

A Prospective Study on Epididymo-orchitis: An Unrevealed Enigma**Nilesh Guru¹, Bhushita Nilesh Guru²**¹Associate Professor, Department of Urology, Index Medical College and Hospital Research Centre, Indore, MP, India²Professor, Department of Radiodiagnosis, Index Medical College and Hospital Research Centre, Indore, MP, India

Received: 01-06-2026 / Revised: 15-07-2026 / Accepted: 21-08-2026

Corresponding author: Dr. Bhushita Nilesh Guru

Conflict of interest: Nil

Abstract

Introduction: Epididymo-orchitis is one of the most common urological conditions encountered in urology clinics in India. Despite advances in diagnostic modalities, many cases are still treated empirically without a confirmed causative agent. If not treated promptly, epididymo-orchitis may progress to testicular abscess, testicular infarction or septicaemia.

Aim: To determine the aetiology of epididymo-orchitis in order to tailor treatment accordingly.

Materials and Methods: This prospective cross-sectional study was conducted in the Department of Urology, Shri B. M. Patil Medical College, Hospital and Research Centre, Karnataka, from January 2016 to June 2017. Thirty-three patients aged above 10 years presenting with signs and symptoms suggestive of epididymo-orchitis were enrolled consecutively, evaluated by detailed clinical history, and subjected to relevant investigations. Patients with diabetes mellitus or a history of urological instrumentation were excluded.

Results: The mean age of the 33 patients was 37.57 years. A causative organism was identified in 69.7% of cases. Gram-negative bacilli (*Escherichia coli*, *Klebsiella* and *Pseudomonas* species combined) were the most frequently identified group, accounting for 30.3% of cases, closely followed by *Rickettsia* as the single most common individual organism (21.2%). In the remaining 30.3% of cases, no causative organism could be identified.

Conclusion: In a substantial proportion of cases of epididymo-orchitis, the aetiology remains obscure despite thorough investigation. Identifying the exact cause is essential to guide appropriate treatment; in the remaining idiopathic cases, testing for viral and fastidious organisms may be a useful direction for future study.

Keywords: Epididymitis/etiology; Orchitis/etiology; Rickettsial infections; Gram-negative bacterial infections.

DOI: 10.25258/ijcpr.18.9.64

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Epididymo-orchitis is one of the most common urological conditions encountered in urology clinics in India, and many urological centres encounter a substantial number of such cases on a daily outpatient basis. This condition has a diverse aetiology that varies with age, anatomy and geographical region. In men younger than 35 years, the most common causative agents are *Chlamydia trachomatis* and *Neisseria gonorrhoeae*. [1]

In men older than 35 years, coliform bacteria causing urinary tract infections are the predominant causative agents. [2] Other recognised causes include viruses, particularly mumps virus in post-pubertal males, [3] fungi (*Candida*), parasites (*filaria*), and non-infectious causes such as autoimmune orchitis. Another emerging cause, especially in endemic areas, is *Rickettsia* (particularly in cases of scrub typhus caused by

Orientia tsutsugamushi), in cases previously labelled idiopathic; these cases of acute epididymo-orchitis respond dramatically to doxycycline. [4,5] Despite advances in diagnostic modalities, many cases of epididymo-orchitis are still treated empirically without knowledge of the causative agent. There is a need to establish a correct diagnosis in all cases of epididymo-orchitis to tailor treatment accordingly, since inadequate or delayed treatment may allow the condition to progress to testicular abscess, testicular infarction or septicaemia.

The present study was therefore undertaken to determine the aetiology of epididymo-orchitis in a cohort of patients and to inform their management.

Materials and Methods

This was a prospective cross-sectional study conducted in the Department of Urology, Shri B. M. Patil Medical College, Hospital and Research Centre, Karnataka, from January 2016 to June 2017. Thirty-three patients aged above 10 years presenting with signs and symptoms suggestive of epididymo-orchitis were evaluated by detailed clinical history and subjected to relevant investigations.

Inclusion Criteria

- All patients aged above 10 years presenting to the Department of Urology with signs and symptoms suggestive of epididymo-orchitis.

Exclusion Criteria

- Patients with a history of diabetes mellitus.
- Patients with a history of urological instrumentation.
- Immunocompromised patients.
- Patients not providing consent for the study.

Sample Size and Recruitment: All consecutive patients meeting the eligibility criteria who presented to the department during the 18-month study period were enrolled, yielding a final sample of 33 patients.

This approach follows the total-enumeration/consecutive-sampling method commonly used for

standard biostatistical sample-size estimation [6] in settings where the eligible caseload over a defined recruitment period is limited; a separately calculated target sample size was not used to restrict enrolment.

Investigations: All patients were investigated with complete blood count, random blood sugar, renal function tests, urine routine microscopy, and urine for acid-fast bacilli, Weil-Felix reaction, Brucellar agglutination test, and peripheral smear for microfilaria.

Urine culture, blood culture, semen analysis and culture, fine-needle aspiration cytology, and histopathological examination of resected tissue were performed where clinically indicated (for example, in patients with urinary symptoms, fever, or a palpable mass). Ultrasound of the scrotum with colour Doppler was performed in all patients.

Results

A total of 33 patients presenting with signs and symptoms suggestive of epididymo-orchitis were evaluated. The mean age was 37.57 years. Baseline demographic and clinical characteristics, including age distribution, duration of symptoms before presentation, and laterality of involvement, are summarised in Table 1.

Table 1: Demographic and clinical characteristics of study participants (N = 33)

Characteristic	n (%)
Age group	
15-30 years	13 (39.4)
31-45 years	7 (21.2)
46-60 years	13 (39.4)
Duration of symptoms	
<1 week	17 (51.5)
1-2 weeks	9 (27.3)
>2 weeks	7 (21.2)
Laterality	
Right	16 (48.5)
Left	13 (39.4)
Bilateral	4 (12.1)

The most frequent presenting symptoms were pain and scrotal swelling, each present in all 33 patients, followed by fever and urinary symptoms. On examination, tenderness and testicular swelling with epididymal thickening were universal findings. These and other clinical symptoms and signs are summarised in Table 2.

Table 2: Clinical presentation: symptoms and signs (N = 33)

Clinical feature	n	%
Symptoms		
Pain	33	100
Scrotal swelling	33	100
Fever	18	54.5
Urinary symptoms	13	39.4
Recurrence	5	15.2
Signs		
Tenderness	33	100

Testicular swelling and epididymal thickening	33	100
Signs of acute inflammation	18	54.5
Cord thickening and tenderness (acute funiculitis)	4	12.1

The results of the investigations performed are summarised in Table 3. Investigations performed in all patients as part of the standard diagnostic protocol (peripheral smear for microfilaria and the Brucellar agglutination test) were negative in all 33

patients. Urine culture, blood culture, and other investigations were performed selectively where clinically indicated, and are reported here as tested/positive/negative among only those patients who underwent each specific test.

Table 3: Investigations performed and results

Investigation	Patients tested (n)	Positive, n (%)	Negative, n (%)
Urine routine	32	10 (31.3)	22 (68.8)
Urine culture	11	8 (72.7)	3 (27.3)
Peripheral smear for microfilaria	33	0 (0.0)	33 (100.0)
Weil-Felix reaction	23	7 (30.4)	16 (69.6)
Brucellar agglutination test	33	0 (0.0)	33 (100.0)
Blood culture	16	3 (18.8)	13 (81.3)
Semen culture	1	1 (100.0)	0 (0.0)
Fine-needle aspiration cytology	5	2 (40.0)	3 (60.0)
Histopathology of resected tissue	1	1 (100.0)	0 (0.0)
Sputum for acid-fast bacilli	1	1 (100.0)	0 (0.0)

A causative organism was identified in 23 of 33 patients (69.7%), while the remaining 10 patients (30.3%) had idiopathic epididymo-orchitis in which no organism could be identified despite thorough investigation.

Among the identified organisms, gram-negative bacilli considered together (*Escherichia coli*, *Klebsiella* species and *Pseudomonas aeruginosa*) accounted for 10 cases (30.3%), matching the idiopathic group as the largest overall category.

Considered individually, however, *Rickettsia* was the single most common organism identified, accounting for 7 cases (21.2%), followed by *E. coli* (15.2%).

The full breakdown of aetiological categories and microbial agents is presented in Table 4. Among the 7 patients with rickettsial infection, Weil-Felix agglutination was positive for antigen OX2 in 3 patients, OX19 in 1 patient, OXK in 2 patients, and both OX2 and OX19 in 1 patient.

Table 4: Etiology and microbial causative agents of epididymo-orchitis (N = 33)

Etiological category	n	%
Cause detected	23	69.7
<i>Rickettsia</i>	7	21.2
<i>Escherichia coli</i>	5	15.2
<i>Mycobacterium tuberculosis</i>	4	12.1
<i>Klebsiella</i> species	3	9.1
<i>Pseudomonas aeruginosa</i>	2	6.1
Coagulase-negative <i>Staphylococcus</i>	2	6.1
<i>Filaria</i> (<i>W. bancrofti</i> , <i>B. malayi</i>)	0	0.0
Idiopathic (no organism identified)	10	30.3
Total	33	100.0

Discussion

Although epididymo-orchitis is a common condition encountered in urology clinics, most cases are treated empirically without a confirmed diagnosis. There is a need to investigate the exact aetiology of epididymo-orchitis to tailor treatment accordingly. We studied 33 patients and subjected them to investigations guided by clinical history. In our study, even after extensive investigation, a causative organism could not be identified in about 30.3% of patients. In the literature, epididymo-

orchitis accounts for 7-22% of all genitourinary tuberculosis cases and assumes a greater relative importance in high-prevalence regions. [7,8] Acute orchitis as a complication of mumps is reported in up to 40% of post-pubertal males. [9] In our study, we did not identify any case of tubercular or mumps orchitis. Acute epididymo-orchitis may also occur after indwelling urethral catheterisation, as well as after transurethral diagnostic and surgical manipulation. [10,11] Urethro-ejaculatory duct reflux has been implicated as an important factor in

the aetiology of acute epididymitis in both children and adults. [12,13]

Although we excluded cases of post-instrumentation epididymo-orchitis from our study, gram-negative bacilli (*E. coli*, *Klebsiella* and *Pseudomonas* species combined) remained the most frequently identified group of organisms, closely followed by *Rickettsia* as the single most common individual organism. Men who engage in anal intercourse without condom use are at risk of epididymitis secondary to sexually transmitted enteric organisms. [14] Non-infective epididymo-orchitis develops in 12-19% of men with the rare Behçet's disease. [15]

Patients with conditions that predispose to invasive candidal infections, such as diabetes or immunosuppression, may rarely develop candidal epididymo-orchitis. [16,17,18] The drug amiodarone, used in the treatment of severe cardiac arrhythmias, can also cause inflammation of the epididymis, which tends to resolve when the drug is discontinued. [19] In endemic regions, acute epididymo-orchitis may occasionally develop as a complication of brucellosis and systemic fungal infections such as blastomycosis. [20,21,22] Trauma to the scrotum can be a precipitating event for acute epididymo-orchitis, especially when predisposing factors are present. Scrotal ultrasound is helpful in diagnosis, allowing evaluation of the structure of the epididymis and testis and the presence, absence and size of abscesses and hydrocele. [23,24]

Colour Doppler imaging of the scrotum is of particular value in the differential diagnosis of acute epididymo-orchitis; it is the investigation of choice for evaluating torsion of the spermatic cord and is also useful for assessing scrotal contents for inflammation and associated complications. [25,26] Shanmugapriya et al. described rickettsial infection as a rare cause of epididymo-orchitis in a case report of a five-year-old child. [27] In our study, rickettsial infection was the cause of epididymo-orchitis in 7 patients (21.2%), making it the single most common individually identified organism.

According to the 2010 United Kingdom national guideline for the management of epididymo-orchitis, when a sexually transmitted pathogen is most likely, the recommended regimen is ceftriaxone 500 mg intramuscularly as a single dose, plus doxycycline 100 mg orally twice daily for 10-14 days, in view of the high prevalence of quinolone-resistant gonorrhoea. Where chlamydia or another non-gonococcal organism is more likely (gonorrhoea considered unlikely, with microscopy negative for Gram-negative intracellular diplococci and no identified risk factors for gonorrhoea), doxycycline 100 mg orally twice daily for 10-14

days, or ofloxacin 200 mg orally twice daily for 14 days, may be considered. [28]

Although we identified the inciting organism in about 70% of cases, the extensive panel of investigations required makes management cumbersome for both patients and treating clinicians. In addition, the small sample size limits generalisability to a larger population. A study with a larger sample size is needed to help devise a diagnostic algorithm for epididymo-orchitis, to guide treating urologists and avoid unnecessary investigation in all patients.

Limitations

This study has several limitations. First, the sample size of 33 patients was determined by consecutive enrolment over a fixed 18-month period rather than by a formal power calculation, and the resulting subgroup sizes for individual organisms are small; the reported frequencies should therefore be interpreted with appropriate caution. Second, this was a single-centre study, and the spectrum of causative organisms, particularly the relatively high proportion of rickettsial infection, may reflect regional endemicity and may not be generalisable to other geographical settings.

Third, investigations such as urine culture, blood culture, semen culture and fine-needle aspiration cytology were performed selectively based on clinical indication rather than in all patients, which may have led to under-ascertainment of some causative organisms. Finally, this study did not include testing for viral pathogens (other than mumps, assessed clinically) or for other fastidious organisms, which may account for some of the idiopathic cases.

Conclusion

In a substantial proportion of cases of epididymo-orchitis, the aetiology continues to be obscure despite thorough investigation. Identification of the exact cause is essential to tailor treatment accordingly. In this study, a causative organism was identified in the majority of cases, with gram-negative bacilli and *Rickettsia* as the leading identified categories.

In the remaining idiopathic cases, investigation for viral and other fastidious infections may be of value in future studies, alongside efforts to develop a more streamlined, cost-effective diagnostic algorithm.

References

1. Tracy CR, Steers WD, Costabile R. Diagnosis and management of epididymitis. *Urol Clin North Am*. 2008;35(1):101-108.
2. Street EJ, Justice ED, Kopa Z, et al. The 2016 European guideline on the management of

- epididymo-orchitis. *Int J STD AIDS*. 2021;32(9):789-797.
3. Masarani M, Wazait H, Dinneen M. Mumps orchitis. *J R Soc Med*. 2006;99(11):573-575.
 4. Varghese GM, Janardhanan J, Mahajan SK, et al. Scrub typhus as a cause of acute epididymo-orchitis. *Indian J Med Res*. 2014;139(3):468-469.
 5. Balamurugan A, Raajamai JM, et al. Rickettsial epididymo-orchitis: a rare presentation of scrub typhus. *Trop Doct*. 2021;51(3):426-428.
 6. Daniel WW. *Biostatistics: A Foundation for Analysis in the Health Sciences*. 7th ed. New York: John Wiley & Sons; 1999.
 7. Chattopadhyay A, Bhatnagar V, Agarwala S, et al. Genitourinary tuberculosis in pediatric surgical practice. *J Pediatr Surg*. 1997;32:1283-1286.
 8. Reeve HR, Weinerth JL, Peterson LJ. Tuberculosis of epididymis and testicle presenting as hydrocele. *Urology*. 1974;4:329-331.
 9. Beard CM, Benson RC Jr, Kelalis PP, et al. The incidence and outcome of mumps orchitis in Rochester, Minnesota, 1935-1974. *Mayo Clin Proc*. 1977;52:3-7.
 10. Centre for Disease Control and Prevention. Sexually Transmitted Diseases Management Guidelines 2006. *MMWR*. 2006;55(RR-11):61-62.
 11. Mittemeyer BT, Lennox KW, Borski AA. Epididymitis: a review of 610 cases. *J Urol*. 1966;95:390-392.
 12. Rinker JR, Hancock CV, Henderson WD. A statistical study of unilateral prophylactic vasectomy in the prevention of epididymitis: 1029 cases. *J Urol*. 1970;104:303.
 13. Megalli M, Gursel E, Lattimer JK. Reflux of urine into ejaculatory ducts as a cause of recurring epididymitis in children. *J Urol*. 1972;108:978-979.
 14. Barnes R, Daifuku R, Roddy R, et al. Urinary tract infections in sexually active homosexual men. *Lancet*. 1986;1:171-173.
 15. Cho YH, Jung J, Lee KH, et al. Clinical features of patients with Behçet's disease and epididymitis. *J Urol*. 2003;170:1231-1233.
 16. Jenks P, Brown J, Warnock D, et al. *Candida glabrata* epididymo-orchitis: an unusual infection rapidly cured. *J Infect*. 1995;31(1):71-72.
 17. Swartz DA, Harrington P, Wilcox R. Candidal epididymitis treated with ketoconazole. *N Engl J Med*. 1988;319:1485.
 18. Docimo SG, Rukstalis DB, Rukstalis MR, et al. *Candida* epididymitis: newly recognized opportunistic epididymal infection. *Urology*. 1993;41:280-282.
 19. Thomas A, Woodard C, Rovner ES, et al. Urologic complications of nonurologic medications. *Urol Clin North Am*. 2003;30(1):123-131.
 20. Gottesman JE. Coccidioidomycosis of prostate and epididymis with urethrocutaneous fistula. *Urology*. 1974;4:311-314.
 21. Short KL, Harty JI, Amin M, et al. The use of ketoconazole to treat systemic blastomycosis presenting as acute epididymitis. *J Urol*. 1983;129:382-384.
 22. Ibrahim AIA, Awad R, Shetty SD, et al. Genitourinary complications of brucellosis. *Br J Urol*. 1998;61:294-298.
 23. See WA, Mack LA, Krieger JN. Scrotal ultrasonography: a predictor of complicated epididymitis requiring orchiectomy. *J Urol*. 1988;139:55-56.
 24. Mevorach RA, Lerner RM, Dvoretzky PM, et al. Testicular abscess: diagnosis by ultrasonography. *J Urol*. 1986;136:1213-1216.
 25. Süzer O, Özcan H, Küpeli S, et al. Color Doppler imaging in the diagnosis of the acute scrotum. *Eur Urol*. 1997;32:457-461.
 26. Herbener TE. Ultrasound in the assessment of the acute scrotum. *J Clin Ultrasound*. 1996;24(8):405-421.
 27. Shanmugapriya V, Sangeetha DA, Sampath S, Kasthuri RK. Epididymo-orchitis: a rare manifestation of scrub typhus in a child. *J Vector Borne Dis*. 2014;51:69-70.
 28. Street E, Joyce A, Wilson J. 2010 United Kingdom national guideline for the management of epididymo-orchitis. Clinical Effectiveness Group, British Association for Sexual Health and HIV.