However, these data may corroborate the theory of agent inoculation from other infectious foci in the corpus cavernosum, which leads to infection and development of the abscess. Poorly conducted penile fractures and procedures for the drainage or surgical treatment of priapism may favor this inoculation and, eventually, abscess formation [21-22]. The hematogenous path also seems to be associated, since there have been reports of an association with dental, perineal, and abdominal infection.

Notoriously, the more aggressive initial treatment with surgical drainage seems to have been the most commonly used in these rare cases [1-3,5,6, 8,10-12, 13, 14, 16, 18-22, 24-26, 28, 35, 37, 42,
43].

However, clinical measures, such as broad-spectrum antibiotic therapy associated with store drainage, have been effective in some cases [9,17,31-33,36].

In other cases, this initial therapy was not effective, and drainage and surgical debridement were necessary in a second stage [8,27,34].

Baksh presented two cases in which the likely association of phosphodiesterase 5 inhibitor (silde- nafil) may have increased blood flow to the corpus cavernosum and the efficacy of broad-spectrum antibiotics [23].

Thirteen cases (30.9%) reported a first episode or worsening of erectile dysfunction after hospital discharge and five (11.9%) developed or had a worsened penile deviation during the follow-up period.

Based on this survey, we cannot conclude which cases may respond better to more conservative measures due to an incomplete description of clinical conditions, non-use of validated questionnaires to assess erectile dysfunction, and non-use of standardized measurements of penile deviation and percentage of corpora cavernosa involvement.

The time between the onset of symptoms and the beginning of treatment may be determinant for a smaller area affected by the local inflammatory process, which may contribute to a smaller fibrotic corpus cavernosum scar.

The outcome of penile deviation and erectile dysfunction does not seem to be related to the size of the cavernous abscess since only 10 cases have reported the size as determined via imaging testing.

Further prospective studies evaluating the proportion of compromised tissue, standardized therapeutic measures, and adequate follow-up should be conducted to better elucidate proper care for these patients.

V. LIMITATION

The present study included only PubMed/Medline, EMBASE, and Cochrane database studies avail- able in the English language, which contained an abstract, thereby reducing the number of relevantpublications. It was not possible to discuss the bias, risks, or individual limitations of the studies since they were not reported.

VI. CONCLUSION

Corpus cavernosum abscess is rare and its management is still heterogeneous instead of being standardized. The use of broad-spectrum antibiotics and surgical incision and drainage seems to be the choice of most surgeons. Rapid and effective management is critical to reduce the area of post-infectious cavernous tissue fibrosis and morbidity, such as partial penectomy.

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