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Predicting the Outcome of Optical Internal Urethrotomy In Short Bulbar Urethral Stricture

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Abstract: *The Incidence Of Urethral Stricture In The West, The Incidence Is Around 0.6 % [2] And Is Probably Higher In India.Trauma Has Taken Over Infection As The Commonest Cause. The Success Rates Of Internal Urethrotomy Is Not Very Encouraging Compared To Urethroplasty. Among Various Factors, The Percentage Of Narrowing At The Point Of The Maximum Stricture On A Retrograde Urethrogram Is Least Studied.*

Aims: *The Aim Is To Evaluate Patients With Urethral Stricture Disease At Our Institution And Predict The Outcome Of Optical Internal Urethrotomy For Short Bulbar Strictures By Measuring The Percentage Of Narrowing At The Stricture On The Retrograde Urethrogram.*

Settings And Design: *The Study Was A Prospective Study Done For A Period Of One Year Between October 2014 To November 2015 In Department Of Urology, Meenakshi Medical College And Research Institute, Kanchipuram*

Methodology And Material : *Inclusion Criteria Being Patients With Primary Bulbar Stricture. Exclusion Criteria Being Patients With History Of Prior Intervention, Complete Block Of Urethral Lumen,Stricture Greater Than 2 Cm . Patients Who Had Any Prior Intervention Like Dilatation, Optical Internal Urethrotomy Or* ***Urethroplasty:*** *Were Excluded. Statistical AnalysisPercentage Arrived Using Crosstabs Contingency Coefficient Test To Yield P Value.*

Results: *Out Of 37 Patients, The Percentage Narrowing Was Calculated From Retrograde Urethrogram With Scale Or Vernier Calipers. It Was Found, Out Of 37 Cases, 13 Patients Had Narrowing In Range Of 71 – 80%; 12 Patients In Range Of 62 – 70%; 6 Patients In The Range Of 40 – 50%; 4 Patients In Range Of 51 – 60% And 2 Patients In Range Of 81 – 90%. In Our Study, Out Of 11 Patients Who Did Not Have Recurrence, 6 Patients Had Percentage Narrowing In Range Of 40 – 50%; 4 Patients Had Percentage Narrowing In Range Of 51 – 60% And One Patient Had Percentage Narrowing In Range Of 61 – 70%.*

Conclusions:*In Our Study, Patients With Percentage Narrowing Of Less Than 60% On Retrograde Urethrogram Had Better Outcome Than Percentage More Than That (P-Value 0.001**). Alternate Treatment May Be Considered For Patients Having High Degree Narrowing On Retrograde Urethrogram.*

Keywords*: Short Bulbar Stricture, Urethral Stricture, Optical Internal Urethrotomy*

I. Introduction

Urethral Stricture Is A Relatively Common Urological Disorder Which Every Urologist Encounters In His Regular Urological Practice. They Pose A Significant Problem From Both Clinical And Economic Point Of View. It Is A Very Ancient Disease. It Has Even Been Described By Sushruta 1, The Ancient Indian Surgeon, As 'Mutra Marga Sankocha'; It Was Treated With Dilatation With A Stick Lubricated With Ghee.The Incidence Of Urethral Stricture Can Only Be Estimated At Best. In The West, The Incidence Is Around 0.6 % 2. The Incidence Is Probably Higher In India.The Etiology Of Stricture Urethra Has Changed Over Times. Trauma Has Taken Over Infection As The Commonest Cause. The Trauma Can Be Either External (Trauma) Or Internal (Instrumentation). Another Important Cause Is Balanitis Xerotica Obliterans Also Known As Lichen Sclerosus. In A Small Group Of Patients, No Particular Cause Can Be Made Out And They Are Grouped Under 'Idiopathic'The Management Of Stricture Has Also Evolved Over The Times. From Lubricated Reed In The Times Of Sushruta The Treatment Has Increased In Complexity To The Present Day Urethroplasties. Despite The Availability Of Various Options For The Treatment Of Stricture Urethra, Internal Urethrotomy Has Remained As A Popular Option Among The Urologists In View Of Its Simplicity, Safety And Shorter Learning Curve. Optical Internal Urethrotomy (Oiu) Is Best Suited For Single, Bulbar Strictures Shorter Than 2 Cm, With Minimal Spongiofibrosis And With No Past Internal Urethrotomy. Optical Internal Urethrotomy (Oiu) May Be Contra-Indicated In Suspected Urethral Malignancy, Coagulation Disorders Or Active Infection. Optical Internal Urethrotomy (Oiu) Is Not Suited For Long Strictures (>2 Cm), Multiple Strictures, Previous Optical Internal Urethrotomy (Oiu), Strictures Other Than Bulbar Where The Recurrence Rate May Be High And Unacceptable.

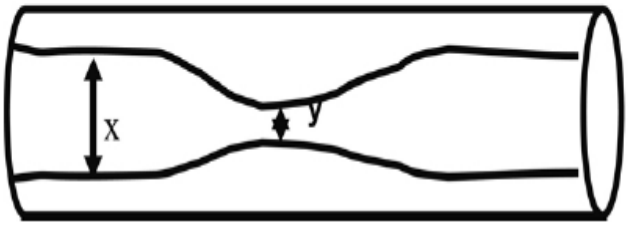
Despite Its Popularity, The Success Rates Of Internal Urethrotomy Is Not Very Encouraging Compared To Urethroplasty. The Reported Success Rates Of Internal Urethrotomy Varies From 60% To 90%.

Various Factors Responsible For Recurrence Have Been Investigated Like Age Of The Patient, Length Of The Stricture, Site Of The Stricture, Amount Of The Peri-Urethral Scarring, Diameter Of The Stricture Etc. Among These Various Factors, The Diameter Of The Stricture Or In Other Words The Percentage Of Narrowing At The Point Of The Maximum Stricture On A Retrograde Urethrogram Is The Least Studied.

Materials And MethodsStudy Design: Prospective Study
Duration: October 2014 To November 2015
Setting: Meenakshi Medical College And Research Institute,
Enathur, Kanchipuram
Inclusion Criteria: Patients With Primary Bulbar Stricture
Exclusion Criteria: Patients With A History Of Prior Intervention
Complete Block Of Urethral Lumen
Stricture Greater Than 2 Cm
Methodology:A Total Number Of 51 Patients Were Studied In The Above Specified Period. All Patients With Primary Bulbar Urethral Stricture Were Selected. Of Those Patients, The Ones Who Had Any Prior Intervention In The Form Of Dilatation, Optical Internal Urethrotomy Or Urethroplasty Were Excluded. All The Patients Underwent A Standardaised Preoperative Evaluation Including Basic Urine And Blood Chemistries, Uroflowmetry And A Good Quality Retrograde Urogram.

On The Retrograde Urethrogram Film, The Site Of The Maximal Narrowing Was Measured. The Diameter Of The Normal Lumen Distal To The Stricture Site Was Also Taken. The Distal Urethral Lumen Was Taken As Normal As This Part Is Maximally Distended While Performing A Urethrogram Rather Than The Urethral Proximal To The Stricture. The Percentage Narrowing Was Calculated.

$$\text{Percentage Narrowing} = [(x\text{-}y/x)\ 100]\%$$



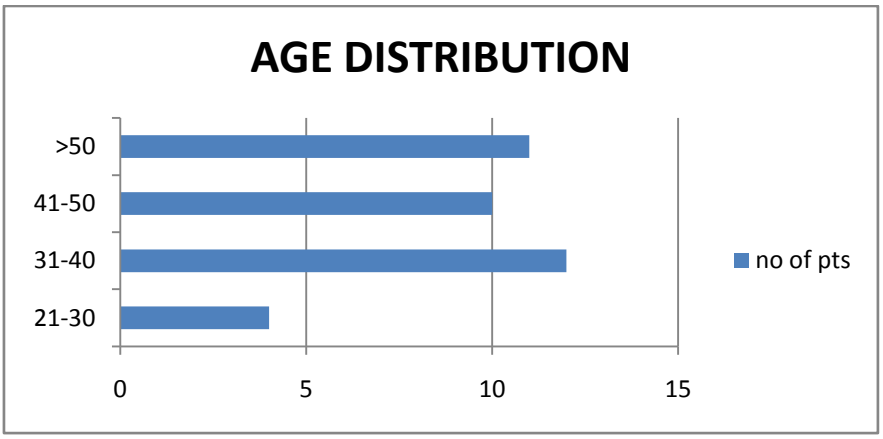
The Patients Were Then Subjected To Optical Internal Urethrotomy. Optical Internal Urethrotomy Was Done Using A Standard 20 Fr Sachse Urethrotome. Following Surgery The Patients Were Advised To Self-Dilate With 14 Fr Tieman Catheter Starting From The 3rd Day Of Removal Of Foleys. Foleys Was Removed On The 7th Post-Op Day. The Patients Were Advised To Self Dilate For Once Daily For The First Month And Then Once In 3 Days Later. Uroflowmetry Was Done At 3rd And 6th Months. Symptom Recurrence, Inability To Pass The Tiemans Catheter And The Necessity For Repeat Optical Internal Urethrotomy Were Taken As Treatment Failures.Ethics World Medical Association Declaration Of Helsinki Ethical Principles For
Medical Research Involving Human Subjects Were Followed During This Course Of
This Study.

II. Results

Age Distribution

Age In Years	Number Of Patients	Percentage
21 – 30	4	11%
31 – 40	12	32%
41 – 50	10	27%
>50	11	30%

In Our Study Of 37 Patients, Majority Of The Patients, Ie., 32% Of Them Were In The Age Group Of 31 – 40 Years;30% More Than 50 Years; 27 % In 41 – 50 Years And 4 Patients In The Age Group 21 – 30 Years.

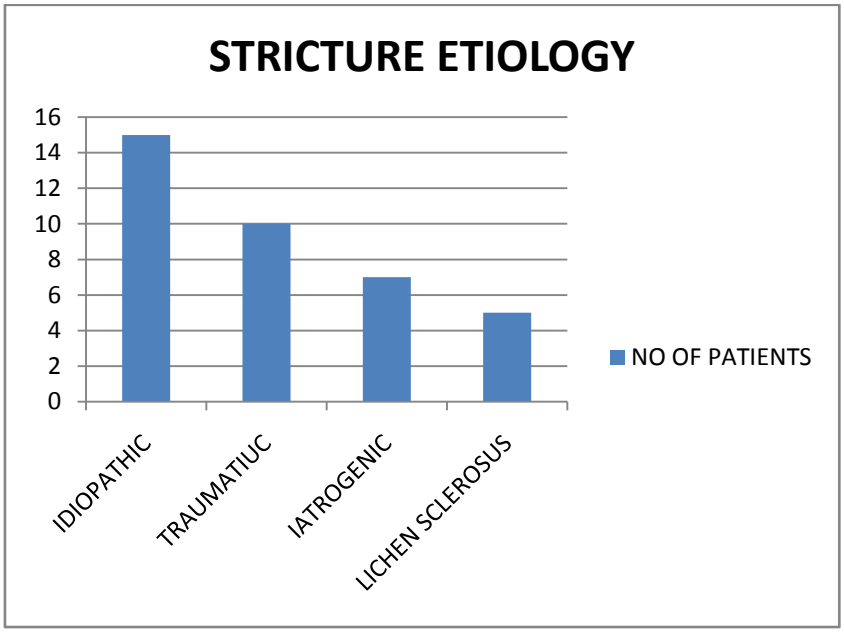


Bar Diagram Showing The Age Distribution

Etiology

Etiology	Number Of Patients	Percentage
Idiopathic	15	41%
Traumatic	10	27%
Iatrogenic	7	19%
Lichen Sclerosus	5	13%

In Our Study, The Most Common Etiology Was Found To Be Idiopathic (41%) Followed By Traumatic (10%), Iatrogenic (19%) And Finally Lichen Sclerosus (13%). Iatrogenic Causes Include Traumatic Catheterization Or Instrumentation.

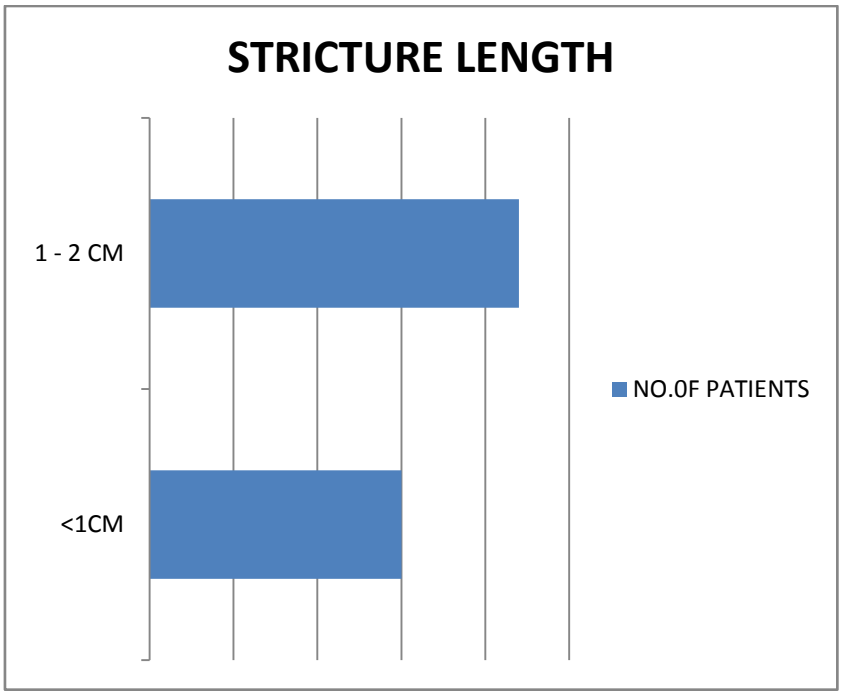


Bar Diagram Showing Stricture Etiology

Stricture Length

Stricture Length	Number Of Patients	Percentage
< 1cm	15	41 %
1 – 2 Cm	22	59%

In Our Study, 15 Patients (41 %) Had A Stricture Length Below 1 Cm And 22 Patients (59 %) Had A Stricture Length Between 1 And 2 Cm.

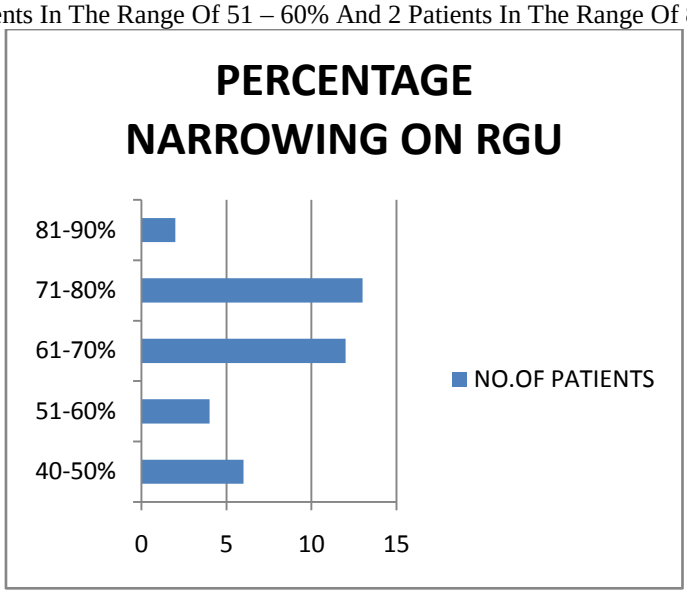


Bar Diagram Showing Stricture Length

Percentage Narrowing On Retrograde Urethrogram

Percentage Narrowing	Number Of Patients	Percentage
40 – 50 %	6	16%
51 – 60 %	4	12%
61 – 70 %	12	32%
71 – 80 %	13	35%
81 – 90 %	2	5%

The Percentage Narrowing Was Calculated From The Retrograde Urethrogram As Described Previously With The Help Of A Scale Or A Vernier Calipers. It Was Found That Out Of The 37 Cases, 13 Patients Had A Narrowing In The Range Of 71 – 80%; 12 Patients In The Range Of 62 – 70%; 6 Patients In The Range Of 40 %; 4 Patients In The Range Of 51 – 60% And 2 Patients In The Range Of 81 – 90%.



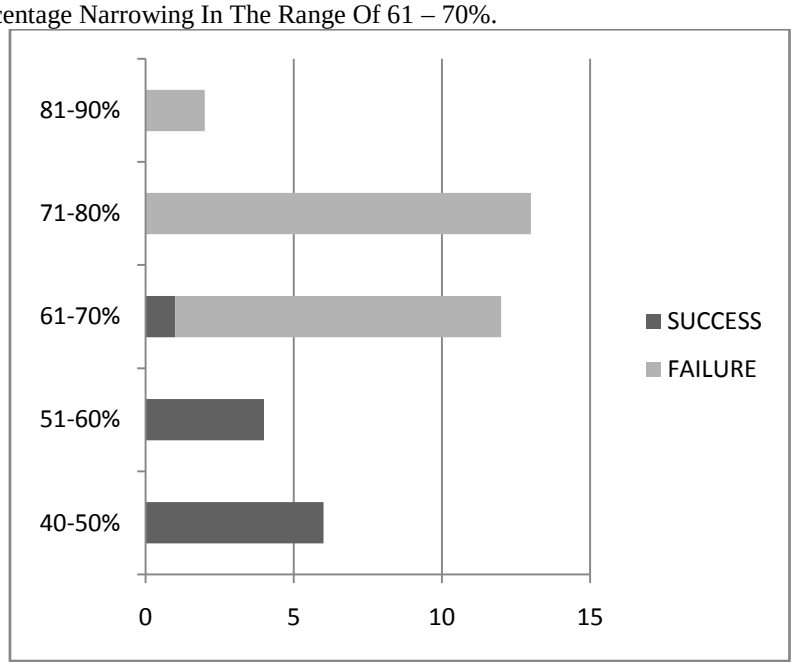
Bar Diagram Showing The Percentage Narrowing

Treatment Result According To Percentage Narrowing On The Retrograde Urethrogram

Percentage Narrowing	Treatment Success	Treatment Failure

40 – 50%	6	-
51– 60%	4	-
61 – 70%	1`	11
71 – 80%	-	13
81 – 90%	-	2

In Our Study, Out Of The 11 Patients Who Did Not Have Recurrence, 6 Patients Had A Percentage Narrowing In The Range Of 40 – 50%; 4 Patients Had A Percentage Narrowing In The Range Of 51 – 60% And One Patient Had A Percentage Narrowing In The Range Of 61 – 70%.

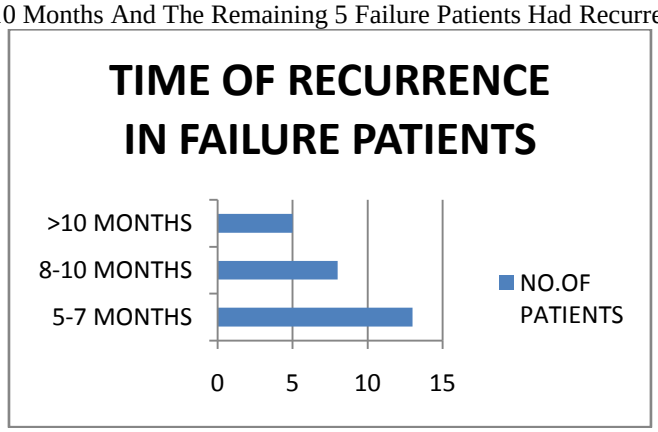


Bar Diagram Showing The Treatment Result According To The Percentage Narrowing On The Retrograde Urethrogram

Time Of Recurrence In Failure Cases

Time Of Recurrence	Number Of Patients
5 – 7 Months	13
8 – 10 Months	8
>10 Months	5

Most Of The Recurrences In The Failure Patients Occurred In The First 5 To 7 Months. In Our Study, Out Of The 26 Treatment Failure Cases, Around 13 Patients Failed In The First 5 To 7 Months. Around 8 Patients Failed In The First 8 To 10 Months And The Remaining 5 Failure Patients Had Recurrence After 10 Months.



Bar Diagram Showing Time Of Recurrence In Failure

Percentage Narrowing On Retrograde Urethrogram - Outcome Crosstabulation

			Outcome		Total	P Value
% On Rgu	<= 60	Count	8	1	9	<0.001**
		% Within % On Rgu	88.9%	11.1%	100.0%	
		% Within Outcome	72.7%	3.8%	24.3%	
	> 60	Count	3	25	28	
		% Within % On Rgu	10.7%	89.3%	100.0%	
		% Within Outcome	27.3%	96.2%	75.7%	
Total		Count	11	26	37	
		% Within % On Rgu	29.7%	70.3%	100.0%	
		% Within Outcome	100.0%	100.0%	100.0%	

*Note: ** Denotes Significant At 1% Level*

III. Discussion

Optical Internal Urethrotomy 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 Bulbar Urethral Stricture. But When Juxtaposed With Urethroplasty, The Success Rate Of Optical Internal Urethrotomy Is Modest, Ie., 50% Compared With 83% At 5 Years And At 10 Years It Is Around 33 %. Although Optical Internal Urethrotomy Is Being Employed So Widely, The Fact Remains That Strict Guidelines Governing The Indications And The Frequency Of Optical Internal Urethrotomy Are Lacking. Similarly, There May Be Evidence In Literature To Suggest That Repeat Optical Internal 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 Optical 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 Particular Patient Undergoing Optical Internal Urethrotomy May Be Extremely Useful In Patient Selection And Avoidance Of Unnecessary Oiu.

The Commonest Imaging Done To Evaluate A Patient Of Stricture Urethra Is Retrograde Urethrogram. But A Minor Disadvantage With It Is That At Times It May Underestimate The True Length Of The Stricture. Inspite Of The Above Minor Disadvantage, In Regular Urological Practice It Is The Commonest Imaging Modality Employed To Decide Upon Optical Internal Urethrotomy As A Management Choice For Short Segment Bulbar Stricture.

The Wall Of Normal Urethra Is Relatively Thin, Smooth And Pliable As Evidenced By A Normal Retrograde Urethrogram. But In Cases Of Stricture Or Any Other Urethral Pathology, There Is Frequently Fibrosis Of The Wall Of The Urethra Thus Making It Non-Pliable And Thick-Walled. This Fibrosis Of The Corpus Spongiosum Can Be Objectively Assessed By The Extent Of The Narrowing Of The Urethral Lumen On Retrograde Urethrogram. In Other Words, The Degree Of Spongiofibrosis Is Considered To Be A Crucial Parameter That Influences Appropriate Choice Of Treatment And The Outcome.

Usually, Sonourethrogram Is The Modality That Has Been Traditionally Used By Urologists To Assess The Degree Of Spongiofibrosis At The Stricture Site By Comparing The Lumen At The Stricture Site With That Of The Normal Urethra Distal To The Stricture Site. Although Sonourethrogram Is A Good Investigation To Assess The Degree Of Spongiofibrosis, It Is Hampered By The Fact That It Is Not Widely Available, It Is More Operator Dependent And Has A Relatively Low Sensitivity And Specificity.

Our Present Study Which Employs The Technique Of Measuring The Percentage Narrowing At The Site Of Maximal Narrowing On The Retrograde Urethrogram Is More Or Less An Extension Of The Scientific Precept Of Assessing Spongiofibrosis On A Sonourethrogram.

As In Sonourethrogram Where The Degree Of Spongiofibrosis Is Measured By Measuring The Degree Of Encroachment Of The Lumen At The Stricture Site, Here Also The Narrowing At The Maximal Stricture Site Is Measured On The Retrograde Urethrogram. In Other Words, The Extent Of The Luminal Narrowing On The Retrograde Urethrogram May Be Considered A Surrogate Marker For The Degree Of Spongiofibrosis At That Site. It Should Also Be Remembered That This Measurement Is Usually Not Influenced By The Position Of The Patient Since The Direction Of The X-Ray Beam Is Almost At Right Angles To The Length That Is Measured.

In Our Study, The Degree Of Narrowing Or In Other Words, The Percentage Of Narrowing At The Maximal Stricture Site On The Retrograde Urethrogram Was Found To Be Associated With The Outcome Of Optical Internal Urethrotomy .

Out Of The 37 Patients Who Had Undergone Optical Internal Urethrotomy In Our Study Period, 11 Patients Who Had A Narrowing Of Less Than 70% Had A Good Outcome. In Particular, All The 10 Patients Who Had A Narrowing In The Range Of 40 – 60% Had Good Outcome With No Recurrence Till Date. On The Other Hand, Out Of The Remaining 27 Patients Who Had A Narrowing Of More Than 60 % On The Retrograde Urethrogram 26 Patients Had Treatment Failure And Required Repeat Treatment At Some Point During The Follow-Up.Thus This Method Of Using The Percentage Narrowing At The Stricture Site On A Good Retrograde Urethrogram Is A Very Useful Method Of Judging The Degree Of Spongiofibrosis At The Stricture Site Which In Turn Can Be Used To Predict The Outcome Of Optical Internal Urethrotomy .Factors Which Can Influence The Measurement Are Under-Distension And Over-Distension Of The Distal Urethra Thus Affecting The Calculation Of The Percentage Since The Lumen Of The Distal Urethra Forms The Denominator In Our Calculation. In Order To Ascertain Correct Filling Of The Distal Urethra, A Few Hints May Be Taken Into Consideration. If There Is Entry Of Contrast Into Posterior Urethra, It Suggests A Correct Filling The Distal Urethra. In The Same Way If There Is Intravasation Of Contrast, It Denotes Overfilling And Such Urethrograms Must Be Excluded And A Fresh Retrograde Urethrogram May Be Ordered.Other Factors Like Length Of The Stricture, Site Of The Stricture And Etiology Of The Strictures Being Equal, The Degree Of Narrowing On The Retrograde Urethrogram May Play A Crucial Role In The Result Of Optical Internal Urethrotomy . Thus It May Be Used In Prognosticating Or Predicting The Outcome Of Optical Internal Urethrotomy.Studies Have Also Indicated That A Repeat Optical Internal Urethrotomy Does Not Alter The Overall Results, Thus A Repeat Optical Internal Urethrotomy May Not Afterall Be A Good Option In Cases Of Failures.Though There Is Nothing In The Literature To Say That Multiple Optical Internal Urethrotomies May Influence The Outcome Of A Future Urethroplasty, It Would Be Prudent To Restrain From Doing Multiple Oius In A Particular Patient As There Is A Chance Of Worsening The Fibrosis And Increasing The Length Of The Stricture Thereby Precluding The Possibility Of A Anastamotic Urethroplasty And Necessitating A Substitution Urethroplasty.Based On Our Present Study, Though The Sample Size Is Not Great, There Is A Rough Indication That Those Patients With A Percentage Narrowing Of Less Than 60% On The Retrograde Urethrogram Had A Better Outcome With Optical Internal Urethrotomy Than Those With A Percentage Narrowing Of More Than 60%. This Result Was Found To Be Statistically Significant With A P-Value Of <0.001**One Of The Limitations Which We Had Encountered In Our Study Was In The Follow-Up Of The Patients And The Compliance Of The Patients To Our Instructions. Though We Had Given Explicit Instructions To The Patient With Regard To The Follow-Up Timetable, Many Patients Turned Up Late And A Few Did Not Turn Up At All Who Were Excluded From The Study. In The Same Way, Though The Patients Were Properly Instructed And Demonstrated On The Clean Intermittent Self Catheterisation Technique, A Few Patients Had Not Performed It. Another Issue Was The Tool Used To Measure The Degree Of Narrowing On The Retrograde Urethrogram. Vernier Calipers Or A Conventional Foot Scale Was Used For Measuring. Sometimes The X-Ray Quality Was Not Good Enough To Allow Precise Measurement Of The Degree Of Narrowing Especially Conventional Film X-Rays. With Digital X-Rays It Was Possible To Measure The Narrowing On The Console. These Issues May Have To Be Addressed And Taken Into Consideration When Conducting And Interpreting Any Study Of This Nature And Similarity.

Acknowledgements

I Thank My Chief Prof. Radhakrishnan For Guiding Me Through This Study And Dr.Natarajan For Helping Me In Preparing This Original Article.

References (Bibliography)

[1] Das S. Urology In Ancient India. Indian J Urol 2007;23:2-5.
[2] Santucci Ra, Joyce Gf, Wise M (2007) Male Urethral Stricture Disease. J Urol 177:1667–1674
[3] Pansadoro V, Emiliozzi P (1999) Iatrogenic Prostatic Urethral Strictures: Classification And Endoscopic Treatment Urology 53:784–789
[4] Daniel M. Stein, D. Joseph Thum, Guido Barbagli, Sanjay Kulkarni Et Al, A Geographical Analysis Of Male Urethral Stricture Aetiology And Location, Bjui 2013: 112; 830-834.
[5] Devine Cj, Devine Pd, Felderman Tp, Burns Cn (1983) Classification And Standardization Of Urethral Strictures. J Urol A 325
[6] Mcaninch Jw, Laing Fc, Jeffrey Rj (1988) Sonourethrography In The Evaluation Of Urethral Stricture: A Preliminary Report. J Urol 139:294–297
[7] Barbagli Et Al (2004) Lichen Sclerosus Of The Male Genitalia And Urethral Stricture Diseases. Urol Int 73(1):1–5
[8] Rourke Kf, Jordan Gh (2005) Primary Urethral Reconstruction: The Cost Minimized Approach To The Bulbous Urethral Stricture. J Urol 173(4):1206–10
[9] Wright Jl Et Al (2006) What Is The Most Costeffective Treatment For 1 To 2-Cm Bulbar Urethral Strictures: Societal Approach Using Decision Analysis. Urology 67(5):889–93

[10] Steenkamp Jw, Heyns Cf, De Kock Ml (1997) Internal Urethrotomy Versus Dilation As Treatment For Male Urethral Strictures: A Prospective, Randomized Comparison. J Urol 157:98–101
[11] Carter Hb (2002) Basic Instrumentation And Cystoscopy. In: Walsh Pc, Retik Ab, Darracott Vaughan E, Wein Aj (Eds) Campbell's Urology. 8th Ed, Vol 2. Saunders, Philadelphia, Pp 114–116
[12] Lipsky H, Hubmer G. (1977) Direct Vision Urethrotomy In The Management Of Urethral Strictures. Br J Urol 49:725–728
[13] Djulepa J, Potempa J. (1983) Urethrotomy Technique In Urethral Strictures: 6-Year Results. J Urol 129:955–957
[14] Chiou Rk. (1999) Re: Treatment Of Male Urethral Strictures: Is Repeated Dilation Or Internal Urethrotomy Useful? J Urol 161:1583
[15] Stormont Tj, Suman Vj, Oesterling Je (1993) Newly Diagnosed Bulbar Urethral Strictures: Etiology And Outcome Of Various Treatments. J Urol 150:1725–1728
[16] Pain Ja, Collier Dg (1984) Factors Influencing Recurrence Of Urethral Strictures After Endoscopic Urethrotomy: The Role Of Infection And Peri-Operative Antibiotics. Br J Urol 56:217–219
[17] Schneider T, Sperling H, Lummen G, Rubben H (2001) [Sachse Internal Urethrotomy. Is Erectile Dysfuction A Possible Complication?] [Article In German]. Urologe A 40:38–41
[18] Merkle W, Wagner W (1990) Risk Of Recurrent Stricture Following Internal Urethrotomy. Prospective Ultrasound Study Of Distal Male Urethra. Br J Urol 65:618–620
[19] Heyns Cf, Steenkamp Jw, De Kock Ml, Whitaker P (1998) Treatment Of Male Urethral Strictures: Is Repeated Dilation Or Internal Urethrotomy Useful? J Urol 160 356–358
[20] Albers P, Fichtner J, Brühl P, Müller Sc (1996) Long-Term Results Of Internal Urethrotomy. J Urol 156:1611–1614
[21] Pansadoro V, Emiliozzi P (1996) Internal Urethrotomy In The Management Of Anterior Urethral Strictures: Long-Term Followup. J Urol 156:73–75
[22] Merkle W, Wagner W. (1988) Sonography Of The Distal Male Urethra – A New Diagnostic Procedure For Urethral Strictures: Results Of A Retrospective Study. J Urol 140:1409–1411
[23] Tunc M, Tefekli A, Kadioglu A, Esen T, Uluocak N, Aras N (2002) A Prospective, Randomized Protocol To Examine The Efficacy Of Postinternal Urethrotomy Dilations For Recurrent Bulbomembranous Urethral Strictures. Urology 60:239–244
[24] Giannakopoulos X, Grammeniatis E, Gartzios A,Tsoumanis P, Kammenos A. (1997) Sachse Urethrotomy Versus Endoscopic Urethrotomy Plus Transurethral Resection Of The Fibrous Callus (Guillemin's Technique) In The Treatment Of Urethral Stricture. Urology 49:243–247
[25] Sandozi S, Ghazali S. (1988) Sachse Optical Urethrotomy, A Modified Technique: 6 Years Of Experience. J Urol 140:968–969
[26] Newman Lh, Stone Nn, Chircus Jh, Kramer Hc. (1990) Recurrent Urethral Stricture Disease Managed By Clean Intermittent Self-Catheterization. J Urol 144:1142–1143
[27] Mandhani A, Chaudhury H, Kapoor R, Srivastava A, Dubey D, Kumar A (2005) Can Outcome Of Internal Urethrotomy For Short Segment Bulbar Urethral Stricture Be Predicted? J Urol 173:1595–1597
[28] Harriss Dr, Beckingham Ij, Lemberger Rj, Lawrence Wt (1994) Long-Term Results Of Intermittent Lowfriction Self-Catheterization In Patients With Recurrent Urethral Strictures. Br J Urol 74:790–792
[29] Gnanaraj J, Devasia A, Gnanaraj L, Pandey Ap (1999) Intermittent Self Catheterization Versus Regular Outpatient Dilatation In Urethral Stricture: A Comparison. Aust N Z J Surg 69:41–43
[30] Ziprin P, Wheeler J, Davies G, Stephenson Tp (1996) The Long-Term Follow-Up Of The Urethroplasty For Non-Traumatic Urethral Strictures. J Urol 155:Abstract 762:501a

Tables And Figures

1. Table 1 :

Age In Years	Number Of Patients	Percentage
21 – 30	4	11%
31 – 40	12	32%
41 – 50	10	27%
>50	11	30%

2. Table 2 :

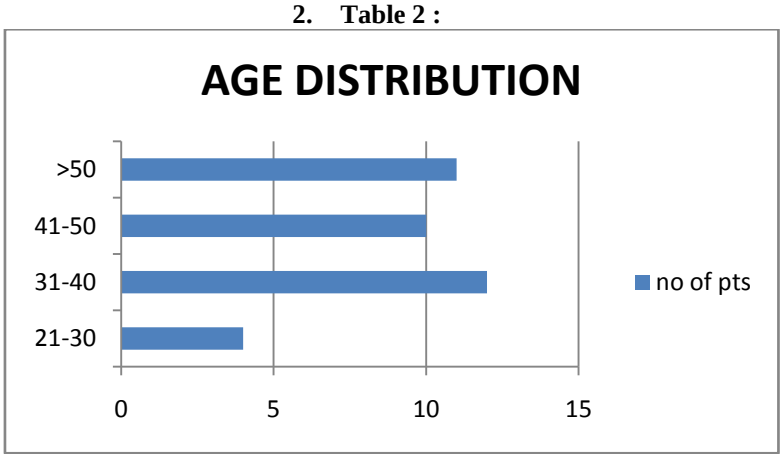


Table 3 :

Etiology	Number Of Patients	Percentage

Idiopathic	15	41%
Traumatic	10	27%
Iatrogenic	7	19%
Lichen Sclerosus	5	13%

Table 4

Stricture Length	Number Of Patients	Percentage
< 1cm	15	41 %
1 – 2 Cm	22	59%

Table 5

Percentage Narrowing	Number Of Patients	Percentage
40 – 50 %	6	16%
51 – 60 %	4	12%
61 – 70 %	12	32%
71 – 80 %	13	35%
81 – 90 %	2	5%

Table 6 :

Time Of Recurrence	Number Of Patients
5 – 7 Months	13
8 – 10 Months	8
>10 Months	5

Table 7:

			Outcome		Total	P Value
% On Rgu	<= 60	Count	8	1	9	<.001**
		% Within % On Rgu	88.9%	11.1%	100.0%	
		% Within Outcome	72.7%	3.8%	24.3%	
	> 60	Count	3	25	28	
		% Within % On Rgu	10.7%	89.3%	100.0%	
		% Within Outcome	27.3%	96.2%	75.7%	
Total		Count	11	26	37	
		% Within % On Rgu	29.7%	70.3%	100.0%	
		% Within Outcome	100.0%	100.0%	100.0%	