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**Sureshkumar K**  
PG Junior Resident, Department  
of Surgery, Shyam Shah Medical  
College, Rewa, Madhya Pradesh,  
India

**Shukla PK**  
Assistant Professor (Urology),  
Department of Urology, Shyam  
Shah Medical College, Rewa,  
Madhya Pradesh, India

**Gaharwar APS**  
Professor, Department of Surgery,  
Shyam Shah Medical College,  
Rewa, Madhya Pradesh, India

**Jeswani M**  
PG Junior Resident, Department  
of Surgery, Shyam Shah Medical  
College, Rewa, Madhya Pradesh,  
India

**Sahu S**  
PG Junior Resident, Department  
of Surgery, Shyam Shah Medical  
College, Rewa, Madhya Pradesh,  
India

**Corresponding Author:**  
**Shukla PK**  
Assistant Professor (Urology),  
Department of Urology, Shyam  
Shah Medical College, Rewa,  
Madhya Pradesh, India

## Role of visual internal urethrotomy in the management of short segment urethral stricture in male

Sureshkumar K, Shukla PK, Gaharwar APS, Jeswani M and Sahu S

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### Abstract

**Introduction:** To study the Role of Visual Internal Urethrotomy in the Management of Short Segment Urethral Stricture in Male.

**Materials and Methods:** A total of 59 diagnosed short segment urethral stricture male patients who underwent for Visual Internal Urethrotomy from Jan 2018 to May 2019 were studied. The preoperative and postoperative AUA score, Uroflowmetry, Postvoidal residual urine were used to evaluate the effect of visual internal urethrotomy. Paired t test is used for statistical analysis of the result.

**Result:** The postoperative AUA score, uroflowmetry changes and postvoidal residual urine were improved significantly. There was significant change in the AUA score after VIU from  $17.52 \pm 11.53$  preoperatively to  $10.28 \pm 05.25$  and  $09.88 \pm 07.96$  on postoperative 4<sup>th</sup> and 12<sup>th</sup> weeks ( $p < 0.0001$ ). There was significant change in the postvoidal residual urine from  $149.75 \pm 58.66$  ml preoperatively to  $35.56 \pm 39.52$  ml and  $41.64 \pm 80.05$  ml postoperatively at 4<sup>th</sup> and 12<sup>th</sup> week respectively ( $p < 0.0001$ ). The mean stricture length of patients who underwent VIU was  $1.74 \pm 1.86$  cm and the recurrence rate was 14.25% for length  $\geq 2$ cm and 7.89% for length  $< 2$ cm. Among the uroflowmetry parameters there was significant change in the maximum flow rate (Qm) from  $10.20 \pm 6.22$  ml/s preoperatively to  $22.93 \pm 8.60$  ml/s and  $21.90 \pm 10.63$  ml/s postoperatively on 4<sup>th</sup> and 12<sup>th</sup> week respectively ( $p < 0.0001$ ). It was also found that the average flow rate in uroflowmetry had a significant change preoperatively from  $4.36 \pm 3.20$  ml/s to  $13.80 \pm 6.04$  ml/s and  $13.17 \pm 7.14$  ml/s postoperatively on 4<sup>th</sup> and 12<sup>th</sup> weeks respectively ( $p < 0.0001$ ). The mean voided volume of patients who underwent for VIU found to have  $236.42 \pm 137.40$  ml preoperatively, whereas at 4<sup>th</sup> and 12<sup>th</sup> postoperative weeks it was  $415.12 \pm 174.40$  ml and  $397.88 \pm 216.01$  ml respectively and the p value found to be  $< 0.0001$  which was significant. So it is evident that VIU have significant effect over voided volume. Patients with mild spongiofibrosis have got 100% success rate. Those patient who got severe spongiofibrosis have got a recurrence rate of 37.5% and moderate spongiofibrosis got a recurrence rate of 12%. Those patients who practiced clean intermittent self-catheterization after VIU had a good result ( $p = 0.0023$ ) at the end of 12<sup>th</sup> postoperative week. The success rate of VIU at the end of 12<sup>th</sup> postoperative week found to be 89.83%.

**Conclusion:** Visual Internal Urethrotomy is a safe, minimally invasive, easy and time effective procedure for the treatment of short segment urethral strictures in male patients as a short term management. In short segment stricture urethra patients with mild spongiofibrosis, a single attempt of Visual Internal Urethrotomy can be considered as an initial procedure for short term management. Clean Intermittent Self Catheterization is to be advised to the patients for further effective outcome of urethrotomy.

**Keywords:** Stricture urethra, visual internal urethrotomy, uroflowmetry

### Introduction

Urethral stricture is the narrowing of the urethra and is described as a scar of the sub-epithelial tissue of the corpus spongiosum that constricts the urethral lumen. As the constriction progresses, obstruction develops and leads to symptoms either directly related to the obstruction or as secondary consequences. The most common cause is idiopathic in developed countries and trauma to perineum, pelvis or any instrumentation in developing countries [1]. Iatrogenic injuries, such as oversized resectoscope at the time of transurethral surgery and traumatic placement of indwelling urinary catheters, account for 45 percent of all cases [2]. The other causes include infection, hypospadias, skin conditions (most commonly lichen sclerosus), trauma, carcinoma and radiation therapy. Also, stricture urethra gives rise to wide range of symptoms and signs mandating definitive treatment at some point of time in patient's life.

There are different treatment modalities available for stricture urethra but among them the internal urethrotomy gained significant level of approach among urologists because of its

simplicity, ease and short learning curve [3, 4]. The first blind internal urethrotome by Civiale and Otitis in 18<sup>th</sup> century but failed to gain much popularity because of their complications and poor result. After the introduction of endoscopic optical system by Hopkins 1960 and later Sachse 1970 much improvement was found in recurrence rate [5]. In spite of its variable success rate, its long term effect is challenging to us. Trials are being conducted to improve its efficacy with adjuvant modalities. Various factors for recurrence following urethrotomy are studied and still research is going on to overcome its limitation [6-10]. In India, considering over the economic background urethrotomy is considered effective for initial management of stricture urethra. Thus it is important to study the role of visual internal urethrotomy in the management of short segment urethral stricture in male.

### Materials and Methods

The study was conducted as a prospective study in Sanjay Gandhi Memorial Hospital, Rewa, Madhya Pradesh, India.

**Inclusion criteria:** Male Patients of all age group with stricture urethra.

**Exclusion criteria :** Critically ill patients, acute retention of urine due to benign prostatic hypertrophy, patients with neurogenic bladder and patients who failed to come for follow-up. So, a total 59 patients were selected to study the role of Visual Internal Urethrotomy in the management of short segment stricture urethra. Patients were prepared for routine elective OT after getting preanaesthetic checkup. Preoperative antibiotics like third generation cephalosporin given and patients were posted for VIU. The stricture was incised at 12<sup>o</sup> clock position using Sachse urethrotome with a 21 Fr Cystoscope sheath and a 12<sup>o</sup> telescope. The primary incision extended both proximally and distally into macroscopically normal urethral tissue, and the bleeding points were left undiathermized. Some patients were operated under local anesthetic infiltration with 2% lignocaine gel per urethral. After VIU patients were kept catheterized for 3 to 7 days depending on the degree of spongiofibrosis. Patients were discharged on next day after VIU and advised to come after one week for voiding trial. Then they were reviewed at 4<sup>th</sup> postoperative and 12<sup>th</sup> postoperative weeks to evaluate for recurrence. Meantime patients were advised for clean intermittent self-catheterization (CISC) twice weekly for first 4 weeks then once weekly in the upcoming weeks. The patient's data were charted in Microsoft excel 2016 software and statistical data were analyzed in Graph pad prism 8 software. Paired student t test, one-way ANOVA test and chi square tests were used for statistical analysis and p value <0.05 set as significant and results were obtained as per parameters.

### Result

In the present study, there was significant change in the AUA score after VIU from  $17.52 \pm 11.53$  preoperatively to  $10.28 \pm 05.25$  and  $09.88 \pm 07.96$  on postoperative 4<sup>th</sup> and 12<sup>th</sup> weeks ( $p < 0.0001$ ) (figure-1). There was significant change in the postvoidal residual urine from  $149.75 \pm 58.66$  ml preoperatively to  $35.56 \pm 39.52$  ml and  $41.64 \pm 80.05$  ml postoperatively at 4<sup>th</sup> and 12<sup>th</sup> week respectively ( $p < 0.0001$ ) (figure-2). The mean stricture length of patients who underwent VIU was  $1.74 \pm 1.86$  cm and the recurrence rate was 14.25% for length  $\geq 2$ cm and 7.89% for length  $< 2$ cm. Among the uroflowmetry parameters there was significant change in the maximum flow rate (Qm) from  $10.20 \pm 6.22$  ml/s preoperatively to  $22.93 \pm 8.60$  ml/s and

$21.90 \pm 10.63$  ml/s postoperatively on 4<sup>th</sup> and 12<sup>th</sup> week respectively ( $p < 0.0001$ ) (Table 1). It was also found that the average flow rate in uroflowmetry had a significant change preoperatively from  $4.36 \pm 3.20$  ml/s to  $13.80 \pm 6.04$  ml/s and  $13.17 \pm 7.14$  ml/s postoperatively on 4<sup>th</sup> and 12<sup>th</sup> weeks respectively ( $p < 0.0001$ ) (Table 2). The mean voided volume of patients who underwent for VIU found to have  $236.42 \pm 137.40$  ml preoperatively, whereas at 4<sup>th</sup> and 12<sup>th</sup> postoperative weeks it was  $415.12 \pm 174.40$  ml and  $397.88 \pm 216.01$  ml respectively. By using statistical test, the p value found to be  $< 0.0001$  which was significant (Table 3). So it is evident that VIU have significant effect over voided volume. Patients with mild spongiofibrosis have got 100% success rate. Those patient who got severe spongiofibrosis have got a recurrence rate of 37.5% and those with moderate spongiofibrosis got a recurrence rate of 12% (Table 4). Those patients who practiced clean intermittent self-catheterization after VIU had a good result ( $p = 0.0023$ ) at the end of 12<sup>th</sup> postoperative week (Table 5). The success rate of VIU at the end of 12<sup>th</sup> postoperative week found to be 89.83%.

### Discussion

Visual Internal Urethrotomy (VIU) is a very safe and relatively easy procedure to perform and to learn. This attribute has made it as the procedure of choice among many urologists worldwide for the treatment of short segment urethral stricture. Although Visual Internal Urethrotomy is being employed so widely, the fact remains that the strict guidelines governing the indications and the frequency of Visual Internal Urethrotomy are lacking. Similarly, there may be evidence in literature to suggest that repeated urethrotomy may actually aggravate the condition of the stricture. Therefore, it is wise to have some parameters that may be employed to predict the outcome of Visual Internal Urethrotomy in a particular patient so that it may be used more judiciously and on evidence basis. Objective variables that may forecast a better or a poorer outcome in a patient undergoing Visual Internal Urethrotomy may be extremely useful in patient selection. If proper patients are selected and taken for Visual internal Urethrotomy they will have good results for short term period.

In the present study those patients who underwent VIU (n=59) have got a significant decrease in AUA score ( $p < 0.0001$ ). So after VIU patients have got relief from obstructive symptoms significantly. There is also significant decrease in post voidal residual volume of urine after VIU ( $p < 0.0001$ ).

In the present study during VIU, mild spongiofibrosis was found in 44.07% (n=26), moderate spongiofibrosis in 42.37% (n=25) and severe spongiofibrosis in 13.56% (n=8). Among those patients who came for follow up, the recurrence rate was noted as 12% (n=3) in moderate spongiofibrosis and 37.5% (n= 3) in severe spongiofibrosis and no recurrence in mild type. So it is evident that if the degree of spongiofibrosis increases, the chance for recurrence also increase. There is still controversy in establishing the relation between degree of spongiofibrosis with urethrotomy but, certain studies suggest that if degree of spongiofibrosis is minimal or mild, then there was significant success rate after VIU [11, 12].

Uroflowmetry is a useful objective test to follow up patients postoperatively. In studies it has been found that maximum flow rate (Qm) of  $< 15$  ml/sec is considered as recurrence in an operated case of stricture urethra. In the present study the mean preoperative Qm was  $10.2 \pm 6.22$  ml/s and the mean Qm at 4<sup>th</sup> and 12<sup>th</sup> postoperative week were  $22.93 \pm 8.60$  ml/s and  $21.90 \pm 10.63$  ml/s respectively. By using paired t-test the p value found to be  $< 0.0001$  which is statistically significant. In a study by

Ankur Jhanwar *et al* the preoperative Qm in VIU group was  $5.3 \pm 1.96$  ml/sec and postoperative Qm at 3 months was  $23.4 \pm 2.71$  ml/sec.<sup>13</sup> In a study, Kenan I *et al* the mean preoperative Qm was 7.9ml/sec and after VIU with endoscopic scissors, the mean Qm was 19.4 ml/sec at third month of postoperative period<sup>14</sup> and these results are similar to present study. Pansadoro *et al* showed that recurrence could be diagnosed in 84% patients who had stricture recurrence in their series by using a peak flow rate of <15ml/sec<sup>15</sup>. Heyns and Marais *et al* showed that an AUA score of > 10 combined with a urine flow rate of < 15 ml/sec would save 34% of patients from further invasive testing such as urethrography, to rule out recurrence<sup>16</sup>. Also there is significant increase in average flow rate and voided volume by using uroflowmetry ( $p < 0.0001$ ). thus signifying that VIU have a beneficial effect in stricture urethra.

In the present study, the mean stricture length of patients who underwent VIU was  $1.74 \pm 1.86$  cm and the recurrence rate was 14.25% for length  $\geq 2$ cm and 7.89% for length <2cm. Santhosh Kumar *et al.*, in his study has got recurrence rate of 14.5% if length < 2cm and for 2-4cm with recurrence rate of 23.52% for VIU and these results were similar to present study. In a study by Shah JV *et al*, the results of visual internal urethrotomy were excellent in 60 (75%) patients who did not require any other treatment. Internal urethrotomy has excellent results with low recurrence rate in patients with short strictures.<sup>17</sup> In another study by Steenkemp JW *et al.*<sup>16</sup> it has been reported that the risk of stricture recurrence after VIU and urethral dilation was greatest at 6 months, whereas the risk of failure after 12 months was slight. The recurrence rate at 12 months was approximately 40% for strictures shorter than 2 cm and 80% for strictures longer than 4cms, whereas the recurrence rate for strictures 2-4cms long increased from approximately 50% at 12 months to approximately 75% at 48 months.

In the present study the success rate of short segment stricture urethra patients who underwent for VIU was 89.83%(n=53) and the recurrence rate was 10.17% (n=6) at the end of 12<sup>th</sup> week of followup. Ramyil VM *et al* in his study reported a success rate of 80% after internal urethrotomy<sup>18</sup> and these results were similar to present study. Also in the follow-up postoperative period 52 patients have regularly done CISC, 49 patients have got success and 3 patients got recurrence when compared to those not done CISC ( $p=0.0023$ ). From the study it is also evident that CISC following VIU plays an important role in its outcome. In a randomized study, Harriss *et al.*<sup>19</sup> showed that biweekly CISC, when continued for longer than 12 months, had a much lower rate of stricture recurrence (16%) when compared with the group that performed CISC for 6 months (40%). In a review study by Jackson MJ *et al* concluded that performing intermittent self-dilatation may confer a reduced risk of recurrent urethral stricture after endoscopic treatment<sup>20</sup>.

The limitation of present study is that the duration of study was short, which limits us in evaluation of long term results of visual internal urethrotomy.

**Conclusion**

Visual Internal Urethrotomy is a safe, minimally invasive, easy and time effective procedure for the treatment of short segment urethral strictures in male patients as a short term management. In short segment stricture urethra patients with mild spongiofibrosis, a single attempt of Visual Internal Urethrotomy can be considered as an initial procedure for short term management. Clean Intermittent Self Catheterization is to be advised to the patients for further effective outcome of urethrotomy. Urethroplasty has been recommend in patients with recurrent strictures after internal urethrotomy.

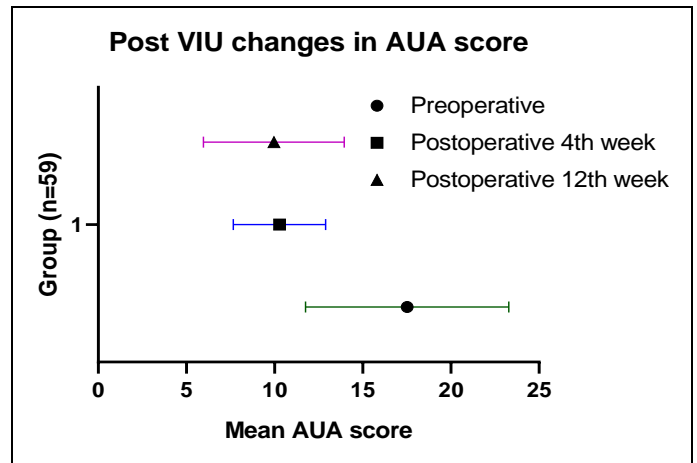


Fig 1: Post VIU changes in AUA score

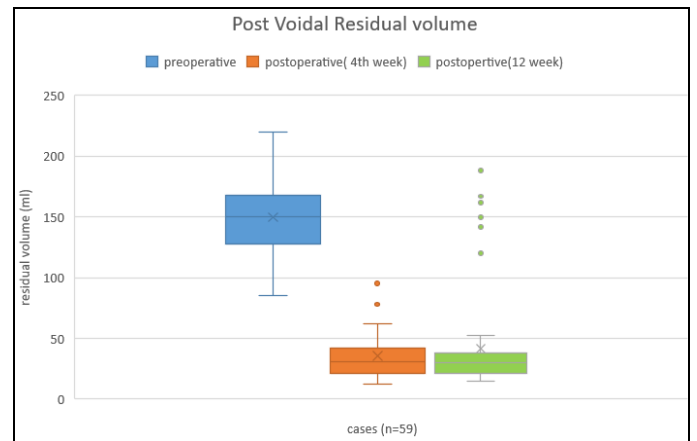


Fig 2: Post VIU changes in residual urine (n=59)

**Table 1:** Post VIU changes in Maximum flow rate in uroflowmetry (Qm)

Sl.no	Period	Mean maximum flow rate (Q m) ml/s (n=59)	P value
1	Preoperative	$10.20 \pm 6.22$	P value < 0.0001
2	Postoperative (4 <sup>th</sup> week)	$22.93 \pm 8.60$	
3	Postoperative (12 <sup>th</sup> week)	$21.90 \pm 10.63$	

**Table 2:** Post VIU changes in Average flow rate in uroflowmetry (Qavg)

Sl.no	Period	Mean of average flow rate (Q avg) in ml/s (n=59)	P value
1	Preoperative	$4.36 \pm 3.20$	P value < 0.0001
2	Postoperative (4 <sup>th</sup> week)	$13.80 \pm 6.04$	
3	Postoperative (12 <sup>th</sup> week)	$13.17 \pm 7.14$	

**Table 3:** Post VIU changes in voided volume

Sl.no	Period	Mean voided volume in ml (n=59)	P value
1	Preoperative	236.42 ± 137.40	P value < 0.0001
2	Postoperative (4 <sup>th</sup> week)	415.12 ± 174.40	
3	Postoperative (12 <sup>th</sup> week)	397.88 ± 216.01	

**Table 4:** Spongiofibrosis and its relation with outcome of VIU cases

Sl.no	Degree of Spongiofibrosis	Visual Internal Urethrotomy cases (n=59)				
		Total	Success	Success Percentage	Recurrence	Recurrence Percentage
1	Mild	26	26	100.0%	0	00.00%
2	Moderate	25	22	88.00%	3	12.00%
3	Severe	8	5	62.50%	3	37.50%
4	Total	59	53	89.83%	6	10.17%

**Table 5:** Clean intermittent Self catheterization (CISC) and its role in outcome of VIU

Sl. no	Self-catheterization (CISC)	No of cases	Recurrence		No recurrence		P value
			N	%	N	%	
1	YES	52	3	05.76	49	94.24	P value 0.0023
2	NO	07	3	42.85	4	57.14	
3	TOTAL	59	6	10.17	53	89.83	

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