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A CROSS-SECTIONAL STUDY OF SONOGRAPHIC EVALUATION OF MALE ANTERIOR URETHRAL ANOMALIES IN A TERTIARY HOSPITAL IN CENTRAL INDIA.

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ABSTRACT

Background: The purpose of this study is to assess the utility of sonourethrography in the diagnosis of male anterior urethral anomalies.

Aims & Objectives: The purpose of this study was to determine the role of sonourethrography in the assessment of male anterior urethral lesions. In order to detect anterior urethral lesions, the sensitivity of ascending urethrography and sonourethrography were compared.

Materials and Methods: Source of data: Patients with voiding difficulties were directed to the department of urology and radiology at a tertiary health care hospital in Central India.

Method of collection of data: Patients with voiding problems underwent a conventional radiographic retrograde urethrogram followed by a sonourethrogram.

Results: - A total of 80 people were chosen for the investigation. RGU and SUG were performed on all 80 patients. RGU had a pathology detection rate of 58 percent, whereas SUG had a pathology detection rate of 63 percent. RGU had an 83 percent stricture detection rate, but SUG had a 100 percent stricture detection rate. RGU had a urethritis detection rate of 83 percent, while SUG had a rate of 100 percent. RGU and SUG both have 100% detection rates for diverticulae. RGU had a 50% detection rate for periurethral cysts, but SUG had a 100% detection rate.

Conclusions: Sonourethrography takes less time than radiographic retrograde urethrography, is simple to use, does not require iodinated contrast medium, and poses no radiation risks.

Keywords: sono urethrogram, retrograde urethrogram, Urethritis.

INTRODUCTION:

The urethra, the final passage of the lower urinary tract, is affected by a variety of disorders. Urethritis is caused by a variety of sexually and non-sexually transmitted illnesses. It is a common site for strictures caused by infections, trauma, or iatrogenic medications[1]. Even while congenital defects are uncommon, they do occur. Urethral diseases can also be caused by pathologies of exterior structures such as the Littre bulbo-urethral glands and Cowper's glands[2]. Conventional retrograde and antegrade urethrography, as well as voiding cystourethrography, were the usual studies for the anterior urethra until recently. Their limits in accurately evaluating urethral disorders, however, are well known. They can only provide a rough estimate of the length of the stricture and can't determine the depth of scar formation[3]. They simply give you the luminal anatomy and don't tell you anything about the periurethral structures or the level of fibrosis. Ultrasound imaging of the kidneys, urinary bladder, scrotum, and prostate has advanced tremendously in the previous decade and is now frequently employed[4]. A few papers on the use of ultrasonography in the evaluation of urethral stricture disease have recently surfaced in western countries as well as India. They've confirmed its benefits. However, there have been few reports of its usage in other urethral anomalies, and it is not frequently utilised[5]. Sonourethrography, or ultrasonography of the anterior urethra, provides a dynamic, three-dimensional scan that can be easily repeated without ionising radiation to the gonads[6]. It also has the potential to define the stricture as well as the state of peri-urethral structures. The best surgical strategy can now be chosen more simply thanks to this new technology.

Aims & objectives: The purpose of this study is to assess the utility of sonourethrography in the diagnosis of male anterior urethral anomalies. The following were the goals of the research: The purpose of this study was to determine the role of sonourethrography in the diagnosis of male

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anterior urethral abnormalities. In order to detect anterior urethral lesions, the sensitivity of ascending urethrography and sonourethrography were compared.

Materials and Methods

Source of data: Patients with voiding difficulties were directed to the department of urology and radiology at a tertiary health care hospital in Central India.

Method of collection of data: Patients with voiding problems underwent a conventional radiographic retrograde urethrogram followed by a sonourethrogram.

Inclusion criteria: All male patients with voiding problems related to the anterior urethra, such as straining and a weak urine stream and a uroflowmetry report with plateau curve.

Exclusion criteria: All female patients. All patients with diagnosed posterior urethral and prostatic conditions.

Method of examination: The process of retrograde urethrography and sonourethrography, as well as the aim of both tests, were explained to the study's participants. Patients' written consent was acquired. Throughout the examinations, patients' privacy was respected.

The patients who were chosen for the study were first assessed using traditional radiographic retrograde urethrography. Patients were taken for sonourethrography after conventional retrograde urethrography. Patients were asked to lie supine on the ultrasound examination table with their hips and knees extended. In the distal region of the urethra, a thin polythene catheter was linked to a 20 ml syringe filled with normal saline. The catheter was kept in place by exerting pressure to the glans of the penis and holding it between the examiner's left index and middle fingers. While using a linear transducer with a frequency of 7.5-10 MHz to examine the penis sonographically, saline was gradually injected. The Esoate Biomedica AU5 sonography machine with a linear transducer of 7.5-10 MHz was employed in our research. By positioning the transducer across both the dorsal and ventral portions of the penis, pictures were produced in both sagittal and transverse sections. When necessary, the trans perineal technique was used. On normal conventional radiograms, the results of retrograde urethrography were recorded. The results of the sonourethrogram were saved on the sonography unit's memory disc. In the framework created for the study, the results of both assessments were tallied. The study's findings were then subjected to statistical significance tests. The sensitivities were computed statistically. Percentage sensitivities of pathology detection rates were used to examine the results of both examinations.

Results

Table 1: Various details of subjects

	Number
Subjects selected For study	80
Subjects underwent RGU	80
Subjects underwent SUG	80
Pathologies detected	50
Normal studies	30

80 subjects were selected for the study. All the 80 patients underwent RGU and SUG

Table 2: Pathology detection rates of RGU and SUG in 40 patients presented with voiding difficulties

Character	Pathology	Normal	Percentage
R G U	46	34	58
S U G	50	30	63

Pathology detection rates of RGU was 58 % and Pathology detection rates of SUG 63 %.

Table 3: Stricture detection rates of RGU and SUG

Character	Number	Percentage
Total strictures detected	36	100
Detected on RGU	30	83
Detected on SUG	36	100

Stricture detection rates of RGU was 83 % whereas in SUG it was 100 %.

Table 4: Urethritis detection rates of RGU and SUG

Character	Number	Percentage
Total urethritis detected	20	100
Detected on RGU	18	90
Detected on SUG	20	100

Urethritis detection rates of RGU was 83 % whereas in SUG it was 100 %.

Table 5: Diverticulae detection rates of RGU and SUG

Character	Number	Percentage
Total diverticulae detected	2	100
Detected on RGU	2	100
Detected on SUG	2	100

Diverticulae detection rates of RGU and SUG was 100 %

Table 6: Periurethral cysts detection rates of RGU and SUG

Character	Number	Percentage
Total periurethral cysts detected	4	100
Detected on RGU	2	50
Detected on SUG	4	100

Periurethral cysts detection rates of RGU was 50 % and whereas in SUG it was 100 %.

Table 7: Percentage sensitivities of SUG and RGU in detecting different pathologies

Character	SUG	RGU
Strictures	100	83
Urethritis	100	90
Diverticulae	100	100
Periurethral cysts	100	50

Discussion

The urethra, the final passage of the lower urinary tract, is affected by a wide range of diseases. Urethritis is caused by a variety of sexually and non-sexually transmitted illnesses. It is a common site for strictures caused by infections, trauma, or iatrogenic medications[7]. Even while congenital defects are uncommon, they do occur. Urethral diseases can also be caused by pathologies of exterior structures such as the Littre bulbo-urethral glands and Cowper's glands. Conventional retrograde and antegrade urethrography, as well as voiding cysto urethrography, were the usual examinations for the anterior urethra until recently[8]. Their limits in accurately evaluating urethral disorders, however, are well known. They can only provide a rough estimate of the length of the stricture and can't determine the depth of scar formation. They simply give you the luminal anatomy and don't tell you anything about the periurethral structures or the level of fibrosis[9]. They employ radiation and are hence linked to radiation risks. Ultrasonography has come a long way in the last decade. A few studies on the use of ultrasonography in the diagnosis of urethral stricture illness have recently been published. They've confirmed its benefits[10]. However, there are few reports on its use in other urethral problems. The goal of this study is to see how useful sonourethrography is in diagnosing male anterior urethral anomalies. Urethral anomalies have been documented since Aristotle's time. Conventional radiographic retrograde urethrography was the gold standard for urethral abnormalities evaluation until 1984. Mathew F Rifkin published trans- rectal endosonography as a viable method for evaluating the prostatic urethra in the year 1984. The article was published in the December 1984 issue of Radiology. Ultrasonography's efficacy in the examination of urethral anomalies has been studied since then. Mc Aninch, Jack W. Faye C Laing and R Brooke Jaffrey, Jr. used conventional retrograde urethrography and sonourethrography to examine 17 individuals with probable stricture illness[11]. In seven patients, they compared the length of stricture as measured by each imaging technique and open urethroplasty. When compared to conventional retrograde urethrography, they discovered that sonourethrography was consistently more accurate.

The length of strictures detected by sonourethrography was frequently greater than the length detected by traditional urethrography, according to our findings[12]. Clifford d. Gluck, Albert L Bundy, Calliope Fine, and colleagues studied 22 patients with stricture illness. In 19 patients, sonourethrographic findings were found to be as diagnostic as roentgen findings. Sonourethrography revealed a bulbar urethral stricture in one patient that was not seen on retrograde urethrography[13]. All strictures found on retrograde urethrography were visible on sonourethrography in our investigation. Sonourethrography also revealed three strictures that were not seen on retrograde urethrography. Retrograde urethrography could not be performed in four cases because the stricture was complete, lengthy, and started from the meatus itself. We used sonourethrography to delineate the distal extent of the stricture by forcing saline into the meatus while maintaining the glans closed. The patients were then advised to strain in order to demonstrate the proximal extent of the stricture by outlining the proximal urethra with urine. In 1993, Gupta S, Majumdar B, Tiwari A, and colleagues used roentgenographic and sonographic techniques to assess 30 patients with urethral strictures, ranging in age from 19 to 77 years. In 28 individuals, they discovered 29 urethral strictures. They also discovered that the stricture seemed shorter on radiographic study than on sonourethrography in the majority of patients[14]. This was especially true for urethral strictures in the proximal penile, bulbopenile, and bulbar regions. We also discovered a disparity in length measuring using roentgenographic and sonographic techniques in our research. The majority of the time, sonourethrographic measurements revealed higher stricture length. During a 7-year period in 1995, Peter A Nash, Jack W Mc Aninch, Jeremy E Bruce, and Douglas K Hanks evaluated 123 instances with sonourethrographic and traditional retrourethrographic examinations. Sonourethrography was found to be effective in detecting urethral calculi, diverticulae, and false passageways. In every case, it properly detected the stricture and its location[15]. The lengths of strictures measured by urethrography and those measured by sonourethrography differed significantly. In every way, the findings of our research back up their claims. Ravi Pushkarna, S K Bhargava, and Mukta Jain studied patients with urethral strictures in the year 2000. All patients had standard retrograde urethrography followed by sonourethrography, which was done independently by different observers. They found anomalies of the anterior urethra in ten of the 20 patients they examined with urethral strictures. Six of them had anterior urethral strictures, three showed urethritis, and one showed urethral diverticula. On retrograde urethrogram and sonourethrography, five of the six strictures were discovered. On sonourethrography, one patient who appeared normal on retrograde urethrography had a minor 2 mm stricture. Sonourethrography revealed the length of strictures in all patients, which ranged from 2 mm to 1 cm. On retrograde urethrography, three patients displayed urethritis, which was well-appreciated on sonourethrography. On retrograde urethrography, one patient displayed a diverticulum, which was highly associated with sonourethrography. We found 36 strictures, 20 cases of urethritis, 4 periurethral cysts, 2 fistulas, and 2 diverticula in our sonourethrography investigation. Only 30 strictures, 18 cases of urethritis, 2 periurethral cysts, 2 fistulas, and 2 diverticula were seen on retrograde urethrography, while only 30 strictures, 18 cases of urethritis, 2 periurethral cysts, 2 fistulas, and 2 diverticula were seen on retrograde urethrography. As a result, sonourethrography was found to have a higher rate of pathology detection.

Conclusions

Sonourethrography takes less time than radiographic retrograde urethrography, is simple to use, does not require iodinated contrast medium, and poses no radiation risks. It's a three-dimensional, real-time experiment that can be replicated without risk. Periurethral diseases such as periurethral cysts and spongiofibrosis are also well visible. The study's only flaw is that it does not show the entire urethra in a single panoramic picture. We conclude by proposing the routine use of sonourethrography for the examination of anterior urethral anomalies, given all of the benefits of the technology.

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