REVIEW ARTICLE

Epidemiology of male urethral strictures in Pakistan

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Abstract

Urethral stricture disease is relatively common in Pakistan, constituting 4-5% of the urological workload. Despite the high prevalence, little is known about its epidemiology in the country. The current narrative review comprised search on PubMed, Pak MediNet and Google Scholar databases for studies done in Pakistan and published between January 1, 2000, and December 31, 2021. The search yielded 30 local publications on stricture urethra. Demographic data as well as causes and management pattern of male urethral stricture were noted and analysed. There were 5,021 patients, with 3850 (76.6%) being from the province of Sindh. The disease had the greatest impact on younger patients aged up to 40 years (n=1572), while after the age of 60 years, 248 (9%) patients had the disease. The common cause was trauma due to road traffic accidents in both anterior and posterior strictures compared to idiopathic cause reported in the West. Infection 170 (6.9%) and Lichen sclerosis 123(4.5%) as a cause was found to decline in our region. A clinic-based regular urethral dilatation was still in practice at some centres to manage such cases. Vast majority of stricture patients were being treated by endoscopic procedures, and only 1154 (23%) cases underwent urethroplasty.

Keywords: Male, Urethral structure, Epidemiology.

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Introduction

The exact incidence and prevalence of urethral strictures in Pakistan is not known due to a lack of community-based studies. A hospital-based study showed that it is a highly prevalent disease in the country and constitutes 4-5% of indoor urological admissions.[1] Data from Karachi showed that hospital outpatient department visits in stricture clinics in the year 2006 is 5760.[2] A study from the United States[3] showed 5,000 in-patient visits and half-a-million OPD visits annually in 2007 from across the country. Urethral strictures cause various symptoms, ranging from thin urine stream to straining to pass urine to sense of incomplete emptying of bladder and recurrent urinary tract infections (UTIs).[4] Apart from lower urinary tract symptoms, it can be a cause of male subfertility due to failure of ejaculation and can be one of the causes of Fournier's Gangrene (FG), a life-threatening condition. Urethral strictures, if left untreated, can lead to bladder failure, renal failure, prostatitis, recurrent epididymitis and orchitis.[5] Unfortunately, literature is scanty on the epidemiology of stricture urethra in Pakistan as well as on the treatment of the disease. One study on spectrum of care at district hospitals in Pakistan reported that urethral dilation for stricture urethra constituted 1.5% of all surgical procedures in adults and 3.8% in adolescents.[6] Proper study of the epidemiology of the disease is important to identify the aetiological risk factors and the severity of the disease to put in place early diagnosis and preventable means to avoid serious complications. The current narrative review was planned to review the epidemiological aspects of urethral stricture in Pakistan.

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Materials and Results

The current narrative review comprised search on PubMed, Pak MediNet and Google Scholar databases for studies done in Pakistan and published between January 1, 2000, and December 31, 2021. Key words used in the search included male, 'urethral stricture''epidemiology''aetiology' and 'Pakistan'. Additional articles were identified by cross-referencing the retrieved articles. The search was limited to studies published in English language. Duplicate studies were excluded.

Of the 30 local data base publications on stricture urethra 4(13.3%) were excluded. No paper was found on the epidemiology of urethral stricture. There were 5(19.2%) papers on disease aetiology[2,6-9] 11(42.24%) discussed various aspects of direct vision internal urethrotomy (DVIU)6,[10-19] including 1(9%) on laser urethrotomy,[6] 8(35.88%) studies were on different aspects of urethroplasty[7,20-26] 1(3.84%) on the aspect of frequency of strictures occurring in urological patients[2] and 2(7.68%) highlighted historical evolution and recent advances.[1,2]

Demographic data as well as causes and management pattern of male urethral stricture were noted and analysed. There were 5,021 patients, with 3,850(76.6%) being from the province of Sindh, 262(9.2%) from Khyber Pakhtunkhwa (KP), 358(7.1%) from Baluchistan, 276(5.4%)

Table: Province-wise distribution of urethral stricture patients (n=5021).

Provinces	n (%)
Sindh	3850 (76.6)
Khyber Pakhtunkhwa (KP)	462 (9.2)
Balochistan	358 (7.2)
Punjab	276 (5.4)
Islamabad, Gilgit, Azad Jammu and Kashmir (AJK) and other areas.	75 (1.6)

from Punjab, and 75(1.4%) from Islamabad, Gilgit, Azad Jammu and Kashmir (AJK) and other areas (Table).

Incidence and prevalence

Although urethral stricture is a relatively common urological problem in Pakistan, there is no population-based data about the incidence and prevalence of the disease. One study reporting hospital-based data showed stricture urethra constituted about 1.5% of all surgical operations in adults, 4.6% of all surgical patients in district hospitals in adults, 3.8% in adolescent operations and 2.7% in children.[5] The reported incidence based on hospital data from the USA showed a prevalence of 229-627 for 100,000 males or 0.6% of the at-risk population aged >65 years. The same study reported annual incidence of 9/100,000 in patients aged >65 years and 5.8/100,000 in patients aged <65 years.[3] Estimated prevalence for Pakistan, based on hospital-based data, extracted from the reviewed 27 studies showed 24.2 patients/million and 2.4 patients /100,000 population. However, the real incidence and prevalence could be much higher, since numerous hospitals do not publish or report all the cases they treat.

Age distribution of urethral stricture patients

Patients' age was reported in 2,739 patients. The common age group of all documented patients was 21-40 years 1122 (40.9%) followed by 41-60 years 919 (33.5%) (Figure 1). This was contradictory to the findings reported in the USA, which showed predominance of stricture urethra occurrence in patients aged >65 years in the year 2001. This difference in the age can be explained by the different aetiology of disease in Pakistan (trauma) versus prostatic surgery in the USA.[3]

Palmenteri et al. evaluated age in 1,439 male urethral stricture patients in Italy and found the mean age to be 45.1 years (range: 2-84 years).[27] A study from Pakistan reported

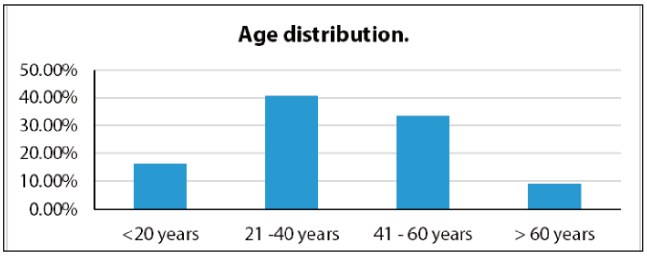

Figure-1: Age distribution of urethral stricture patients.

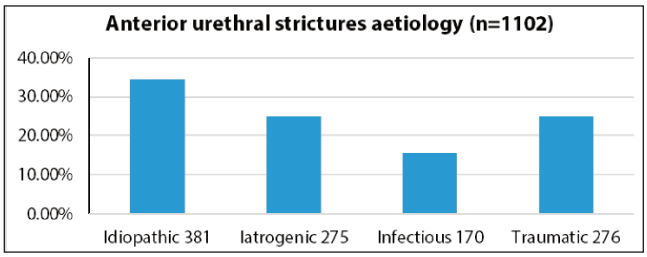

Figure-2: Aetiology of anterior urethral strictures.

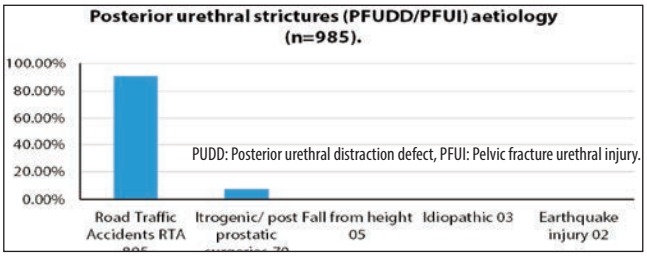

Figure-3: Aetiology of posterior urethral strictures

a mean age of 32.3 years (range: 12-74 years), which also showed a high prevalence of the disease in younger patients in Pakistan.[7]

Length of stricture reported by various studies in 934 patients ranged 0.5-16 cm with the mean being 3.3±2.5 cm.[7] The mean length of strictures reported by Palmenteri et al. was 4.15 cm in 1,439 patients in Italy.[27]

Aetiology of urethral stricture in Pakistan

Aetiology was divided according to the location of stricture; either anterior urethral or posterior urethral strictures.[28] Anterior strictures aetiology was further divided into idiopathic, infectious/inflammatory, traumatic and iatrogenic causes (Figure 2).

Aetiology of 1,102 anterior urethral strictures showed 381 (34.5%) to be idiopathic followed by 275 (25%) cases caused by external trauma. Similarly, in posterior urethral strictures n=985, road traffic accidents (RTAs) constituted 895 (90.8%) of all cases, followed by iatrogenic (post-transurethral resection of the prostate [TURP]/ post-prostatectomy) causes in the remaining 70 (7.1%) (Figure 3).

Infection

Historically, Gonococcal urethritis was the most common cause of strictures all over the world. This cause has decreased over time due to public awareness, use of protective condoms and early treatment of gonococcal urethritis. From a total of 1,323 patients from Pakistan, 111(6.9%) showed infection as the cause.[8] This was a retrospective study and showed a diagnosis based only on history of sexual contact, but was not proven by polymerase chain reaction (PCR) testing. A 2020 study with data compiled from 546 urethroplasty cases revealed

15(2.75%) cases to be due to infective aetiology.[7] This study was also based on clinical history of sexually-transmitted infections (STIs). Both these studies prove that infection as a cause of urethral stricture is on a decline in Pakistan. A study done in Quetta, the capital of Balochistan province, showed infection as a cause of stricture in 15(8.3%) of 180 cases.[9]

Balanitis Xerotica Obliterans / Lichen Sclerosis (BXO/LS)

Balanitis Xerotica Obliterans/Lichen sclerosis BXO/LS is a chronic inflammatory condition of genital skin of unknown aetiology. It involves the external urethral meatus, causing stenosis and progressively it involves the whole length of the anterior urethra causing panurethral strictures. The exact incidence of BXO/LS leading to stricture urethra is not known. A 2020 study in Pakistan reported BXO/LS as a cause of stricture in 12(2.2%) of 546 cases.[7] However, BXO/LS was reported to be one of the most common causes of pan-urethral strictures in Italy.[27] These strictures behave like inflammatory strictures and are common in uncircumcised men with poor personal hygiene. Although no causative organism has been identified, there is a history of STIs in many cases. A study reported 123 cases of BXO/LS from Tharparkar, a desert area in Sindh. Of them, 116 (94.3%) were uncircumcised with common age group being 18-30 years, 15 (12%) of the patients gave history of sexual contact with animals, and 17(13.8%) had documented UTIs.[9] No other study from Pakistan reported BXO/LS as a cause of strictures. This indicates that the disease is common in uncircumcised, non-Muslim, poor people with bad physical and sexual hygiene. However, no association with sexually-transmitted diseases (STDs) has been documented by any other study.

Trauma

Trauma, as a cause of anterior urethral strictures, represented in 276 (25%) of all cases in a recent data analysis of 1,102 patients. Posterior urethral strictures (stenosis) were caused by trauma due to various mechanisms in 895 (92.4%) of the cases. Data from Hyderabad showed 32 (64%) of strictures treated with optical urethrotomy were caused by trauma.[11] Similarly, a study from Quetta on optical internal urethrotomy reported trauma as a cause in 80 (67%) cases.[10] Another study published in 2021 from Karachi based on 358 stricture patients, underwent non-transecting urethroplasty showed 78 cases (22%) were due to trauma.[19] Hence, it can be concluded that trauma is the most common cause of strictures in Pakistan if all parts of urethra are included, but idiopathic is the commonest cause in anterior urethral strictures.

Post-TURP / post-prostate cancer surgeries

Strictures are reported after all treatment modalities of prostate cancer in many countries.[29,30] Two studies from Pakistan reported stricture after TURP or open prostatectomy for benign disease in the range of 2-16.5%.[8,12] All post-TURP strictures were treated by DVIU or dilatation. Robot-assisted laparoscopic simple and radical prostatectomy have been recently started at SIUT Karachi. They have not yet published their data about outcome and complications of robotic assisted prostatectomies. However, international reported incidence of strictures after radical prostatectomy is variable and ranges from 2.7% to 25.7%.[29,30] After external beam radiation therapy, this complication is relatively low, and is around 12%.[29]

Meatal stenosis and circumcision

Meatal stenosis occurs as a complication of circumcision or due to BXO/LS. An operation theatre database of 7,343 stricture patients, from a tertiary care centre showed that 376 (5.1%) patients had meatal stenosis and underwent meatotomy and meatoplasty between January 2010 and August 2021 (SIUT operating theatre audit report of 10 years). The study from Tharparker on BXO/LS also reported meatotomy for BXO/LS.[9] On further analysis of rural and urban locations, the majority of patients belonged to rural areas of the country.[7]

Patient visits and cost of treatment

Regarding patients visits to urology centres, no data has been published in recent era on this subject from any unit of urology in Pakistan. Similarly the treatment cost for urethral strictures is not exactly known in this region. SIUT provides free of cost healthcare facilities for all types of treatment including urethral stricture management. On Google search, in two leading private-sector hospitals, excision and primary anastomosis (EPA) urethroplasty costs between Rs250,000 and Rs.450,000, DVIU costs between Rs.85,000 and Rs140,000[30] and OPD-based urethral dilatation under local anaesthesia costs between Rs7,000 and Rs10,000[31] (year 2020). Santucci et al. reported a high cumulative healthcare cost of $191 million for the treatment of urethral strictures in the USA in the year 2000, with $17,747 being the cost of treatment for patients who needed urethroplasty and internal urethrotomy treatment.[3]

Management trends

Still our approach is least invasive methodology should be applied first.[32] A review of 1600 patients from Karachi showed that that a vast majority of stricture patients 1248 (78%) were still being treated by dilatation or endoscopic procedures rather than urethroplasties.[8] Pattern of management of urethral strictures from the same institute

from January 2010 to August 2021 showed that from a total of 7,343 urethral stricture patients, 2,995(40.7%) were treated with urethroscopy and dilation, 2,098(28.6%) with cold-knife DVIU, and 1,707(23.2%) underwent urethroplasty, which is the gold standard. Meatotomy was sufficient in 376(5.1%) patients, laser DVIU in 120(1.7%) patients and perineal urethrostomy in 47(0.7%) patients.[1,6,7,8]

Limitations: The narrative review focussed on the epidemiology of male urethral stricture disease in Pakistan. It is not a systematic review or meta-analysis, as studies from other parts of the world were not included. The included studies spanned 20 years, and were mostly published in local journals.

Conclusion

The aetiology of urethral stricture disease was largely trauma in posterior strictures, and idiopathic in anterior strictures. STIs as a cause was found to have decreased drastically. BXO/LS was more common in uncircumcised and impoverished people in desert areas with poor hygiene. Strictures due to prostate cancer treatment were extremely rare or were not reported. Iatrogenic strictures were not rare and were usually preventable. Management was done mostly through DVIU, dilation or urethroplasty. There is a need to have population-based studies to know the exact prevalence and risk factors for this common urological disease and to open specialised urethral stricture surgery centres to improve the outcomes.

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