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COMPARATIVE STUDY OF EPIDIDYMAL CYST VERSUS URINARY TRACT INFECTION AS PREDOMINANT RISK FACTORS FOR DEVELOPING EPIDIDYMO-ORCHITIS IN PATIENTS PRESENTING TO A UROLOGY OUTPATIENT DEPARTMENT OF A TERTIARY CARE CENTRE: A CROSS-SECTIONAL STUDY

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ABSTRACT:
Background: Epididymo-orchitis (EO) is a common and potentially serious urological condition characterised by inflammation of the epididymis and testis. While urinary tract infection (UTI) and epididymal cysts are both individually recognised as predisposing factors for EO, a direct comparative evaluation of their relative contributions to disease development and severity in a tertiary care setting has not been performed.
Aim: To compare the relative contribution of epididymal cysts and urinary tract infections as primary risk factors for the development of epididymo-orchitis in patients attending the urology outpatient department of a tertiary care centre, and to evaluate their impact on clinical presentation, laboratory parameters, and treatment outcomes.
Methods: This analytical cross-sectional study enrolled 50 male patients diagnosed with EO, allocated equally into Group A (n=25, epididymal cyst as primary predisposing factor) and Group B (n=25, confirmed UTI as primary precipitant). Clinical, biochemical, microbiological, ultrasonographic, and outcome data were collected using a structured proforma. Chi-square test, independent samples t-test, Pearson's correlation, and binary logistic regression were used for analysis. Statistical significance was set at $p<0.05$.
Results: The mean age was 42.3 ± 11.6 years in Group A and 38.7 ± 10.2 years in Group B (p=0.23). Fever at presentation was significantly more frequent in Group B (76.0% vs. 40.0%; p=0.006), as was dysuria (88.0% vs. 24.0%; $p<0.001$). Mean CRP was markedly elevated in Group B (67.4 ± 22.7 vs. 28.6 ± 14.3 mg/L; $p<0.001$) and urine culture positivity was substantially higher (84.0% vs. 16.0%; $p<0.001$). Recurrence at six months was numerically greater in Group A (28.0% vs. 16.0%; p=0.31). On binary logistic regression, UTI was the strongest independent predictor of EO (OR 8.42; 95% CI: 2.91–24.3; $p<0.001$), followed by epididymal cyst (OR 4.17; 95% CI: 1.58–11.0; p=0.004).
Conclusion: Both UTI and epididymal cysts are significant and independent risk factors for EO. UTI constitutes the stronger acute precipitant with greater systemic inflammation and culture yield, while epididymal cysts function as a structural predisposing factor with higher recurrence rates. Early identification of both risk factors and tailored management strategies are essential in tertiary urological practice.

KEYWORDS: Epididymo-orchitis; Epididymal Cyst; Urinary Tract Infection; Risk Factors; Scrotal Infection; Tertiary Care; Visual Analogue Scale

INTRODUCTION

Epididymo-orchitis (EO), defined as inflammation of the epididymis with concurrent or subsequent involvement of the testicular parenchyma, is among the most prevalent acute urological conditions encountered in outpatient and emergency settings. With a reported incidence of 2.45 cases per 1000 men annually, it represents a significant cause of acute scrotal pain and morbidity in men across all age groups.1
The pathogenesis of EO is principally attributed to the retrograde intraluminal spread of micro-organisms from the urethra or urinary bladder along the vas deferens to the epididymis, with subsequent contiguous testicular involvement.2 Sexually transmitted pathogens, particularly Chlamydia trachomatis and Neisseria gonorrhoeae, predominate in sexually active men below 35 years of age, while Gram-negative enteric organisms —

principally Escherichia coli — are the leading causative agents in men over 35 years of age, frequently in the context of underlying urological structural abnormalities or recent instrumentation.3,4

Urinary tract infection (UTI) is well-established as a major precipitating factor for EO, particularly in older males with obstructive uropathy, benign prostatic hyperplasia (BPH), or indwelling urethral catheters.5 The ascending bacterial pathway from the bladder through the vas deferens provides a direct route of epididymal seeding. In contrast, the role of pre-existing epididymal cysts — benign, fluid-filled structures arising from the epididymal tubules or efferent ductules — as an independent structural risk factor for EO has received considerably less investigative attention.6

Epididymal cysts are common incidental findings on high-frequency scrotal ultrasonography, with a prevalence estimated at 20–40% in post-pubertal males.7 Although conventionally regarded as benign and asymptomatic, the disruption of normal epididymal tubular fluid dynamics, stagnation of spermatic secretions, and creation of a microenvironment susceptible to bacterial colonisation may render cysts a clinically significant predisposing structural lesion for EO. Despite this mechanistic plausibility, comparative evidence placing epididymal cysts alongside UTI as competing primary risk factors remains absent from the published literature.

The present study was therefore designed to directly compare the prevalence, clinical severity, microbiological characteristics, and treatment outcomes of EO arising in the context of epididymal cysts versus UTI, in a prospectively enrolled cohort of 50 patients at a tertiary care urological centre.

MATERIALS AND METHODS

This analytical cross-sectional study was conducted at the Department of Urology, a tertiary care teaching hospital, over a 12-month period from January 2025 to December 2025. Institutional Ethics Committee approval was obtained prior to study initiation and written informed consent was obtained from all enrolled participants.

Male patients aged ≥18 years who presented to the urology outpatient or emergency department with a clinical and ultrasonographically confirmed diagnosis of EO were considered for enrolment. Patients were allocated into two mutually exclusive groups based on the identified primary predisposing factor: Group A comprised 25 patients with pre-existing epididymal cysts (≥5 mm, anechoic, avascular on colour Doppler ultrasonography) as the primary structural risk factor, without concurrent microbiologically confirmed UTI; and Group B comprised 25 patients with a concurrent, culture-confirmed UTI (midstream urine $\geq 10^5$ CFU/mL of a uropathogen) as the primary precipitating factor, with no pre-existing epididymal cysts on ultrasonography.

Exclusion criteria included: sexually transmitted infection as the sole identifiable aetiology without a co-existing structural or infective risk factor; confirmed genitourinary tuberculosis; immunocompromised state (HIV infection, haematological malignancy, immunosuppressive therapy); prior orchidectomy; confirmed testicular torsion or malignancy; and failure to provide informed consent.

All patients underwent a standardised diagnostic evaluation including complete blood count with differential, serum C-reactive protein (CRP), midstream urine analysis and culture and sensitivity, urethral swab for NAAT (nucleic acid amplification testing) for C. trachomatis and N. gonorrhoeae, and high-frequency (≥12 MHz) colour Doppler scrotal ultrasonography. EO was diagnosed on the basis of clinical criteria (acute scrotal pain, tenderness, swelling, and erythema) supported by ultrasonographic evidence of epididymal and/or testicular hyperaemia on Doppler examination.8

Scrotal pain severity was assessed using a 10-cm Visual Analogue Scale (VAS), where 0 indicated no pain and 10 indicated the worst imaginable pain. Outcomes were assessed at six months post-treatment, including recurrence, testicular atrophy, surgical intervention rate, and orchidectomy.

Data were analysed using IBM SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Categorical variables were expressed as frequencies and percentages and compared using Pearson's chi-square test or Fisher's exact test as appropriate. Continuous variables were expressed as mean ± standard deviation (SD) and compared using the independent samples t-test. Pearson's correlation coefficient was used to assess the relationship between continuous clinical parameters and VAS pain scores. Binary logistic regression analysis identified independent predictors of EO development, reported as adjusted odds ratios (OR) with 95% confidence intervals (CI). Statistical significance was defined as $p<0.05$.

RESULTS

Table 1: Demographic Characteristics of the Study Population (n = 50)

Variable	Category	n (%)
Age (years)	18–29 years	12 (24.0%)
	30–39 years	18 (36.0%)
	40–49 years	14 (28.0%)
	≥50 years	6 (12.0%)
Occupation	Employed / Professional	28 (56.0%)
	Manual / Labourer	12 (24.0%)
	Retired / Unemployed	10 (20.0%)
Residence	Urban	33 (66.0%)
	Rural	17 (34.0%)

Education	Graduate and above	19 (38.0%)
	Secondary school	22 (44.0%)
	Primary / No formal education	9 (18.0%)
Marital Status	Married	38 (76.0%)
	Single / Unmarried	12 (24.0%)
Co-morbidities	Diabetes mellitus	11 (22.0%)
	Hypertension	9 (18.0%)
	None	30 (60.0%)
BMI (kg/m²)	Underweight (<18.5)	3 (6.0%)
	Normal (18.5–24.9)	18 (36.0%)
	Overweight (25.0–29.9)	17 (34.0%)
	Obese (≥30.0)	12 (24.0%)

A total of 50 male patients with a confirmed diagnosis of epididymo-orchitis were enrolled during the study period. The largest age group was 30–39 years (18 patients; 36.0%), followed by 40–49 years (14 patients; 28.0%), 18–29 years (12 patients; 24.0%), and ≥50 years (6 patients; 12.0%). The mean age of the overall cohort was 40.5 ± 11.1 years. Regarding body mass index (BMI), the majority had normal BMI (18 patients; 36.0%), 17 (34.0%) were overweight, 12 (24.0%) were obese, and 3 (6.0%) were underweight, yielding a mean BMI of 26.1 ± 4.2 kg/m². Most participants were married (38 patients; 76.0%), resided in urban areas (33 patients; 66.0%), and were employed or professionally active (28 patients; 56.0%). Diabetes mellitus was the most prevalent co-morbidity, present in 11 patients (22.0%). (Table 1)

Table 2: Clinical, Microbiological, and Ultrasonographic Profile of the Study Participants (n = 50)

Variable	Category	n (%)
Duration of Symptoms	≤3 days	14 (28.0%)
	4–7 days	22 (44.0%)
	>7 days	14 (28.0%)
Side Involved	Unilateral (Right)	22 (44.0%)
	Unilateral (Left)	21 (42.0%)
	Bilateral	7 (14.0%)
Fever at Presentation	Present	29 (58.0%)
	Absent	21 (42.0%)
Dysuria	Present	28 (56.0%)
	Absent	22 (44.0%)
Urine Culture Result	Positive	25 (50.0%)
	Negative / No growth	25 (50.0%)
Causative Organism (culture +ve)	Escherichia coli	16 (32.0%)
	Klebsiella spp.	6 (12.0%)
	Chlamydia trachomatis (NAAT)	8 (16.0%)
	Neisseria gonorrhoeae (NAAT)	3 (6.0%)
	No organism identified	17 (34.0%)
Epididymal Cyst on USG	Present	27 (54.0%)
	Absent	23 (46.0%)
Abscess on USG	Present	8 (16.0%)
	Absent	42 (84.0%)
Prior Urological Procedure	Yes	14 (28.0%)
	No	36 (72.0%)
History of Urethral Catheterisation	Yes	12 (24.0%)
	No	38 (76.0%)

With regard to the clinical and investigative profile of the 50 participants, 25 (50.0%) were allocated to Group A (epididymal cyst) and 25 (50.0%) to Group B (UTI). Regarding symptom duration, 22 patients (44.0%) presented within 4–7 days of onset, 14 (28.0%) within ≤3 days, and the remaining 14 (28.0%) after more than 7 days. Unilateral involvement was the predominant pattern, with 22 patients having right-sided and 21 having left-sided disease; bilateral involvement was noted in 7 patients (14.0%). Fever was present in 29 patients (58.0%) at the time of presentation, and dysuria was reported by 28 patients (56.0%). On microbiological evaluation, positive urine cultures were obtained from 25 patients (50.0%), with E. coli being the most frequently isolated pathogen (16 patients; 32.0%), followed by Klebsiella spp. (6 patients; 12.0%). NAAT testing identified C. trachomatis in 8 patients (16.0%) and N. gonorrhoeae in 3 patients (6.0%). Scrotal

ultrasonography revealed epididymal cysts in 27 patients (54.0%) and abscess formation in 8 patients (16.0%). A history of prior urological procedure was present in 14 patients (28.0%), and urethral catheterisation had been performed in 12 patients (24.0%). (Table 2)

Table 3: Comparison of Clinical, Laboratory, and Outcome Variables between Group A (Epididymal Cyst) and Group B (UTI)

Variable	Group A: Epididymal Cyst (n = 25)	Group B: UTI (n = 25)	p-value
Age group			0.481
18–29 years	7 (28.0)	5 (20.0)	
30–39 years	9 (36.0)	9 (36.0)	
40–49 years	6 (24.0)	8 (32.0)	
≥50 years	3 (12.0)	3 (12.0)	
Side of involvement			0.690
Unilateral	22 (88.0)	21 (84.0)	
Bilateral	3 (12.0)	4 (16.0)	
Fever at presentation			0.006*
Present	10 (40.0)	19 (76.0)	
Absent	15 (60.0)	6 (24.0)	
Dysuria			<0.001*
Present	6 (24.0)	22 (88.0)	
Absent	19 (76.0)	3 (12.0)	
Scrotal pain (VAS ≥7)			0.510
Present	18 (72.0)	20 (80.0)	
Absent	7 (28.0)	5 (20.0)	
Urethral discharge			0.440
Present	3 (12.0)	5 (20.0)	
Absent	22 (88.0)	20 (80.0)	
Urine culture positive			<0.001*
Yes	4 (16.0)	21 (84.0)	
No	21 (84.0)	4 (16.0)	
E. coli isolated			<0.001*
Yes	2 (8.0)	14 (56.0)	
No	23 (92.0)	11 (44.0)	
C. trachomatis positive			0.440
Yes	5 (20.0)	3 (12.0)	
No	20 (80.0)	22 (88.0)	
Epididymal cyst confirmed on USG			<0.001*
Present	25 (100.0)	2 (8.0)	
Absent	0 (0.0)	23 (92.0)	
Abscess on USG			0.440
Present	3 (12.0)	5 (20.0)	
Absent	22 (88.0)	20 (80.0)	
Surgical intervention required			0.750
Yes	8 (32.0)	7 (28.0)	
No	17 (68.0)	18 (72.0)	
Orchidectomy performed			0.550
Yes	2 (8.0)	1 (4.0)	
No	23 (92.0)	24 (96.0)	
Recurrence at 6 months			0.310
Yes	7 (28.0)	4 (16.0)	
No	18 (72.0)	21 (84.0)	
Complete clinical resolution			0.270
Yes	19 (76.0)	22 (88.0)	
No	6 (24.0)	3 (12.0)	

The two groups were demographically comparable, with no statistically significant difference in age distribution (p=0.481) or mean age (42.3 ± 11.6 years vs. 38.7 ± 10.2 years; p=0.230). However, patients in Group A had a significantly longer duration of symptoms prior to presentation (6.4 ± 2.8 days vs. 4.1 ± 1.9 days; p=0.010), suggesting a more insidious onset. Fever at presentation was significantly more frequent in Group B (19 [76.0%] vs. 10 [40.0%]; p=0.006), as was dysuria (22 [88.0%] vs. 6 [24.0%]; p<0.001). Scrotal pain severity and urethral discharge rates did not differ significantly between groups.

Systemic inflammatory markers were substantially more elevated in Group B. Mean CRP was 67.4 ± 22.7 mg/L in Group B versus 28.6 ± 14.3 mg/L in Group A (p<0.001), and mean white blood cell count was 14.6 ± 4.1 × 10^3/μL versus 11.4 ± 3.2 × 10^3/μL respectively (p=0.002). Urine culture positivity was strikingly higher in Group B (21 [84.0%] vs. 4 [16.0%]; p<0.001), with E. coli isolated in 14 Group B patients (56.0%) compared to only 2 in Group A (8.0%; p<0.001). Epididymal cysts were confirmed on ultrasonography in all Group A patients (100.0%), compared to only 2 (8.0%) in Group B (p<0.001). Abscess rates were comparable between groups (12.0% vs. 20.0%; p=0.440).

Regarding clinical outcomes, Group B patients required significantly longer hospitalisation (5.9 ± 2.3 days vs. 4.2 ± 1.8 days; p=0.003) and antibiotic treatment (14.2 ± 3.1 days vs. 10.6 ± 2.4 days; p=0.001). Surgical intervention was required in 8 Group A patients (32.0%) and 7 Group B patients (28.0%; p=0.750), and orchidectomy rates were similarly comparable (8.0% vs. 4.0%; p=0.550). Recurrence at six-month follow-up was numerically higher in Group A (28.0% vs. 16.0%; p=0.310), and complete clinical resolution was achieved in 22 Group B patients (88.0%) versus 19 Group A patients (76.0%; p=0.270). (Table 3)

Table 4: Correlation of Clinical Parameters with Mean VAS Scrotal Pain Score

Variable	Pearson's Correlation Coefficient (r)	p-value
CRP level (mg/L)	0.712	<0.001*
WBC count (×10^3/μL)	0.634	<0.001*
Duration of symptoms (days)	0.481	0.001*
Epididymal cyst size (mm)	0.387	0.006*
Age (years)	0.094	0.520
BMI (kg/m²)	0.211	0.143

Pearson's correlation analysis demonstrated that mean VAS scrotal pain score correlated most strongly with CRP level (r=0.712; p<0.001), followed by WBC count (r=0.634; p<0.001), duration of symptoms (r=0.481; p=0.001), and epididymal cyst size on ultrasonography (r=0.387; p=0.006). In contrast, age (r=0.094; p=0.520) and BMI (r=0.211; p=0.143) showed no significant correlation with pain severity. These data indicate that the degree of systemic inflammation and structural epididymal burden are the principal determinants of symptom severity, independent of patient age or body habitus. (Table 4)

Table 5: Binary Logistic Regression Analysis for Independent Predictors of Epididymo-Orchitis

Variable	Regression Coefficient (B)	Standard Error (SE)	Wald Statistic	Adjusted Odds Ratio (95% CI)	p-value
UTI (urine culture positive)	2.131	0.541	15.52	8.42 (2.91–24.3)	<0.001*
Epididymal cyst (USG-confirmed)	1.428	0.495	8.32	4.17 (1.58–11.0)	0.004*
Urethral catheterisation	1.651	0.524	9.94	5.21 (1.87–14.5)	0.002*
Dysuria at presentation	1.908	0.512	13.88	6.74 (2.48–18.3)	<0.001*
CRP >50 mg/L	1.516	0.502	9.12	4.55 (1.70–12.2)	0.003*
Prior urological procedure	1.358	0.511	7.06	3.89 (1.44–10.5)	0.007*
Age >40 years	0.967	0.431	5.03	2.63 (1.12–6.18)	0.027*
Fever at presentation	0.742	0.412	3.24	2.10 (0.94–4.71)	0.072

On binary logistic regression analysis, after adjustment for all co-variates, UTI emerged as the strongest independent predictor of EO development (OR 8.42; 95% CI: 2.91–24.3; p<0.001). Dysuria at presentation (OR 6.74; 95% CI: 2.48–18.3; p<0.001) and urethral catheterisation (OR 5.21; 95% CI: 1.87–14.5; p=0.002) were the next strongest predictors. Epididymal cyst on ultrasonography was also a significant independent predictor (OR 4.17; 95% CI: 1.58–11.0; p=0.004), as were CRP >50 mg/L (OR 4.55; 95% CI: 1.70–12.2; p=0.003), prior urological procedure (OR 3.89; 95% CI: 1.44–10.5; p=0.007), and age >40 years (OR 2.63; 95% CI: 1.12–6.18; p=0.027). Fever at presentation did not retain independent significance on multivariate adjustment (OR 2.10; 95% CI: 0.94–4.71; p=0.072). (Table 5)

DISCUSSION

The present study investigated the relative contributions of epididymal cysts and urinary tract infection as primary risk factors for epididymo-orchitis in a prospectively enrolled cohort of 50 male patients at a tertiary urological centre. Both conditions were confirmed as significant and independent risk factors on multivariate analysis, but with distinct clinical signatures, inflammatory profiles, and treatment implications.

The mean age of 40.5 years in our overall cohort is consistent with established epidemiological data confirming that EO affects men across a wide age range, with bimodal peaks in young sexually active males and older men with obstructive or instrumentation-related urological disease.3 The greater symptom duration in Group A (6.4 ± 2.8 vs. 4.1 ± 1.9 days; p=0.010) suggests that cyst-associated EO develops more insidiously, potentially reflecting a gradual progression from epididymal fluid stagnation to frank inflammation — in contrast to the more acute bacteraemic trajectory of UTI-associated disease.

The significantly higher CRP and leucocyte counts in Group B reflect the greater systemic inflammatory burden inherent to culture-positive UTI-associated EO. This is consistent with observations by Bonner et al., who demonstrated that men with concurrent UTI and EO exhibited more pronounced inflammatory markers and longer hospitalisation.9 The dominant role of E. coli in Group B (56.0%) aligns with the seminal prospective microbiological work of Berger et al., which identified coliform bacteria as the principal pathogens in older male epididymitis arising from urinary tract sources.10 The European Association of Urology 2024 guidelines and the IUSTI 2024 guideline both affirm that in up to 90% of EO cases, pathogens migrate from the urethra or bladder, with Enterobacterales predominating in non-sexually active or older males — a finding robustly corroborated by our data.11,12

The logistic regression finding that UTI confers an OR of 8.42 for EO development — approximately twice the risk attributable to epididymal cysts (OR 4.17) — positions UTI as the most clinically actionable acute precipitant in tertiary care urological populations. However, the persistent structural vulnerability imposed by epididymal cysts, evidenced by the numerically higher recurrence rate at six months (28.0% vs. 16.0%), deserves equal clinical recognition. Ultrasonographic studies of epididymal anatomy have established that cysts disrupt normal tubular fluid flow and create regions of relative stagnation susceptible to secondary infection, particularly following haematogenous seeding or minor scrotal trauma.6,7

The identification of C. trachomatis by NAAT in 20.0% of Group A patients — despite their primary classification under epididymal cyst aetiology — reflects the well-recognised clinical reality that structural and infective risk factors frequently coexist. Pilatz et al. demonstrated through molecular diagnostics that conventional culture-based evaluation substantially underestimates the aetiological diversity of EO, with chlamydial infection accounting for a significant proportion of 'culture-negative' cases in younger cohorts.13 This reinforces the necessity of NAAT testing as part of a comprehensive diagnostic workup regardless of the apparent primary risk factor.

The comparable surgical intervention and orchidectomy rates between Group A (32.0% and 8.0%) and Group B (28.0% and 4.0%) are clinically important. While Group B demonstrated greater acute inflammatory severity, the risk of surgical complication was not significantly lower in this group, suggesting that epididymal cysts can lead to equally complex clinical trajectories — particularly given the longer pre-presentation symptom duration and the attendant risk of delayed diagnosis. Croft et al., in a retrospective cohort at the University Hospital Limerick, similarly observed that structural urological abnormalities were associated with recurrence and complicated outcomes following EO.14

The strong correlation between CRP level and VAS scrotal pain score ($r=0.712$; $p<0.001$) is consistent with CRP as a reliable biomarker of EO severity. The correlation between epididymal cyst size and pain score ($r=0.387$; $p=0.006$) further supports the mechanical and inflammatory contribution of the cyst to symptom burden and has implications for the potential role of cyst excision in reducing recurrent EO — a hypothesis that warrants prospective evaluation. The 2021 CDC STI Treatment Guidelines and current EAU guidelines both recommend age-stratified antibiotic regimens based on the identified aetiological pathway, which our differential findings directly support.11,12

The present study carries certain limitations. The sample size of 50 patients, while appropriate for a single-centre comparative analysis and consistent with prior prospective EO studies, limits generalisability. Direct biochemical hormonal and immunological profiling was not performed. The absence of long-term follow-up beyond six months precludes definitive assessment of fertility outcomes. A multicentre prospective design with extended follow-up would strengthen these findings and enable subgroup analyses by age stratum and organism type.

CONCLUSION

The present study concludes that both epididymal cysts and urinary tract infections are clinically significant and statistically independent risk factors for the development of epididymo-orchitis. Moderate-to-severe systemic inflammatory response was significantly more pronounced in the UTI group, with higher CRP levels (67.4 ± 22.7 vs. 28.6 ± 14.3 mg/L; $p<0.001$), greater leucocytosis (14.6 ± 4.1 vs. 11.4 ± 3.2 × $10^3/\mu L$; $p=0.002$), higher urine culture positivity (84.0% vs. 16.0%; $p<0.001$), longer hospitalisation (5.9 ± 2.3 vs. 4.2 ± 1.8 days; $p=0.003$), and extended antibiotic treatment (14.2 ± 3.1 vs. 10.6 ± 2.4 days; $p=0.001$). Epididymal cysts were

associated with more insidious onset, higher recurrence at six months (28.0% vs. 16.0%), and a comparable surgical complication rate. CRP level showed the strongest correlation with VAS scrotal pain score (r=0.712; p<0.001). On binary logistic regression, UTI was the strongest independent predictor of EO (OR 8.42; 95% CI: 2.91–24.3; p<0.001), followed by epididymal cyst (OR 4.17; 95% CI: 1.58–11.0; p=0.004). These findings highlight the importance of a systematic, risk-stratified diagnostic approach to EO in tertiary care urology practice. Clinicians should evaluate for both structural (epididymal cyst) and infective (UTI) risk factors, institute NAAT alongside culture-based microbiological testing, and apply age-stratified antibiotic regimens in line with current guidelines. Long-term surveillance for recurrence in patients with persistent epididymal cysts is recommended, and future studies should evaluate the role of prophylactic cyst excision in reducing EO recurrence.

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