

Epididymo-orchitis: A Retrospective Study of 121 Patients

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One hundred twenty-one patients with acute epididymitis or epididymo-orchitis were evaluated retrospectively according to their clinical symptoms, duration of symptoms, physical examination, and laboratory studies. The patients younger than 30 years of age usually showed less severity of symptoms than the patients older than 50 years of age. The latter often demonstrated evidence of outflow obstruction. Eighty-two percent of patients with demonstrated urographic abnormalities had lower tract abnormalities, mainly secondary to outflow obstruction. All of these patients were older than 50 years of age. An intravenous pyelogram is indicated only in patients over 50 years of age and in young adults with positive bacteriologic urine culture. **J FAM PRACT 1990; 30:548-552.**

Acute epididymo-orchitis is a common clinical syndrome in a urologic practice and in primary care. In 55% to 100% of the cases, there is no clear known cause.^{1,2} Regardless of cause, the pain associated with this syndrome can cause significant morbidity. Inappropriate diagnosis and treatment may result in complications including testicular abscess formation,³ necrosis,⁴ atrophy,⁵ and long-lasting infertility.⁶ Witherington and Harper⁷ recently suggested epididymotomy to decrease morbidity and complications resulting from acute bacterial epididymitis.

The infectious causes are by far the most common. Sexually transmitted organisms, eg, *Chlamydia* and *Neisseria*, account for most cases in men who are younger than 35 years of age, while coliform bacteria are the most likely causative agents in the elderly.⁸⁻¹⁰ It is therefore important to find clues to the correct diagnosis and to the presumed causative agent.

A 5-year experience of patients hospitalized with epididymo-orchitis is presented, with particular focus on the clinical and laboratory features that will help the primary care physician in the initial selection of antibiotics for the treatment of the disease.

METHODS

The records were reviewed of 121 consecutive patients who presented to the emergency department of the Tel-Aviv Medical Center between 1980 and 1985 with the diagnosis of epididymitis or epididymo-orchitis. Since children aged 15 years or younger are hospitalized in the pediatric ward, this survey does not include any patients younger than 16 years; patients with relapsing and chronic epididymo-orchitis were also excluded, as were two patients with mumps orchitis.

The following information was drawn from the medical charts: age, ethnic origin, marital status, duration of symptoms before admission, clinical symptoms, results of physical examination, and laboratory results. In 75 cases an intravenous pyelogram (IVP) was ordered to detect underlying abnormalities, and the results were reviewed by the authors. Attention was paid to the type of antibiotic given and to the length of hospitalization.

The Statistical Package for the Social Sciences (SPSS)¹¹ was used for analysis of the data. Comparisons were carried out using the chi-square test, and analysis of variance (ANOVA) was used to identify the influence of variables.

RESULTS

The age distribution of patients and the overall incidence of various symptoms are given in Table 1. Only one third

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TABLE 1. DESCRIPTION OF THE STUDY POPULATION (N = 121) AND PRESENTING SYMPTOMS

Variable	Number of Patients	Percent of Total*
Age (y)		
16-30	42	35
31-50	23	19
51-70	35	29
71-90	21	17
Origin		
Israel	18	15
Eastern	45	37
Western	58	48
Sexual relations presently		
Yes	37	71
No	15	29
Unknown	67	—
Duration of symptoms (d)		
0-1	32	29
2-3	36	32
4-7	33	30
>10	10	9
Unknown	10	—
Testicular pain		
Yes	108	91
No	10	9
Unknown	3	—
Dysuria		
Yes	40	33
No	80	67
Unknown	1	—
Fever		
Normal <37.5°C (99.5°F)	31	26
High >37.5°C	90	74
Chills		
Yes	24	21
No	90	79
Unknown	7	—

*Exclusive of patients for whom symptom data are unknown.

of the patients had dysuria, which is considered a major symptom of urethritis that accompanies many cases of epididymitis. There was no correlation of dysuria with patient age ($\chi^2 = 0.723, P = .87$). Urethral discharge was present in a minority of cases (5%). Fever (>37.5°C, 99.5°F) was present in approximately 75% of the cases and was well correlated with age. Increased temperature was noted among men over 30 years of age. (ANOVA $F = 5.219, P = .002$). Chills were noted in 21% and in approximately 25% of those presenting with fever (>37.5°C, 99.5°F). Elderly patients presented with chills

TABLE 2. PHYSICAL FINDINGS (N = 121 PATIENTS)

Variable	Number of Patients	Percent of Total*
Prostatitis		
Yes	10	8
No	109	92
Unknown	2	—
Orchitis		
Right	37	32
Left	30	26
No	49	42
Unknown	5	—
Epididymitis		
Right	63	52
Left	58	48
Scrotal swelling and erythema		
Yes	72	62
No	45	38
Unknown	4	—

*Exclusive of patients for whom symptom data are unknown.

more often than the younger ones ($\chi^2 = 10.13, 3 df, P = .017$).

Table 2 summarizes the physical examination findings in the 121 men. Prostatitis as defined by rectal examination was present in only 10 patients. Orchitis accompanied the epididymal inflammatory process in 67 out of 116 cases; thus 49 patients had "epididymitis only." The incidence of orchitis was not correlated with age or with positive urine culture. The right and left epididymides were noted to be equally involved. Scrotal skin erythema and swelling of the epididymis were highly correlated ($P < .0001$).

Table 3 shows the incidence of different laboratory findings among the entire study group. Of the young adults (16 to 30 years of age) 67.5% did not have erythrocytes in the urine, while in the three older age groups (31 to 50, 51 to 70, and 71 to 90 years of age) only 34.8%, 36.7%, and 36.8%, respectively, did not have erythrocytes in their urine. In 31% of the youngest patients no leukocytes were found in their urine, but such negative results were noticed in only 17.4%, 16.7%, and 10.5%, respectively, of the three older age groups. Leukocytosis ($10 \times 10^3/L$ [$>10,000/mL$]) was found in over 60% of patients at admission. Correlating the degree of leukocytosis with age yielded borderline significance. (ANOVA $F = 2.59, SD = 0.053$). Whereas negative urine culture was noted in 92% of men aged 16 to 30 years, an almost constant one third of those aged 31 to 90 years had positive cultures. Of the 27 positive urine cultures, 12 samples grew *Escherichia coli*, and 10 grew *Pseudomonas*. Com-

TABLE 3. LABORATORY FINDINGS (N = 121 PATIENTS)

Variable	Number of Patients	Percent of Total*
Blood leukocytes/L		
<10.0 × 10 ⁹ /L	44	36
10.0 – 15.0 × 10 ⁹ /L	41	34
15.0 – 20.0 × 10 ⁹ /L	29	25
>20.0 × 10 ⁹ /L	7	5
Urine erythrocytes		
Few (10/HPF)	40	36
Many (>10/HPF)	19	17
No	53	47
Unknown	9	—
Urine leukocytes		
Few	43	39
Many	45	40
No	23	21
Unknown	10	—
Urine bacterial culture		
Negative	85	76
<i>Escherichia coli</i>	12	10
<i>Pseudomonas</i>	10	9
<i>Enterobacter</i>	2	2
Other	3	3
Unknown	9	9

*Exclusive of patients for whom symptom data are unknown.
HPF—high-power field.

paring the findings of direct urine examination (presence of leukocytes and erythrocytes) with urine culture demonstrated good correlation for each item (*P* = .03 for each).

Table 4 shows the radiographic findings in 75 cases in which an IVP was performed. The percentage of IVPs performed in each age group was quite similar (21% to 28%), thus age was not the basis for the examination. Of the 28 patients with urographic abnormalities, 23 (82%)

TABLE 4. INCIDENCE OF URINARY TRACT PATHOLOGY DEPICTED ON INTRAVENOUS PYELOGRAM (IVP), BY AGE GROUP

Age Groups (y)	Normal IVP	Lower Urinary Tract Abnormalities*	Upper Urinary Tract Abnormalities†	Total
16–30	19	—	2	21
31–50	14	4	—	18
51–70	9	9	2	20
71–90	5	10	1	16
Total	47	23	5	75

$\chi^2 = 22.04, 6 \text{ df}, P = .0012.$
*Residual urine, bladder hypertrophy, trabeculation, diverticula, ureteral hook sign.
†Renal stone, parapelvic cysts, hydrocalyx, double collecting system.

had lower urinary tract abnormalities, but none of the abnormalities were found among the young age group (16 to 30 years). On the other hand, 19 patients (82.5% among the three older groups (31 to 50, 51 to 70, and 71 to 90 years) had the following lower urinary tract abnormalities: postvoiding residual urine, bladder wall hypertrophy, bladder trabeculation, diverticula, and ureteral hook sign. Only in five cases were upper urinary tract abnormalities found, and these findings were diffusely scattered among the different age groups.

In the 6 months preceding the present inflammatory process, 57 (47%) of the 121 patients had relevant urological history. Eight (6.6%) had symptoms of prostatism (all were over 50 years of age). Thirteen (10.7%) had prior recent prostatic surgery, suprapubic or transurethral. Ten (8.3%) had a history of lower urinary tract infection without prostatism, indwelling catheter, or surgery (eg, for renal stones). Twenty-six patients (21.5%) had a history of previous intrascrotal surgery (varicocele, torsion, and hydrocele) or trauma to the scrotum and its contents.

DISCUSSION

The differential diagnosis of the inflamed scrotum, a common urological emergency, still causes clinical problems.¹² The differential diagnosis of the acute swollen scrotum includes incarcerated hernia, torsion, acute hydrocele, testicular tumor, and epididymo-orchitis.⁹ Urologic and family practice teaching have always emphasized the need for urgency in the diagnosis and subsequent treatment of acute testicular pain. Early diagnosis and prompt treatment are essential if testicular torsion is the underlying condition for the pain and swelling of the involved scrotum. For example, salvage rates for avoiding torsion atrophy and loss of fertility are progressively reduced with longer delays in detorsion. Complex investigational instruments, such as Doppler scans of the scrotum, ultrasonography,¹³ and testicular scanning,⁴ are not always available and do not yield, as yet, decisive results even when available. Recently an attempt has been made to devise a computer-aided diagnostic method that would improve accuracy and shorten delay in diagnosing acute testicular pain.¹²

Conventionally one must rely on a careful history, a meticulous physical examination, and a rapid laboratory workup to achieve the diagnosis.⁹ Once the diagnosis of acute epididymitis is established, a presumptive diagnosis should also be rapidly established to permit appropriate laboratory tests and initiation of antimicrobial therapy.

It has already been demonstrated that the most useful clue in diagnosis is age.^{1,14} Melekos and Asbach¹⁵ have demonstrated that in men younger than 40 years old, 56%

of the cases of epididymitis were caused by *Chlamydia trachomatis*, and 18% by bacteria, whereas in those older than 40 years, the incidence of epididymitis resulting from urinary tract infection bacteria was 68% and only 18% from *C trachomatis*. De Jong and associates¹⁶ have reported that gram-negative bacteria were the common organisms causing epididymitis in the patient group over 35 years of age. Of the 12 patients (>35 years), 10 had gram-negative infection (83%), 1 had a gram-positive infection, and only 1 patient had *C trachomatis* (8%).¹⁶ All these reports emphasize that patients under 35 years of age would most probably suffer from *C trachomatis* infection, while a great number would still remain idiopathic.^{10,14} On the other hand, those over 50 years of age have a high chance of having a bacterial infection, usually coliform.¹⁶⁻¹⁹

The study reported here further characterizes the acute epididymitis patient. Several points shown in Table 1 deserve discussion. Dysuria was absent in two thirds of the patients, its presence had no predilection for age, and urethral discharge was present in only 5% of the cases. Thus, the disease process clinically diagnosed as nonspecific urethritis and assumed to precede epididymitis in the young is not applicable in this population.

Urethral ejaculatory reflux of urine has been implicated as an important factor in the cause of acute epididymitis in children²⁰ as well as in adults.²¹ Cathcart²² had pointed out that straining associated with urethral discharge may have a role in the pathogenesis of acute epididymitis. He found that 12 of the 14 patients with a history of straining at onset also had urethral discharge. In the study reported here, only one patient, 22 years old, had a history of straining associated with urethral discharge. The involvement of the testis itself in the inflammatory process was of no diagnostic significance, as it was found equally in the different age groups, and in patients with both positive and negative microbial urine cultures. There is no privileged side; both epididymides were noted to be equally involved, as was also noted by Mitemeyer et al.¹

In this study two groups of patients can be identified and characterized. In the young patients up to 30 years of age who present with low-grade fever, negative findings on the urinalysis, and negative microbial urine culture, the chance of a *Chlamydia* infection is extremely high. Thus, it is probably best to start antibiotic therapy with tetracycline. On the other hand, finding a positive microscopic urine analysis in a young man (<30 years) could point toward a bacterial infection rather than a *Chlamydia* infection. Therefore, antimicrobial agents other than tetracycline commonly given for *Chlamydia* infection should be administered. The older patient presenting with high fever and chills and erythrocytes and leukocytes on the dipstick or in microscopic urine examination would probably have a bacterial epididymitis. Thus, while waiting for the results of

the urine culture and sensitivity, broad-spectrum antimicrobial therapy should be started immediately.

Is an IVP necessary in the evaluation of a patient with acute epididymitis? Bullock and Hunt²³ have demonstrated that in patients under 50 years of age who present with acute epididymitis, excretory urogram abnormalities are uncommon. A complete urologic workup including an IVP and voiding cystourethrogram is recommended by Siegel et al²⁴ in any prepuberty patient with epididymitis. In this study, 36 of the 75 patients in whom an IVP was performed were over 50 years of age. More than 50% (22 out of 36 patients) had abnormal findings on IVP that were associated with outflow obstruction, which resulted in urine stasis and infection.

In conclusion, the clinical, laboratory, and radiographic findings of 121 patients with acute epididymitis or epididymo-orchitis seen over a 5-year period have been reviewed. Acute epididymitis is a common inflammatory process in young adults and elderly men. In patients over 50 years of age acute epididymitis is associated more commonly with urinary bacterial infection related to bladder outlet obstruction, while in young men (<30 years) *C trachomatis* appears to be the most common causative agent. Finding a positive urine culture in men younger than 30 years of age might suggest an underlying genitourinary abnormality. In these cases, therefore, radiographic evaluation (IVP) may be of value. In the elderly group an excretory urogram is recommended so as to provide objective information of genitourinary pathology, particularly of the lower urinary tract.

References

1. Mitemeyer BT, Lennox KW, Borski AA: Epididymitis: A review of 610 cases. *J Urol* 1966; 95:390-392
2. Harnisch JP, Berger RE, Alexander ER, et al: Aetiology of acute epididymitis. *Lancet* 1977; 1:819-820
3. Mevorach RA, Lerner RM, Dvoretzky PM, et al: Testicular abscess: Diagnosis by ultrasonography. *J Urol* 1986; 136:1213-1216
4. Vordermark JS II, Favila MA: Testicular necrosis: A preventable complication of epididymitis. *J Urol* 1982; 128:1322-1324
5. Nilsson S, Obrant KD, Persson PS: Changes in the testes parenchyma caused by acute non-specific epididymitis. *Fertil Steril* 1968; 19:748-757
6. Tozzo PJ: Semen analysis in unilateral epididymitis. *NY State J Med* 1968; 1:2769-2770
7. Witherington R, Harper WM IV: The surgical management of acute bacterial epididymitis with emphasis on epididymotomy. *J Urol* 1982; 128:722-725
8. Berger RE, Alexander ER, Harnisch JD, et al: Etiology, manifestations and therapy of acute epididymitis: Prospective study of 50 cases. *J Urol* 1979; 121:750-754
9. Epididymo-orchitis, editorial. *Br Med J* 1981; 183:627-628
10. Berger RE, Alexander ER, Monda GD, et al: *Chlamydia trachomatis* as a cause of acute "idiopathic" epididymitis. *N Engl J Med* 1978; 298:301-304
11. Nie NH, Hull CH, Jenkins JG, et al: Statistical Package for the Social Sciences. New York, McGraw-Hill, 1975

12. Goulbourne IA, Nixon SJ, Macintyre IMC: Computer-aided diagnosis in acute testicular pain. *Br J Surg* 1984; 71:528-531
13. See WA, Mack LA, Krieger JN: Scrotal ultrasonography: A predictor of complicated epididymitis requiring orchiectomy. *J Urol* 1988; 139: 55-56
14. Holmes KK, Berger RE, Alexander ER: Acute epididymitis: Etiology and therapy. *Andrology* 1979; 3:309-316
15. Melekos MD, Asbach HW: Epididymitis: Aspects concerning etiology and treatment. *J Urol* 1987; 138:83-86
16. De Jong Z, Pontonnier F, Plante P, et al: The frequency of *Chlamydia trachomatis* in acute epididymitis. *Br J Urol* 1988; 62:76-78
17. Kristensen JK, Scheibel JH: Etiology of acute epididymitis presenting in a venereal disease clinic. *Sex Trans Dis* 1984; 11:32-34
18. Scheibel JH, Andersen JT, Brandenhoff P, et al: *Chlamydia trachomatis* in acute epididymitis. *Scand J Urol Nephrol* 1983; 17:47-50
19. Berger RE, Holmes KK, Mayo ME, et al: The clinical use of epididymal aspiration cultures in the management of selected patients with acute epididymitis. *J Urol* 1980; 124:60-61
20. 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
21. 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
22. Cathcart CW: Epididymitis from muscular strain followed by tuberculosis of epididymitis. *Edinburgh Med J* 1921; 26:152-153
23. Bullock KN, Hunt JM: The intravenous urogram in acute epididymo-orchitis. *Br J Urol* 1981; 53:47-49
24. Siegel A, Snyder H, Duckett JW: Epididymitis in infants and boys: Underlying urogenital anomalies and efficacy of imaging modalities. *J Urol* 1987; 138:1100-1103

Commentary

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It is unfortunate that no *Chlamydia* or *Neisseria* cultures are reported in the preceding paper, but in their discussion the authors rightly stress that these are the commonest infecting organisms in the younger age group. They have omitted mention of *Escherichia coli* infection acquired as a result of anal intercourse.

It is important to remember that the findings reported here are from patients who were sick enough to be treated in the hospital. It is, however, legitimate to compare their findings with those reported by the military groups, for whom hospital care is mandatory. No mention is made in this article of the sexual partners of these patients. I would suggest that any patients under the age of 35 years should automatically have their partner treated.

Any patient who is not showing marked clinical improvement with appropriate therapy after 3 weeks should be completely reevaluated. Not infrequently, the underlying problem is, in fact, missed torsion or a neoplasm. This reevaluation should include sonography, and some

would suggest serum markers. The latter may be confusing, as they can be elevated in all of these conditions. If there is ever any doubt about the diagnosis, the patient should be explored to establish the diagnosis. There is some evidence that epididymotomy will decrease the morbidity of epididymitis.

Finally, reflux of sterile urine back up the vas giving rise to a chemical epididymitis has been suggested but never proven. Clearly, more research is required. Almost every practitioner has been called on to certify that acute or chronic epididymitis was secondary to some industrial happenstance. The patient will frequently give a clear history of the acute onset of testicular pain following straining or heavy lifting. The most recent thoughts on this matter are that the urine was not sterile, and that all of these patients should have chlamydial cultures done.

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