

Symptomatic Male Urethral Diverticula- Presentation, Diagnosis and Management

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*Article History:

Received: 21/02/2018

Revised: 02/03/2018

Accepted: 03/03/2018

DOI: <https://doi.org/10.7439/ijbr.v9i3.4661>

Abstract

Objective: To report our experience of aetiology, diagnosis, management and outcomes of uncommon male urethral diverticula managed at a single institute.

Patients and Methods: After due approval from local ethical committee the case records of 8 male patients including a child presenting with urethral diverticula in a 10 year period (2002-2012) were retrospectively analysed with regard to presentation, diagnosis, management and outcomes.

Results: A total of eight patients were identified having been managed for a urethral diverticulum during the period. Of the eight patients one was congenital diverticulum and rest acquired. A child aged 10 years, presented with straining to void and inability to empty the bladder and was diagnosed to have anterior urethral valve located at peno-scrotal junction. The valves were endoscopically resected and diverticulum de-roofed. The child recovered with good outcome of good flow and emptying of bladder. Patients with acquired diverticula, presented at a mean age of 42 years (25-60 years). The presentation was similar with two patients presenting with acute retention. The Aetiological factors included Trauma, Previous urethral surgeries like Visual internal urethrotomy and infection. The common site of diverticula was peno-scrotal junction, followed by distal penile urethra. Two patients were treated with primary excision and establishment of urethral continuity and rest with two stage procedures. The outcome was poor in one patient of primary excision who presented later with stricture at the anastomotic site.

Conclusions: Unlike in female population, male urethral diverticula are uncommon but should always be thought of in young men with obstructive urinary symptoms and in those with a past history straddle injuries. Treatment if individualized leads to good outcomes.

Keywords: Urethral Diverticula; Urethra; Congenital; Acquired.

1. Introduction

Urethral diverticula are saccular dilatations of urethra maintaining a communication with the true urethral lumen by a discrete orifice. Urethral diverticula are arguably common in females owing to poor urethral support and frequent periurethral abscesses. On the other hand they are uncommon clinical entities in males. Great majority (67-90%) of male urethral diverticula are acquired resulting commonly from urethral infection, trauma and obstruction [1-4].

In this study we analyse 8 male patients managed for urethral diverticula at a medical college hospital during the period of ten years (2002-2012).

2. Patients and methods

During the decade from 2002 to 2012, 8 male patients were diagnosed with symptomatic urethral diverticula at a medical college hospital in India. A retrospective review of their medical records was undertaken with a view to analyse their presentation, diagnosis, treatment and outcomes. The mean follow up period was 60 months.

All of the eight patients were evaluated with Ascending urethrogram, Voiding cystourethrography and Urethroscopy when indicated.

The follow up consisted of repeated flowrates and additional investigations when indicated.

3. Results

Out of 8 patients one was congenital as diagnosed by age at presentation (10 Years), and finding of anterior urethral valve on voiding cystourethrography. The remaining seven patients had acquired diverticula with a mean age at presentation as 42.5 years (25-60 years).

The various aetiologies of the urethral diverticula were as depicted in Table 1.

Table 1: Urethral Diverticula: Aetiology, Presentation & Management

	Congenital [n=1]	Acquired [n=7]
Aetiology		
Congenital	1	
Stricture/ Infection		1
Trauma		2
Post Endoscopic Urethrotomy		4
Location		
Penile Urethra		4
Penoscrotal Junction	1	3
Bulbar Urethra		
Presenting features		
Swelling	1	1
Poor Stream	1	3
Post void dribble	1	1
Sense of incomplete void		3
Acute Retention		2
*Symptoms not mutually exclusive		
Management		
Endoscopic	1	
Excision & establishment of continuity		3
Staged procedure		4
Complications		
Stricture		1
Wound infection		1

The presentation in both categories was similar with obstructive lower urinary tract symptoms, failure to empty the bladder, recurrent urinary tract infections and acute urinary retention in two patients with acquired diverticula. Palpable perineal swelling was noted in 2 patients.

The diagnosis of Urethral diverticulum was confirmed with retrograde urethrogram and voiding cystourethrogram. In two patients, who presented with acute retention, the investigations done after preliminary suprapubic cystostomy for failure to catheterize.

Two patients had antecedent straddle injury prior to the development of diverticulum. Four patients had undergone visual internal urethrotomy on more than three occasions, before presenting with diverticulum.

All the diverticula were ventral in location, involving pendulous urethra in four and penoscrotal junction in the rest. Those diverticula which developed after multiple visual internal urethrotomy were most distal, located just proximal to the meatus.

The diameter of the diverticula varied from 2-6 cm (mean of 4 cm), the largest being those resulting from trauma.

The child with anterior urethral valve and diverticulum was treated with endoscopic resection of valve with excellent outcome. Excision of the diverticulum and primary closure of urethra was attempted in three patients using local urethral tissue. One patient had poor outcome with stricture which was treated with BMG as dorsal onlay.

Four patients with post urethrotomy diverticula, being juxta-meatal and smaller diameters were treated only with stage 1 urethroplasty.

Follow up varied from 18 to 60 months (mean of 39 months). All patients except one patient, who required repeat reconstructive procedure for stricture, had good outcomes with normal flow rates and no infection episodes.

Figure 1: Retrograde urethrogram showing penile urethral diverticulum



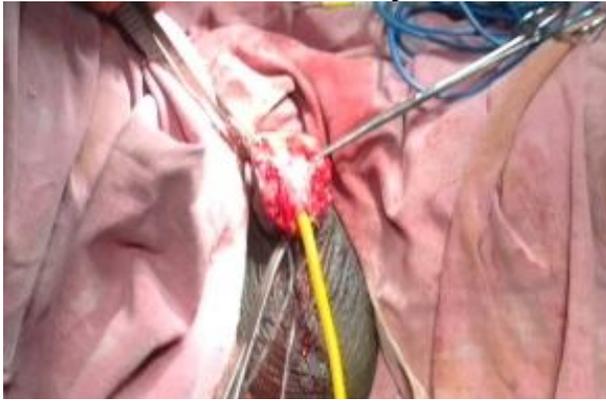
Figure 2: Retrograde urethrogram showing penoscrotal post traumatic diverticulum



Figure 3: Operative photograph showing the diverticulum



Figure 4: Operative photograph showing the diverticulum laid open



4. Discussion

Urethral diverticula in males are uncommon entities. Though simplistic classifications as Congenital Vs Acquired and Primary Vs Secondary are available, they remain mainly academic as the treatment of each diverticulum needs to be individualised.

In Congenital diverticula, the full thickness of the urethral wall is involved with an urothelium lining the diverticulum. On the contrary, the acquired diverticula being infective or traumatic are lined by granulation tissue and the walls are devoid of urethral smooth muscle fibres [5].

Several theories have been proposed for occurrence of congenital urethral diverticula, including incomplete urethral duplication [6]; Intraluminal rupture of periurethral cysts and urethral obstruction like anterior urethral valves [7]. Segmental developmental defect of spongiosum leading to ventral dilatation of urethra, lacking the usual support is the most commonly held theory [8]. Darrel Allen and others, in their series, could find spongiosal defect in six of the seven congenital diverticula and suggested that these could be a part of spectrum of congenital anomalies [1]. In our series the lone congenital diverticulum was managed endoscopically, hence the anomaly could not be determined.

Acquired diverticula, on the other hand have an overt cause like infection, Stricture disease, long term catheterisation and trauma which could be accidental or iatrogenic. In our series trauma was the cause in two following straddle injuries and Iatrogenic in four following visual internal urethrotomy. Similarly in a series of 22 cases of acquired diverticula in males presented by McAninch *et al* trauma (50 %) and iatrogenic causes (27%) predominated [9].

It is expected that the congenital diverticula present earlier than the acquired diverticula, though it is not universal. Darren Allen *et al* in their single centre experience of 21 urethral diverticula included 5 congenital diverticula presenting at a mean age of 25 years [1]. In our series the solitary congenital diverticulum presented at 10

yrs. The delay could be due to difficulty in diagnosis, health seeking behaviour of patients and many diverticula remaining asymptomatic until complications.

The presentation is similar in both the categories, predominantly being obstructive in nature; others are recurrent infections, post void dribble, perineal swelling emptying on pressure. Two of our patients presented with acute retentions that could not be catheterised and two patients presented with penoscrotal swellings. In the McAninch *et al* series, obstructive symptoms and post void dribble were presenting features in 63 % of the cases[9]. Palpable swellings were present in two of eight patients (one in each type) in our series. The same in the series of Darren Allen was 12 out of 21 cases [1] and 5 out 22 acquired urethral diverticula in McAninch *et al* series [9]. Often a high index of suspicion is needed to diagnose this uncommon condition.

The diagnostic work up includes ascending urethrogram, voiding cystourethrography and Urethroscopy. Though magnetic resonance imaging has been used to diagnose these entities [3], however adding urethral ultrasonography to the fluoroscopic modalities gives excellent details like location, volume, neck size and associated urethral pathologies [9]. In our series the diverticula were located mostly in the pendulous and penoscrotal part of anterior urethra. In the series of Darren Allen *et al* the congenital diverticula were predominantly at penoscrotal junction and bulbar & distal in the acquired diverticula. In the series of 22 acquired diverticula published by McAninch & colleagues, the location was predominantly at bulbar (55%) and pendulous (41%) urethra with one located at Membranous urethra. Only one diverticulum was noted to be dorsal in location. In our group of cases all diverticula were ventrally located.

The diverticula are managed by conservative, endoscopic and open surgical methods. McAninch and others in their series, suggested conservative measures for small asymptomatic diverticula by post void compression to reduce stasis and hence complications. 7 patients out of 22 in their series were managed conservatively with good outcomes [9]. Prophylactic antibiotics were also suggested to keep the urine sterile with an option of intervention at a later stage should complications arise. As none in our group of cases fulfilled these criteria conservative measures were not offered.

Endoscopic management by deroofting diverticula, though appearing attractive is not proposed for all diverticula as the chances of successful outcomes are uncommon with possible late complications of recurrence and urethrocutaneous fistula [2,10]. The poor urethral support in the acquired diverticula makes it prone for complications. Out of 22 acquired diverticula presented by McAninch *et al*, two already had endoscopic interventions before presentation [9]. In our series only one case of

congenital diverticulum was managed endoscopically with resection of anterior urethral valve and deroofting, for better drainage. We did not encounter any complications.

The goal of any operative procedure for diverticulum is excision of diverticulum, restoration of urethral continuity and to provide adequate additional tissue support to obviate urethrocutaneous fistulae [11]. McAninch *et al* suggested a size of 3 cm while planning the corrective surgeries. Those less than 3 cm size, continuity could be established by end to end anastomosis after diverticulectomy. Those with larger defects, reconstruction were possible using local urethral flaps, none requiring distant flaps [9]. The technical modification one may need to adopt depends upon the urethral defect left after excision of the diverticulum. In smaller defects, the urethral continuity is established either by longitudinal closure of the defect or spatulated anastomosis after adequate urethral mobilisation [12-13]. For larger defects Ventral onlay graft urethroplasty or staged urethroplasty are considered [14]. In our series three patients were managed with excision of diverticulum & primary closure in using local tissues. One of these developed strictures at the primary site, after two months was salvaged with dorsal onlay BMG urethroplasty. Four diverticula which followed visual internal urethrotomy and located just proximal to the external urethral meatus were laid open with an option for tabularisation at a later stage. Since all four voided well after first stage, did not opt to undergo the second stage. In the other series by Darren Allen *et al*, five underwent diverticulectomy and establishment of continuity using local urethral flaps but 3 developed urethrocutaneous fistula [1]. Walter Parker *et al* reported a case of urethral diverticulum following visual urethrotomy, managed by excision and primary urethral anastomosis [15]. We believe repeated urethrotomy leads to loss of urethral support and hence diverticula. We strongly feel visual urethrotomy though easier to perform, has its share of complications including that of urethral diverticulum. Hence the urge to offer as a definitive treatment needs to be tempered.

Patients were followed up with periodic flow rates for periods ranging from 18 to 60 months. All patients had good outcomes except one patient who developed stricture following primary excision and anastomosis, hence required a further procedure.

5. Conclusion

Urethral diverticula in males, unlike in females are rare entities. The treatment needs to be individualised to achieve good outcomes. The high rate of acquired diverticula following visual urethrotomy in our series underscores the need for further studies to determine the utility of Visual Urethrotomy as a definitive treatment for stricture urethra.

Conflict of Interest: None declared.

Ethical committee Approval

This study was conducted after due approval from the local ethical committee.

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