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AN OBSERVATIONAL STUDY TO ACESS OUTCOME OF DIFFERENT SEQUENTIAL STEPS OF PROGRESSIVE PERINEAL APPROACH IN INDIVIDUALS WITH PELVIC FRACTURE URETHRAL INJURY

General Surgery

Dr. Muthu Vignesh Post Graduate, Department Of General Surgery, Chettinad Academy Of Research And Education, Kelambakkam, Chengalpattu Dist, Tamilnadu

Dr. Imran Thariq Ajmal* Professor, Department Of General Surgery, Chettinad Academy Of Research And Education, Kelambakkam, Chengalpattu Dist, Tamilnadu. *Corresponding Author

Dr. Mahadevan Assistant Professor, Department Of General Surgery, Chettinad Academy Of Research And Education, Kelambakkam, Chengalpattu Dist, Tamilnadu

Dr. Felix Anandraj Assistant Professor, Department Of General Surgery, Chettinad Academy Of Research And Education, Kelambakkam, Chengalpattu Dist, Tamilnadu

KEYWORDS

Pelvic fracture urethral injury,perineal urethroplasty

INTRODUCTION:

Pelvic fracture is usually caused by a high-energy injury, such as a traffic accident or fall from heights, and places patients at risk of associated urethral injury, which is known as Pelvic Fracture Urethral Injury(PFUI).PFUIs are relatively rare and are much more common in males, because the female urethra is shorter and more mobile than that of a male, and is almost completely protected by the pubic bone. PFUIs can cause urinary outflow obstruction, extravasation and secondary sepsis in the acute setting, and can also result in significant morbidity, such as urethral stenosis, Erectile Dysfunction and urinary incontinence, which can be associated with lifelong disability

AIM &OBJECTIVE:

To Analyze the outcome of surgical procedure for Urethral Injuries following Pelvic Fractures. To Analyze complications associated with Pelvic Fracture Urethral Injury

MATERIALS&METHODS

The study was conducted in the Department of Surgery, chettinad academy of research and education conducted from January 2022-December 2022

Incusion Criteria:

All patients of pelvic fracture urethral injury admitted to our department will be included in the study.

Exclusion Criteria:

1. Inflammatory urethral stricture 2.Stricture following traumatic catheterization 3. Urethral stricture following surgery open and endoscopic procedure(iatrogenic) 4. Recurrent stricture 5. congenital urethral stricture 6. Postradiation Stricture.

All patients are preoperatively evalvated with history, physical examinations, complete urine analysis, urine culture, retrograde and voiding cystourethrography. The length of stricture was measured by a combined film of retrograde urethrography and micturating cystourethrography at the time of surgery. surgical procedures performed 1)Urethral mobilization 2)Corporal body seperation 3)Inferior Pubectomy .

At 3 months, clinical history (poor stream, Urinary incontinence, erectile dysfunction), RUG, and uroflowmetry were recorded. At 6 months, the clinical history RUG, and uroflowmetry were again recorded Urethroplasty was considered successful when the patient was voiding well and did not require any further intervention. Urethroplasty was considered a failure in the following cases: 1. Stricture remained 2. Recurrent stenosis 3. The patient needed repeated urethral dilatation

RESULTS:

A total of 25 patients who underwent progressive perineal urethroplasty in chettinad hospital and research institute of one year from January 2022 to December 2022 were included in this study.

All the patients with urethral injury were in the age group of 18 to 61 years of age with mean age of 30.76 years with the highest number of patients in 21-30 years of age

Road traffic accidents and fall from height were the causes of urethral injury in this study with the most common cause being Road traffic accidents in 88% of the total patients followed by fall from height in 12% of the total patients

We performed three different procedures of progressive perineal urethroplasty based on stricture length in preoperative urethrogram and intraoperative status of urethra. The procedures performed were Urethral Mobilisation alone in 13 patients (52%), Urethral Mobilisation and Corporal Body separation in 8 patients (32%) and Urethral Mobilisation with Corporal Body separation and inferior pubectomy both in 4 patients (16%)

Table-1: Procedures performed

Procedure	No. Of patients	%
Urethral Mobilisation	13	52
Corporal Body separation	8	32
Inferior Pubectomy	4	16
Total	25	100

Urethral mobilisation was planned in patients with mean stricture length of 1.9 cm, Corporal body separation in patients with mean stricture length of 2.9 cm and Inferior pubectomy in patients with mean stricture length of 4.6 cm. However, final decision of the procedure was made intraoperatively. The stricture length assessed preoperatively by urethrogram was compared with the procedure performed based on intraoperative decision.

Overall success rate of urethroplasty in this study is 88%. Success rate in cases with urethral mobilisation alone was 92.3%. Urethral mobilisation accompanied by Corporal splitting had a success rate of 87.5%. However, urethral mobilisation and corporal splitting when combined with inferior pubectomy had a success rate of 50%.

Complications Of Urethroplasty

Table-2: Complications of urethroplasty

	No. Of patients	%
Erectile dysfunction	2	16
Re-stricture formation	4	8
Wound infection	6	24

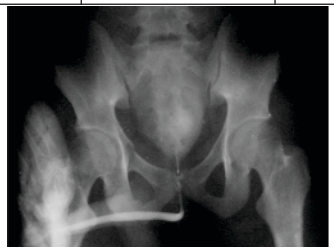

FIG-1-RGU with fracture pelvis

FIG-2-Urethral mobilisation with corporal body separation

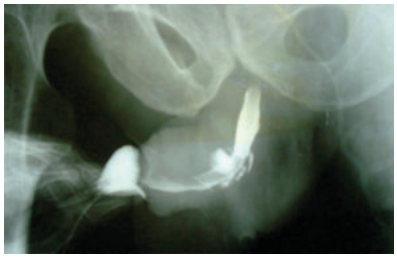

FIG-3-Postoperative 21st day peri-catheteric radiocontrast dye study showing extravasation of dye in the distal bulbar area

DISCUSSION:

The study included 25 patients visited chettinad hospital and research institute following urethral injury**.** All the patients were managed by suprapubic cystostomy diversion at their first presentation and were planned for definitive procedure (progressive perineal urethroplasty) after 3 to 4 months.

The definitive procedure performed included urethral mobilisation alone, urethral mobilisation along with corporal body separation or urethral mobilisation with corporal body separation and inferior pubectomy.

The most common cause of urethral injury was found to be Road Traffic Accident in 22 patients accounting to 88% and fall from height in 3 patients accounting to 12%. In other similar study conducted by **A.T. Hafez et al.[3](2006)** evaluated All patients had a urethral injury associated with trauma, caused by a motor vehicle in 23 (66%) and a fall from height in nine (26%).

The length of stricture that was assessed preoperatively by RGU and MCU ranged from 1.4 cm to 6.0 cm with the mean length being 2.63; In another similar study conducted by **Savalia, A.J. et al[13](2017).,** the mean stricture length was of 2.3 cm. In another similar study performed by **A.T. Hafez et al.[3](2006)** estimated radiographic stricture length before surgery was 2.6 (1–5) cm.In another similar study was by **Flynn B.J. et al.[2](2003), Saini D.K. et al.[11](2019)** evaluated The mean length of stricture were (3.1),(1.7),(2.7) respectively.

Progressive perineal Urethroplasty was considered successful when the patient was voiding well and did not require any further intervention. Based on this criterion, we calculated the success rate of each individual procedure. Overall success rate of urethroplasty in this study is 88%. Success rate in cases with urethral mobilisation alone is 92.3%. Urethral mobilisation accompanied by Corporal splitting had a success rate of 87.5%. However, urethral mobilisation and corporal splitting when combined with inferior pubectomy had a success rate of 50%.

In the study by **Santosh S.K. et al.[6](2010)** retrospectively reviewed the outcome of 172 patients who underwent perineal urethroplasty. Simple perineal urethroplasty procedure showed a success rate of 93.4%, perineal anastomosis with separation of corporal bodies had a success rate of 90.4%, perineal anastomosis with inferior pubectomy had a success rate of 88% . In another similar study by **Fu Qiang et al.[4](2009)** evaluated the results of ancillary procedures and concluded that Simple perineal anastomosis without ancillary procedures reflected an 89.3% success rate, perineal anastomosis with separation of the corporeal body had a 86.5% success rate, perineal anastomosis with inferior pubectomy had an 84.2% success rate.In other similar study by **Mehmood S et al.[10](2018)** in their retrospective study presented their success rate Regarding ancillary maneuvers, urethral mobilization alone with success rate (72.41%), corporeal body separation with success rate (91.66%), inferior wedge pubectomy with success rate (84.61%).

In other similar study by **Singh SK et al.[6] A.T. Hafez et al.[3](2006).** , **Sharma Rakesh et al.[8](2014)** , **Chethan JV et al.[9](2016)** , **Mamdouh M et al.[1](2015)** and **Fu Qiang et al.[4](2009)** experienced their overall success rate of progressive perineal urethroplasty **91%, 89%, 90.78%, 92.3% ,88%** and **87.4%** respectively.

Failure rate(Restricture formation): The clinical outcome was considered as failure when any postoperative instrumentation was needed.Progressive perineal Urethroplasty was considered failure when the patient were not voiding well, the stricture remained, recurrent stenosis ,patients needed repeated urethral dilatation as well as when there was a neccessity of clean intermittent catheterization. **A.T. Hafez et al.[3](2006)** stated that all treatment failures were at the anastomotic site and were within the first year.

Out of 13 patients of urethral mobilisation, 1 patient developed restricture with poor urinary stream that was managed by Optical internal urethratomy and were kept on Clean intermittent cathetrization. Out of 8 patients of urethral mobilisation plus corporal body separation, 1 patients had restricture formation with poor urinary stream postoperatively that was managed by OIU in two settings. Among 4 patients of urethral mobilisation with corporal body separation and inferior pubectomy 2 patients had re-stricture formation with poor urinary stream.Out of two patients, 1 patient that was managed by OIU had got success and one patient failed to void satisfactorily even after repeated OIU and so, planned for Redo perineal anastomosis.

Another similar study performed by **Lumen, N et al.[5] (2009)** , **Fu Qiang et al.[4](2009).**They concluded that the failure rate of Progressive perineal Urethroplasty were **14.8%, 12.6%** and **12%** respectively

All patients were sexually active before trauma. After progressive perineal urethroplasty, 2 patients (8%) developed erectile dysfunction and were initially managed by pharmacological agents. Amongst three procedures, none of the patient with urethral mobilisation developed erectile dysfunction. Erectile dysfunction developed in 1 out of 8 patients(12.5%) who underwent corporal body separation and 1 out of 4 patients (25%) who underwent inferior pubectomy.

Similar study by **Chethan JV et al.[9](2016)** reviewed their experience of Perineal urethral reconstruction and concluded that, Out of the 18 who were potent preoperatively, 3 patients (16.6%) lost their potency after the urethral reconstruction. Similar study conducted by **Sharma Rakesh et al.[8](2014)** and concluded that After urethroplasty, 6 patients (8.57%) had diminished Erectile function.

Out of 25 patients, 6 patients (24%) developed wound infection. Out of these 6 patients, 3 patients (23%) underwent urethral mobilisation, 2 patients (25%) underwent corporal body separation along with urethral mobilisation and 1 patient (25%) underwent inferior pubectomy along with urethral mobilisation and corporal body separation as the primary procedure. Infection resolved in all the patients with regular cleaning and dressing without leaving any long standing complications.

However In other similar study by **Mathur R, Sudarshan O, Lukesh P[7](2014)** identified wound infection was present in 7(2.9%).

CONCLUSION:

Major mode of injury were road traffic accidents followed by fall from height. Perineal urethroplasty is the gold standard and the results of perineal anastomotic repair of Pelvic fracture urethral inury are excellent. Important steps to avoid recurrence include maintaining the vascularity of urethra, meticulous and complete excision of scar tissue is critically important to optimise the outcome after perineal urethroplasty and tension free anastomosis. After removal of scarred portion, in order to achieve tension free anastomosis , adequate mobilization of distal urethra, crural separation, and inferior pubectomy is done sequentially. Moreover most of the defects are not long and necessity beyond 2 steps is rarely required .Inferior

pubectomy is important in achieving a tension-free anastomosis in patients with long strictures. In recent years there has been a move to minimise the steps required to achieve a tension-free anastomosis, primarily by avoiding supracrural re-routing of the urethra. Supracrural urethral rerouting is almost never necessary for success during posterior urethroplasty. Overall there is a need for more high quality research in the work up, management, and follow up care of urethral stricture

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