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Research Article

URETHRAL LENGTH IN THE MALE INDIAN POPULATION

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The male urethra varies in size depending on the age and ethnicity. Despite being extensively assessed by urologists worldwide, studies on the male urethral length are infrequent. A majority of textbooks rely on age old data for reference. In this study, we aim to determine the length of the male urethra in the Indian population and analyze whether age has any impact on the same. Our analysis revealed that the mean urethral length for the Indian population is 18.45 cm and was the longest in males in the 5th to 6th decade of life. On comparison to other studies, it was found that the urethral length in the Indian population was significantly shorter than the Caucasian counterparts.

INTRODUCTION

The urethra was first described in ancient history by Greek scientists and mentioned in early Hippocratic and Aristotelian writings. During the 1st to the 5th century, the ureter and urethra had a common terminology - "urētēr". Various other terms like "collum vesicae" and "canalis virgae" were proposed for it between the 5th and the 14th century before the term - "urethra" was finally accepted around the 15th century.[1]

Despite such a long period of interest in this vital anatomical structure, literature about the actual anatomical length of the male urethra is sparse. Most textbooks and research papers quote the reference of the famous anatomy atlas - Gray's Anatomy by Sir Henry Gray, which describes the male urethral length as 18-20 cm and the female urethra as 3 to 5 cm.[2]

There has been scant data on this topic from Western literature and only one from the Indian subcontinent. Most of these studies used a foley balloon or retrograde urethrogram for measurement, which may have significant operator-dependent biases.[3, 4]

MATERIALS AND METHODS

All males aged 18 and above who underwent urethrocystoscopy for double j stent removal or diagnostic purpose on an outpatient basis were eligible for inclusion in this study. Informed consent was obtained before the procedure.

Exclusion criteria included

1. History of prior urethral or prostate surgery
2. Known urethral abnormalities: idiopathic or iatrogenic
3. Patients < 18 years

METHODOLOGY

A standard Karl Storz 19 Fr cystoscopy sheath (23 cm) with a 30-degree lens was used for cystoscopy (Figure 1). The procedure was performed under local anaesthesia using lignocaine 2% jelly instilled in the urethra for 15 minutes before the procedure. The cystoscope was introduced in standard fashion into the bladder and then withdrawn under vision till the level of the bladder neck and fixed. The penis was not under any stretch during this time. Subtracting the number of 1 cm marking outside the meatus from 23 gave us the length of the urethra from the bladder neck to the meatus. We did not individually measure the penile, bulbar, prostatic or membranous urethra length.

RESULTS

Of the male patients who underwent urethrocystoscopy between November 2020 to January 2021, 120 patients between 18 and 72 years old (mean 40.3 years, SD +13.74) fit the inclusion criteria. The mean urethral length in our group was 18.45 cm with SD + 1.78 cm and a range between 14 cm to 23 cm. Patients in the 31-40 age group (n=38) formed a majority of the study participants. The 51-60 age group had the longest urethral length with a mean value of 18.95 cm. The

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relationship between age and urethral length is shown in Table 1.

Figure 1

Table 1

Age	No of patients	Min-Max	Mean
18 - 20	9	17 - 22	18.50
21 - 30	24	16 - 20	18.22
31 - 40	38	14 - 22	18.30
41 - 50	20	15 - 21.5	18.40
51 - 60	23	14 - 23	18.95
61 - 70	5	17 - 19.5	18.5
71 - 80	4	18 - 19	18.37

DISCUSSION

Evidence or literature regarding male urethral length is sparse. Despite hundreds of thousands of endourology procedures carried out worldwide every day, the opportunity to accurately document urethral length has gone unmet.

The preliminary studies to assess the urethra were carried out by Sir Henry Gray [2], who relied on cadaveric dissection to study the urethral anatomy. Whilst this may be considered the most accurate way to evaluate the length, drawbacks include small numbers available for data collection, lack of ethnic inclusion, and possible effects of rigour mortis and preservation on the cadaveric tissue.

Krishnamoorthy *et al* [5] published the only available data about male urethral length amongst 422 subjects in the Indian population. They devised a simple method using a foley catheter to measure the urethral length by subtracting the extra-meatal length of a standard-size foley catheter. The mean urethral length in their subgroup of patients was 17.55 cm which is almost 1 cm shorter when compared to our findings. However, this discrepancy is possibly due to the pliant nature of foley catheters.

Kohler *et al* [4] were probably the first and only group to use a flexible cystoscope to measure the urethral length of 30 patients, along with using a Foley catheter in 79 patients. The mean urethral length in their study was 22.4 cm demonstrating the contrast in anatomy between the Caucasian and south-east Asian populations. Their study also found no impact of BMI, height, weight and age on urethral length. In contrast, we noticed an increase in the length of the urethra up to the 6th decade of life followed by a gradual fall, even though the number of subjects in the 6th to 8th decade in our study was small.

Ryu [6] shared their experience of using MRI to evaluate the urethra. While this can be highly accurate, the major limitation is the cost of the procedure and the poor visualisation of the proximal prostatic and distal anterior urethra unless a Foley catheter is in place before the study.

In addition to providing anatomical information about urethral length, our study can also potentially guide urologists treating urethral stricture disease in accurately predicting the level of obstruction.

CONCLUSION

The male urethra of the Indian population is significantly shorter compared to the Caucasian counterparts. There seems to be a direct effect of age on the urethral length in our study, but more studies are required to bring out more accurate data by including people from all ethnicities. Our study adds to the basic anatomical information about the male urethra and can aid as a reference for imparting anatomical knowledge to medical students.

Conflict of interest - None

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