The Section on Urology of the American Academy of Pediatrics has charged this committee with the task of evaluating the status of the question of meatal stenosis in boys (excluding those with hypospadias). The objective information on the subject is limited; however, our conclusions, based on review of available literature and the committee's deliberations, are as follows.

**Etiology**

Meatitis, an inflammation generally secondary to ammoniacal diaper irritation, has been cited as the underlying cause of secondary meatal stenosis. The lack of protection by the foreskin in the circumcised male is thought to correlate with an increased incidence of meatitis. Meatal narrowing has been noted to occur more commonly in the circumcised male. The formation of a ventral lip of tissue is characteristic of secondary meatal narrowing and may cause deflection of the urinary stream upward. Campbell, however, suggested that congenital meatal stenosis is the underlying cause of meatitis, whereas Allen and Summers believe meatitis can be either the cause or the effect of meatal stenosis. Other factors which have been stated to influence the development of secondary meatal stenosis include abrasions and diet.

**Incidence and Measurement**

Calibration of the urethral meatus by Allen et al. demonstrated that 9% of newborn boys have a meatus tight to 4F which the authors consider to be congenital meatal stenosis. In a later article the same authors reported the results of visual inspection in a group of 1,800 boys, ages 6 to 10 years. Thirty-two percent were considered to have a "pinpoint meatus." By subtracting the 9% incidence of congenital meatal stenosis previously reported, they concluded that the acquired incidence is 23%. These latter findings were not confirmed by direct calibration.

It was established by Litvak et al., in their study of 200 boys coupled with Morton's study of 1,000 circumcised boys, that the size of the meatus corresponds generally with age. Three distinct groups can be delineated. In boys 6 weeks to 3 years of age, 85% had meatuses which were calibrated to be more than 10F, while 15% were less than 8F. Between 4 to 10 years, 73% measured 12F while only 7% were tight to 8F. Between the ages 11 and 12 years, 4% had a tight meatus at 10F, while 75% were calibrated at 12F and the remainder were larger.

**Suggested Significance**

Meatal stenosis is difficult enough to define, but an assessment of its significance is an even greater challenge. There is a marked divergence of opinion in the literature concerning the effect of the caliber of the urethral meatus on the proximal urinary tract.

Campbell believed that meatal stenosis was of "grave import" and that the early correction of this condition would prevent thousands of episodes of acute urinary infection in childhood. However, objective support for this statement is currently lacking. Additionally it would appear that concrete evidence for significant risk to the upper urinary tract is also unavailable, although Arnold noted an incidence of hydronephrosis in 19% and Noe and Dale in 2%. Other secondary abnormalities include urethral stricture in 12% and "hypertrophy of the verumontanum" in 21%. Finally Mowad and Michaels reported a causal relationship between meatal stenosis and vesicoureteral reflux with resolution of reflux by simple meatotomy.

There are a number of reports in which enuresis is associated with meatal stenosis. Winsbury-White found a 27% incidence of meatal stenosis in...
enuretic boys,10 Arnold and Ginsburg found a 75% incidence in boys and girls,11 while Mahony reported meatal or juxtameatal strictures in 50%12 and subsequently believes that this incidence is even greater (personal communication). In addition, dysuria, urgency, frequency, and hematuria have all been suggested as symptoms secondary to a narrow meatus.

Diagnosis

The differentiation between meatal narrowing and urethral meatal stenosis is really the crux of the problem. Stenosis implies disease while narrowing may be only an anatomic variant. As noted earlier, visual inspection does not correlate with actual calibration.

In general, the articles dealing with calibration of the urethral meatus do not include a statement indicating what meatal size defines the presence of stenosis. Allen et al. proposed that a size 4F meatus in a newborn child was stenotic and that the size 6F was equivocal. From the evidence derived from their extensive study, Litvak et al. advocated caution in labeling those boys with small meatuses for their age as having meatal stenosis. In an editorial comment appearing in the same article, Jeffs maintained that it was unrealistic to claim that 15% of males 6 weeks to 3 years of age with meatuses less than 8F require meatotomy. The author and the editor agreed that the clinical status of the patient and not the appearance of the meatus was the deciding factor.

In an effort to realistically diagnose disease, some attempt at objectivity is necessary. Observation of voiding may be helpful, with spraying or significant deflection of the urinary stream as evidence of interference with voiding. Urodynamics with measurement of flow rate and even voiding velocity may be the only means of accurately identifying significant resistance (D.M. Gleason, personal communication, 1977). Finally, roentgenographic changes with actual dilatation of the urethra proximal to the meatus may be indicative of secondary changes.

Discussion

Widely disparate opinions are held on the subject of meatal stenosis, not only in terms of definition and diagnosis but on its clinical significance as well. Most would agree at this time that the actual risk to the kidneys from obstruction alone is minimal. Even the most stalwart exponents of the risks of obstruction agree that urinary infection is rarely associated with meatal narrowing.12

The question of voiding symptoms manifested by urethral irritation, wetting, urinary urgency, and frequency is subjective, and documenting a causal relationship is tenuous at best. Although many clinicians have seen marked resolution of complaints of this type following meatotomy, the same might be said for many of those left untreated. The question of vesicoureteral reflux being caused by meatal stenosis echoes the contention held ten years ago of its relationship to bladder outlet obstruction. Sufficient data exist regarding the spontaneous resolution of reflux to adequately explain these reports without invoking a cause-and-effect relationship.

A concern voiced repeatedly by some urologists regards the potential secondary effects of minimal changes in urodynamics which may manifest themselves in later years as bladder neck contractures or prostatitis. However, for the present, actual evidence for such a relationship seems to be lacking.

Recommendations

It is not the purpose of this report to come down totally against meatotomy in any circumstance. That would be as foolhardy as stating that every child with visual narrowing of the urethral meatus requires meatotomy. This is a plea, however, for objectivity in making the diagnosis of real stenosis.

Meatotomy as well as local therapy is justified in those infants with a purulent meatitis. These children may even be having obstructive symptoms, although actual urinary retention is unlikely. Additionally, in that group of boys who have spraying or severe, uncontrollable deflection of their urinary stream, correction is indicated.

Boys with documented infection with or without apparent meatal narrowing require complete evaluation with intravenous and voiding urography. If evidence of meatal narrowing is noted, correction in the course of evaluation is indicated.

Subjective complaints, however, represent a more difficult problem. It would appear that narrowing of the urethral meatus as noted by inspection in itself does not justify meatotomy. Voiding symptoms are difficult to interpret but probably have no relationship to the caliber of the meatus. This also holds true for enuresis.

When meatotomy is deemed necessary, it is difficult to justify the complexity and expense involved in carrying this out in the operating room. Except in those rare instances of true stricture of the fossa navicularis, spreading of the meatus with a small hemostat after application of
a local anesthetic is adequate to disrupt the thin ventral web present. Certainly this is no more traumatic than a general anesthetic and much less costly.

Finally, it becomes apparent that there is a great deal of subjectivity involved in dealing with the question at hand. We all agree that there is an art to medicine but let us not deny its science. There is a need for criteria regarding urodynamics which can be transmitted on a numerical level. Voiding flow and velocity studies may be the key. Measurement of intravesical pressure may also be necessary, at least initially, to settle the basic question of urethral meatal stenosis as a real entity. Certainly the least that can be done is to observe the voiding act in an effort to be objective.

The lingering questions regarding the potential long-term effects of a narrowed meatus remain unanswered. However, it is the responsibility of those who are advocates of surgical intervention to justify their position with hard data. Until that evidence is in, there appear to be few circumstances in which urethral meatotomy is indicated in boys.

Committee From the Urology Section

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References


Bibliography


Moral Judgment

What a man calls moral judgment is merely his desire to generalize, and so make available for others, those values he has come to choose.

C. Wright Mills
Submitted by Student

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