ORIGINAL ARTICLE

SURGICAL MANAGEMENT OF MALE INCONTINENCE, WITH PROLENE MESH FIXING WITH PROLENE SUTURES; A PROSPECTIVE NOVEL STUDY FOR THE TREATMENT OF MALE INCONTINENCE AT TERTIARY CARE HOSPITAL

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Background: Urinary incontinence is an uncommon problem in males but has major impact on daily living. This study aimed to highlight the outcome of surgical treatment in terms of safety, efficacy and cost-effectiveness in the management of urinary incontinence. **Methods:** A Total of 48 patients, prospective experimental study, in the duration of 4 years conducted at Department of Urology, Liaquat National Hospital & Medical College. Patients having moderate to severe urinary incontinence for 1 year after transurethral resection of prostate, radical prostatectomy, road traffic accident with pelvic fracture causing neurologic damage were included in this study. Patients having mild incontinence, having multiple co-morbid conditions were excluded from this study. Outcome of surgery was noted during follow up visit after 13 month (median). The data was obtained and analysed by using SPSS version 20. Mean and standard deviation for quantitative data, frequency and percentage for categorical variables were presented. **Results:** Out of 48 patients having urinary incontinence, 28 (58.3%) had severe urinary incontinence while 20 (41.7%) had moderate incontinence. After surgery, 28 (58.3%) patient had no leakage all day, 12 (25%) had some leakage while bending and 8 (16.7%) had no improvement in symptoms. On ultrasound recorded after voiding in post-surgery patients, 40 (83.3%) had no residual found in bladder while 8(16.7%) could not be assessed due to persistence of urinary incontinence. **Conclusion:** Our study predicted that in patients having moderate to severe urinary incontinence, Prolene Mesh repair anchoring with Prolene suture can be an efficient and cost-effective treatment for the urinary incontinence with least complications.

Keywords: Urinary incontinence; Prolene Mesh repair surgery

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INTRODUCTION

Urinary incontinence (UI) affects men and women both, at any age and of any socioeconomic status. It affects approximately 35% of people above 60 years of age.[1] Prevalence of UI increases with age and has shown to be greater in women than men, except in elder population where males and females have similar occurrence rate.[2–4] In recent decade, the prevalence of urinary incontinence in males was thought to be approximately 3–11%.[5] The prevalence of male urinary incontinence in the United States is estimated to be 17% as per cross sectional data from National Health and Nutrition Examination Survey by The Urologic Diseases in America.[6] Male UI rate is rising with time due to advancing age, neurological disease and cognitive impairment and hence its management is a topic of interest for urologists, as associated complication, such as bladder outlet obstruction, increases the need for surgical intervention.[7] Usually the post prostatectomy incontinence (PPI) results as radical prostatectomy complication and may be due to sphincter dysfunction, bladder dysfunction, or both, or due to urinary retention causing overflow of urine.[8] The post prostatectomy incontinence (PPI) significantly affects the daily activity of men.[9] This has been postulated as one of the main causes of urinary incontinence for males, while other causes (neurologic, endocrine) have been reported less frequently.[10] There is a temporary urinary loss after prostatectomy, and the chances of incontinence increases progressively after 12 months of procedure.[11] If it continues for longer duration it may interfere with quality of living and may have impact on individuals emotional, psychological and social aspects.[12,13] Another cause of urinary incontinence is neurological which is a debilitating condition causing alteration in lower urinary tract (LUT) control function.[14] A definitive diagnosis should be established according to patient's symptoms, considering any concomitant comorbidities to reveal any contraindication regarding potential surgical treatment. Depending on findings during diagnosis, urinary incontinence may be classified as mild, moderate and severe.[15] Mean pad-weighing results (grams per 24 hours, 95% confidence intervals) were 7 (4–10) for mild, 39 (26–51) for moderate, 102 (75–128) for severe

and 200 (131–268) for very severe UI.[16] Urinary incontinence can be managed conservatively. It is the mainstay of treatment after radical prostatectomy. It includes several aspects as reducing fluid intake (mainly at night), avoiding bladder irritants (caffeine and alcohol) and pelvic floor exercises.[17,18] Implantable devices are main surgical management for treatment of male urinary incontinence. The most recognized treatments are the artificial urinary sphincter (AUS) and a variety (transobturator orsuburethral) of male slings.[19] Male slings have treated urinary incontinence better than artificial urinary sphincter.[20] In AMS Invance system, Titanium Screws are used to fix Mesh to pubic rami. Reported success rate around 80%, but its cost is around US$3500, which is usually not affordable in our part of the world. So, the principle of our procedure is:

- Based on AMS Invance System
- Using Prolene Mesh to compress Penile & Bulbar Urethra
- Fixing Mesh to periostium of Inferior Pubic Rami with prolene suture instead of Titanum screws.

MATERIAL AND METHODS

This is a prospective experimental study, conducted at Department of Urology in Liaquat National Hospital & Medical College. The study duration was 4 years, from July 2012 to August 2016. Patients were selected using non probability convenient sampling technique after taking approval from ethical committee of the hospital. Total 48 patients were included in this study after taking written and informed consent. Patients having moderate to severe urinary incontinence for 1 year after transurethral resection of prostate (TURP), radical prostatectomy, road traffic accident (RTA) with pelvic fracture causing neurologic damage and Fournier Gangrene causing incontinence were included in this study. Patients having mild incontinence, having co-morbid conditions like hypertension and diabetes and having immobility were excluded from this study. A through medical history, preoperative urodynamics, maximum flow rate measurement, 24–hour pad test, and daily pad usage by patients were used to evaluate urinary incontinence. Routine laboratory investigations were done, anaesthesia fitness was taken for each patient. The surgical procedure was explained to patient and written; informed consent was taken. Outcome of surgery was noted during follow up visit after 13 month (median) as being dry, using one pad or more along with measuring post voiding residual volume. The follow up was done and complications of the procedure were noted. Each patient was operated under spinal anaesthesia. The Patient was placed in Lithotomy position. Catheter balloon placed in navicular fossa (inflated) & connected to saline irrigation at 1m height. Midline perineal Incision given with mobilization up to Bulbospongiosis muscle was done. Laterally, Inferior Pubic Rami mobilized on both sides. Making sure that bulbospongiosis muscle and urethra was intact. Three 1/0 Prolene sutures were taken through the periosteum on each side (Figure-2). Pyramid shaped piece of prolene mesh approx., 2cm at top end 3cm at lower end, anchored on each side with prolene suture (Figure-3). Tension over urethra was controlled with impeding flow of irrigant. Mesh was tightened until flow stops (Figure-4). Anchoring sutures were tied. Wound was then closed in layers with absorbable suture and catheter was placed for 24 hrs.

The data was obtained and analysed by using SPSS version 20. Mean and standard deviation for quantitative data, frequency and percentage for categorical variables were presented. Bar chart was used to represent the frequency of complications.

RESULTS

Total 48 male patients with mean age 55.25±12.29 years, having urinary incontinence were included in this study. Out of 48 patients having urinary incontinence, 9 (18.8%) patients had pelvic fracture due to road accident, 26 (54.2%) had transurethral resection of prostrate resulting in incontinence, 6 (12.5%) had Fournier Gangrene and 7 (14.6%) had radical prostatectomy procedure done leading to incontinence. More than half of patients, 28 (58.3%) had severe urinary incontinence while 20 (41.7%) had moderate incontinence. (Table-1) After surgery, 28 (58.3%) patient had no leakage all day, 12 (25%) had some leakage while bending and 8 (16.7%) had no improvement in symptoms. On ultrasound recorded after voiding in post-surgery patients, 40 (83.3%) had no residual found in bladder while 8 (16.7%) could not be assessed due to persistence of urinary incontinence. (Table-1) On follow up after surgery, complication of procedure was also noted. Majority of patients had perineal pain after surgery 12 (25%), some patients had infection 5 (10.4%), while few had urinary retention 3 (6.2%) and erosion of sling was observed only in 2 (4.1%) patients. (Figure-1)

Table-1: Descriptive analysis of the patients with incontinence

Variables (n=48)		Mean±SD/ Frequency (%)
Age (years)		55.25±12.29
Follow Up (Months)		28.25±10.57
Etiology	History of Pelvic Fracture	9 (18.8)
	Post TURP	26 (54.2)
	Fournier's Gangrene	6 (12.5)
	Post Radical Prostatectomy	7 (14.6)
Severity	Severe	28 (58.3)
	Moderate	20 (41.7)
Outcome	Dry All the time	28 (58.3)
	Occasional Leakage with bending	12 (25.0)
	No Change	8 (16.7)
Voiding	Abdominal Pressure	40 (83.3)
	Leaking All the time	8 (16.7)
Post Void Residual	Nil	40 (83.3)
	N/A	8 (16.7)

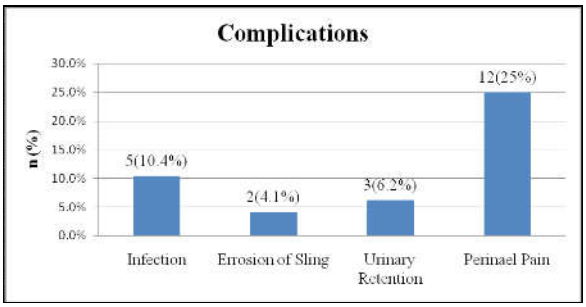

Figure-1: Frequency of complications after the procedure

Figure-2: Three 1/0 Prolene sutures taken through periostium on each side.

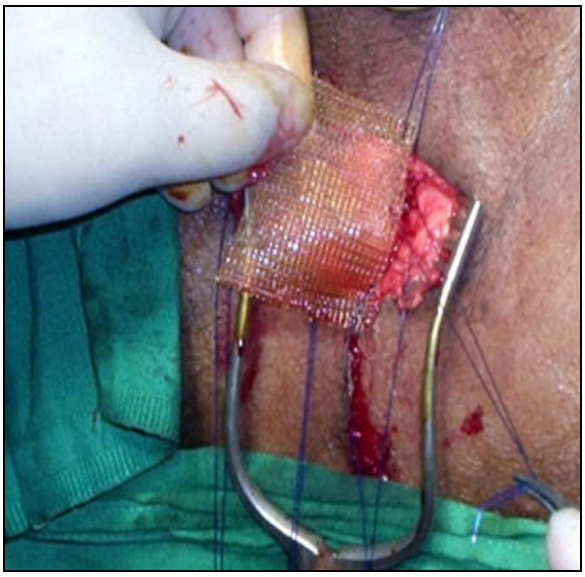

Figure-3: Pyramid shaped prolene mesh anchored

Figure-4: Mesh is Tightened until flow stops.

DISCUSSION

Radical prostatectomy is an important cause of urinary incontinence in male patients. Post prostatectomy incontinence has been noted to affect patient's daily activities and has major impact on quality of life.[21] Initially conservative treatment should be attempted after performing basic diagnostic tests, according to Current guidelines.[15] Current European Association of Urology (EAU) guidelines recommend that if initial conservative treatment (bladder training, pelvic muscle exercises, and modifications of the patient's diet and fluid intake)modalities fail then surgical intervention should be done.[22] The gold standard treatment for post prostatectomy urinary incontinence (PPUI) is artificial urinary sphincter. In recent time, invasive surgical approaches such as sub urethral slings have promising results in curing the incontinence.[23] There are certain alterations in male sling procedure in recent era, such as sling material modification, but the core concept of sub urethral compression remains same. Migliari *et al.,* reported that after using polypropylene mesh suspended via sutures over the rectus fascia to compress the corpus spongiosum, there was a substantial improvement noted at 14 months in 7 out of 9 patients.[24] Male sling is placed with substantial tension, so it is vital to use synthetic material to obtain and maintained adequate tension over time. With absorbable material being used, urethral compression is lost over time due to autolysis of material. Dikranian *et al.,* concluded a higher cure rate (87%) for synthetic graft as compared to dermal graft (56%) after 1 year of surgery.[25] In a prospective study done by Comiter CV, urinary incontinence was controlled surgically in

13 patients out of 18 having post radical prostatectomy leading to incontinence. 1 of 2 patient had cure even after undergoing artificial urinary sphincter placement procedure before.[26] In a prospective study that was done after bone-anchored slings, a high success rate of 70–80% was reported. On a follow up after 48 months, symptoms and pad usage were significantly lowered (p<0.01). Approximately two-third of patients were pad free and 80% were cured after surgery.[27] Bone anchored male slings had shown good success rate for moderate and severe urinary incontinence cases, with 36 months of follow up.[28] The prolene mesh sling was found to have long term cure in almost all cases (99.01%) of urinary incontinence.[29] In a study conducted in India, 6 patients who underwent prolene mesh bulbar urethral sling surgery after having postprostatectomy urinary incontinence, did not reveal any bladder instability on urodynamic studies. Four out of 6 patients were completely dry in their follow ups. Prolene bulbar urethral sling was stated to be economically better option in patients having urinary incontinence postprostatectomy.[30] In our study, prostate surgeries (post TURP + radical prostatectomy) were leading cause of urinary incontinence in patients 33 (68.8%). Our study showed improvement in incontinence in majority of the patient 40 (83.3%) undergone surgical repair.

Slings procedures are safer to perform with less morbidity and few complications in men for urinary incontinence.[31] It was noted that patients with severe incontinence priorto surgery were at higher risk for incontinence after surgical correction.[32,33] In a study showing outcomes of Mesh repair surgery, 30% of slings were removed for either getting infected or wound breakdown. Mesh sling repair is feasible option for urinary incontinence in case of short term follow up.[34] The male Mesh surgery and artificial urethral surgery (AUS) are contraindicated for patients who are anticipated to undergo transurethral surgery (e.g. patients having recurrent urolithiasis, transitional cell carcinoma, urethral stricture). In these patients, transurethral access can get impaired by sling surgery and frequent instrumentation may prone urethra to infection or erosion.[35] The findings of the above studies are inconsistent with our study in which most frequent surgical complication noted was perineal pain 12 (25%), followed by infection in 5 (10.4%) patients, which are the least complications observed with other surgical procedures.

This study has authentically documented the causes of urinary incontinence and outcomes of prolene mesh repair surgery. However, more researches need to be done in this field to cater a solid understanding of success rate of this surgical procedure for urinary incontinence at large. The study might be limited due to the sample size and practice bias. Considering the outcomes of our study and to what range these are consistent with other treatment modalities for urinary incontinence would be enlightening to discover more facts for the selection of best treatment modality.

CONCLUSION

Our study predicted that in patients having moderate to severe urinary incontinence for more than a year after pelvic fracture or as complication of prostate surgery, Prolene Mesh repair surgery using prolene sutures instead of titanium Screw can be an efficient and cost-effective treatment to the incontinence with least complications. This procedure has resolved symptoms in majority of patients and the main complication of this surgical procedure was perineal pain after surgery which can be controlled by medications, initially, and resolves with time.

RECOMMENDATIONS

There is an ample room for further studies in this topic to assist in better understanding of surgical procedure outcome for urinary incontinence patients. More researches need to be performed to mount success rate of this surgical procedure, so it can help other patients in future to control their symptoms as much as possible. Furthermore, new continence devices with innovative design that simulate a physiologic human sphincter and responds to extrinsic and intrinsic stimuli needs to be invented. Until the advent of better engineered urinary device, significant challenges remain in the way of patients in quest for a perfect urinary continence therapy.

AUTHORS' CONTRIBUTION

AA: Concept, design, proof reading. IM, SFA, MA: Manuscript, data collection, data analysis, interpretation. AA, ABT: Data collection, literature search.

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