

The aetiology and current management of prepubertal epididymitis

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ABSTRACT

INTRODUCTION The aim of this study was to review the published evidence on the pathogenesis and management of acute epididymitis (AE) in prepubertal boys after the authors encountered an unexpectedly large number of such cases in their institution.

METHODS Using MEDLINE®, a literature search was performed for articles in English with the words “pre-pubertal” OR “boys” OR “p(a)ediatric” OR “children” AND “epididymitis” OR “epididymo-orchitis”.

RESULTS The literature suggests that it is rare to find a bacterial infection or anatomical anomaly as a cause for AE in this population. A postviral infectious phenomenon is the most likely explanation. The management should be supportive and antibiotics reserved for those with pyuria or positive cultures. Urodynamic studies and renal tract ultrasonography have been advocated for those with recurrent epididymitis.

CONCLUSIONS AE in prepubertal boys is more common than believed previously. A careful history for recent viral illnesses should be included. Antibiotics, urinary tract imaging and functional studies should be used in selected cases.

KEYWORDS

Paediatric epididymitis – Scrotal pain

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Acute scrotal pain is a common urological complaint in the paediatric population. Torsion of testicular appendix, testicular torsion and acute epididymitis (AE) have been shown to be the major differential diagnoses in several cohorts.^{1–4} The management of each patient depends on the individual clinical manifestations, laboratory and sonographic findings. Although it has been shown that colour Doppler sonography can identify testicular torsion in boys reliably,⁵ the surgical exploration remains the gold standard diagnostic tool so as to maximise the chances of testicular salvage in case of testicular torsion.⁶ After torsion of the testis and testicular appendix have been excluded, the acute scrotum in paediatric patients is frequently attributed to AE.

The exact incidence of AE in the paediatric population is difficult to establish. In different series it ranges from 3.7% to 71% of children presenting with acute scrotum.^{1–8} A bimodal age distribution of epididymitis has been reported in many series, with peak incidence in infancy and mainly the age group of 10–12 years.^{7–10}

In our district hospital we encountered six consecutive cases of AE in prepubertal boys over a period of two months. These cases were diagnosed clinically and confirmed either with surgical exploration or with Doppler scrotal ultrasonography (in those two patients who presented late after the onset of symptoms). As the cause for

this clinical entity has not been clearly defined so far, we searched the literature for up-to-date evidence with regard to aetiology and the most appropriate management.

Methods

A comprehensive review of the MEDLINE® literature for prepubertal epididymitis was conducted. The following search terms were used: “pre-pubertal” OR “boys” OR “p(a)ediatric” OR “children” AND “epididymitis” OR “epididymo-orchitis”. The search was limited to English language papers. Further references were identified from the reference list of retrieved articles. There were no randomised or comparative cohort studies, which was expected owing to the nature of the topic. Consequently, most of the conclusions were drawn from the available case series.

Results

Aetiology

It is well demonstrated that most cases of epididymitis in sexually active patients are due to sexually transmitted organisms.^{11–15} In infancy, AE can be a systemic disease manifestation or it can be associated with an underlying genitourinary abnormality.^{9,14–17} However, the cause of AE in prepubertal boys remains controversial.

There are several theories including reflux of infected urine into the ejaculatory duct, chemical irritation from sterile urine reflux or from drugs (eg amiodarone),¹⁸ haematogenously spread infection (viraemia or bacteraemia) and direct viral causes.^{17,19–21} In recurrent epididymitis, a genitourinary abnormality not previously detected should also be suspected.²²

Bennett *et al* demonstrated a statistically significant higher occurrence of AE in uncircumcised children.²⁵ Their study comprised 79 boys with AE. It showed that only 25% of those had been circumcised previously whereas the expected circumcision rate in those populations was 65–70%. This is a relatively historical paper. The authors evaluated patients from different populations and used uncontrolled groups. Nevertheless, it is the only published study so far to evaluate a possible direct relationship between AE and the foreskin factor. Bennett *et al* associated their findings with the increased possibility of urinary tract infection (UTI) in uncircumcised boys, as indicated in some older studies.²⁴

A systematic review of 12 studies (only 1 randomised controlled study) on the causative relation between UTI and circumcision showed that circumcision was associated with a significantly reduced risk of UTI.²⁵ However, it was demonstrated that the number needed to treat to prevent 1 UTI is 111.

But how frequently is bacterial infection the cause of epididymitis? Epididymitis is usually caused by a direct spread of a bacterial UTI in the epididymis. The National Institute for Health and Care Excellence guidelines for UTI in children define UTI as the combination of clinical features of illness of the urinary tract with the presence of bacteria in the urine; a positive urine culture is defined as the presence of a single organism in a high concentration, usually >100,000 colony forming units per millilitre.²⁶ In different studies, the percentage of positive urinalysis in boys with AE varied from 1% to 59%.^{7,10,17,21,27–29} This wide range can be explained by the diversity of the definition for positive urinalysis, which differs from mild leucocyturia to positive culture in those papers.

The possibility of bacterial epididymitis without the presence of UTI has been assessed although this clinical entity has not been demonstrated in the paediatric population. In the published data, the epididymal aspirates cultures' results correlate well with those from urine specimens.^{9,10,50}

A possible explanation for the culture negative AE could be an inflammatory phenomenon following a viral infection. Somekh *et al* evaluated 44 boys with AE.²¹ They performed microbiological and serological studies, and compared the results against a control group of 40 healthy boys. There was microbiological growth in 20.4% of boys with epididymitis (ie 1 urine culture, 3 throat cultures, 3 viral nasopharyngeal cultures and 2 viral stool cultures) and significantly elevated titres to pathogens, suggesting recent infection. Comparing the 'epididymitis' group with the controls, raised titres were found in 53% versus 20% for *Mycoplasma pneumoniae*, 62.5% versus 10% for enteroviruses and 20% versus 0% for adenoviruses respectively. This study provides some evidence that epididymitis in

boys can be caused by viruses possibly following viraemia or as a postinfectious inflammatory phenomenon.

This relation has also been demonstrated in case reports of epididymitis following acute Coxsackie B virus infections.⁵¹ Our literature search failed to reveal any other studies regarding this causative relation.

Although epididymitis in adults has been associated with voiding dysfunction, this is still debatable in the paediatric population. In a study by Bukowski *et al*,²⁰ voiding dysfunction was detected in 10/36 children with AE using uroflowmetry and postvoid residual ultrasonography. The most common findings were high postvoid residual volumes and meatal stenosis.

Management

Systemic antibiotic treatment is conventionally recommended for the treatment of paediatric epididymitis. However, some studies have challenged the necessity for antibiotics.

Lau *et al* assessed 48 boys with AE prospectively and treated only those with antibiotics who had evidence of pyuria; the rest had only analgesia.²⁸ In the follow-up period, there was no complication or testicular atrophy in those patients who had supportive treatment only. Many authors agree that antibiotics should only be administered to patients with pyuria, positive urine culture or a known urogenital abnormality.^{10,21,52} For the others, treatment should be supportive, consisting of bed rest and analgesia such as paracetamol and non-steroidal anti-inflammatory medications.

As discussed earlier, prepubertal epididymitis could be a postviral infectious process. History should therefore include recent upper respiratory or gastrointestinal infections. Serological studies are not indicated routinely as they are unlikely to influence the management.²¹

Whether radiological investigations after AE are necessary is controversial. The association of urogenital abnormalities with AE is highest in infants.^{9,17,55} Cappè *et al* assessed 37 boys with AE.⁹ They found that seven of them had some urogenital anomaly. However, only one required treatment for his condition. The authors suggested that further investigations are indicated in recurrent epididymitis only whereas other authors recommend renal ultrasonography and cystography in every prepubertal case of AE.¹⁷

In a retrospective study, 47 boys with AE were evaluated clinically, some with radiological adjuncts (18 had renal ultrasonography and 15 cystography).⁵⁴ As many as 17 were found to have some urogenital abnormality (most commonly hypospadias); it was noted that 9 out of those 17 had recurrent episodes of epididymitis. In retrospective review of the initial ultrasonography findings, patients with a urogenital abnormality had more profound epididymal swelling. They were also more susceptible to recurrent epididymitis than those with no urogenital abnormality.

One study examined the relation between voiding dysfunction and paediatric epididymitis.²⁰ The authors recommended renal/bladder ultrasonography and cystourethrography for young boys (<5 years) with epididymitis. In older children

(>10 years), they advocated detailed voiding symptoms questioning and uroflowmetry (as well as ultrasonography). They also suggested that bladder retraining and prophylactic antibiotics can prevent recurrence of epididymitis in those with documented voiding dysfunction.

Conclusions

The first priority in assessing boys with an acutely painful scrotum is to exclude the presence of a testicular torsion. If there is uncertainty, the medical dictum for immediate surgical exploration applies. Nevertheless, our review shows that AE is an underreported cause of acute scrotum in prepubertal boys. Although the literature has failed to establish the definite aetiology of the disease in this age group, there is evidence that it commonly represents a postviral inflammatory process with a benign course. Antibiotics should be administered only in cases with evidence of a UTI (eg pyuria or positive urine specimens).

There is currently no consensus in the literature for imaging evaluation for underlying abnormalities in these boys following one self-limiting episode of AE. Examination of the genitalia could reveal an anatomical anomaly such as meatal stenosis, hypospadias or phimosis. Ultrasonography of the renal tracts and flow rate studies/postvoid residues are advised for those with recurrent episodes of epididymitis or with a history of voiding problems.

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