Autolougus rectus sheeth graft vs four armed synthetic mesh in management of cyctocele with stress urinary incontinence and its effect on sexual function in sexually active females

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Abstract

Pelvic organ prolapse and urinary incontinence are among the most common chronic disorders in women. These are common problems whose pathogenesis remains unclear. As life expectancy increases, significantly greater number of women now present with pelvic organ prolapse and urinary incontinence requiring surgical intervention. Currently, the lifetime risk of undergoing prolapse or continence surgery is one in 11, and up to 30% of patients will require repeat reconstructive surgery and repeat surgery for incontinence in 10%. In an attempt to improve surgical outcomes and to preserve vaginal capacity and coital function, a number of synthetic and biological prostheses have been developed. This study was conducted on 80 female patients suffering from stress incontinence and cystocele. The main findings of the study revealed that: Mean age of studied cases was 42.2 years, mean BMI was 28 kg/m2. Median parity was 2 children, median NVD was 2 ranged from 1 to 5, median CS was 1, ranged from 0 to 2, 58.8% were premenopausal, 41.3% were post-menopausal. All studied cases had positive cough test. Median POP-Q was 2.5, median ICIQ was 15, mean FSFI was 10.3, mean Q-max was 19.8 and mean PVRU was 20.The mean age of group I was 42.3 years, while that of group II was 42.1 years, with no significant difference between both groups. In addition, no significant differences were found between group I and II regarding BMI, vaginal delivery, CS, menopausal status. All cases had positive cough test.

Keywords: stress; sexually; active; cyctocele

1. Introduction

There are several different types of urinary incontinence: stress, urge, chronic urinary retention (overflow), mixed, and others. An appropriate evaluation is essential to determine appropriate treatment options. In general, the evaluation should include history, urinalysis, physical exam, demonstration of stress incontinence, assessment of urethral mobility, and the measurement of a post-void residual (PVR) volume [1].

Differentiating complicated from uncomplicated stress urinary incontinence (SUI) is important. Uncomplicated SUI is defined as leakage on Valsalva or physical exertion without symptoms associated with urgency or retention and is classically associated with absence of infection and voiding symptoms. In addition to stress incontinence, complicated SUI may include urgency, retention, and voiding symptoms, and patients may have comorbid conditions that impact continence. Many patients will also have undergone prior anti-incontinence surgery [2].

A careful history includes precipitating events, frequency, severity, pad use, and effects on the activities of daily living. Other questions regarding the presence and frequency of nocturia, urgency, hesitancy, slow stream, feeling of incomplete emptying, and dysuria may be asked as well. There are many validated questionnaires available to assist in completing the history; voiding diaries may also be used. Medication history (assessing medications and agents that may affect bladder function), medical history (assessing the presence of conditions such as diabetes and neurologic disorders), and gynecologic, past surgical, and obstetrical histories should be obtained [3].

Before surgery is performed, stress urinary incontinence should be objectively demonstrated. Visualizing leakage with a cough is diagnostic (with a full bladder or at least 300 ml of fluid and the patient standing if needed). However, a delay in leakage may be due to cough-induced detrusor over-activity. If there is a delay or if leakage is not

demonstrated, multichannel testing is recommended. [4]

Surgical outcomes are more successful in patients with urethral mobility. The cotton swab test is positive when there is a 30 degree or greater displacement from the horizontal when the patient is in the supine lithotomy position and straining [5].

A post void residual volume of less than 150 ml can help exclude a bladder-emptying abnormality or chronic urinary retention (overflow incontinence). An abnormal volume may necessitate multichannel testing. Simple office cystometry with a catheter and syringe can aid in determining post void residual, basic bladder capacity, and ensuring at least 300 ml for Valsalva leakage testing. Multichannel urodynamic testing is not needed with uncomplicated SUI prior to surgery. In cases of mixed or complicated SUI; multichannel urodynamic testing is typically indicated. The goal of multichannel evaluation is to objectively monitor bladder function and dysfunction so the appropriate treatment can be precisely determined. Multichannel evaluation can measure changes to intra-abdominal and intra-vesical pressures, and measure detrusor activity. Uroflowmetry can be performed to assess the voiding rate, pattern, and capacity. Filling cystometry (cystometrogram [CMG]) measures pressure and volume in the bladder during filling, storage in the context of sensation, and compliance. The competency of the urethra is assessed by the valsalva leak point pressure (VLPP) and the urethral pressure profile (UPP). Electromyography may be performed to confirm proper coordination between the bladder and pelvic floor muscles [6].

The aim of this work is to compare the outcome for the management of females complaining of stress urinary incontinence.

2. Patients and methods

This study was conducted on 80 female patients suffering from stress incontinence and cystocele. Patients were divided into two groups randomly; group I, patients were operated by autologus rectus sheath graft; and group II, patients were operated by four arm mesh.

Foregoing the procedure ensure the patient has an empty bladder and if feasible an empty rectum. A full bladder during this examination could risk undervaluing the POP-Q score and therefore, miscalculate the staging.

The patient is then positioned where the utmost magnitude of the prolapse is shown and can be confirmed by the patient. Positions may include supine, standing or in a birthing chair at 45 degree angle.

A Sim's speculum can be used if needed to draw back the anterior and posterior vaginal walls during the examination. All methods and positions utilised during the examination should be documented so that they can be reproduced.

The measurement parameters are made up of six distinct locations (Aa, Ba, C, D, Ap, Bp) and three anatomical markers (GH, PB, TVL):

Point Aa is at the midline of anterior vaginal wall. Where no prolapse is present this location is 3cm up from the hymen (merely interior to the vaginal opening). Parameters from the hymen can be -3cm indicating no anterior vaginal prolapse or +3cm, which is a full prolapse.

Point Ba refers to the most superior location of the front vaginal wall. This location coexists with Aa (-3cm) in a woman with no anterior prolapse. However, in a woman with full prolapse this location coexists with point C.

Point C is the lowest edge of the cervix or the vaginal cuff (i.e. hysterectomy scar). This location identifies if the cervix is descending.

Point D is the topmost point of the posterior vaginal wall. This location can be contrasted with Point C to assess if the entry to the cervix has been extended.

Point Ap is located midline of posterior vaginal wall 3cm proximal to hymen. The parameters for this point can range from -3cm to +3cm relative to hymen.

Point Bp is the uppermost point of the posterior vaginal wall.

GH is the 'Genital hiatus' that records the length from the urethral opening to the posterior vaginal opening/ hymen. The hiatus refers to the opening in puborectalis muscle, a component of the levator ani muscle group. A larger distance here may indicate laxity in this area.

PB is the 'perineal body' and is recorded from the posterior aspect of hymen to the mid-anal opening. This will give an insight to the tonicity of superficial pelvic floor. Through vaginal birth the perineal body can be injuried via tears or by an episiotomy.

TVL refers to 'total vaginal length' measured from hymen to the most distal point. Knowing this allows the depth of prolapse to be assessed and reassessed post surgical repair.

Recording Measurements

- **The position of the six distinct locations is measured during a maximum Valsalva or cough with regard to the hymen (that is defined as 0cm).**
- **The only exception to this is the measurement of TVL, which is to be recorded at rest when the prolapse is decreased.**
- **If a point drops to the hymen it measured as 0cm, if it stays higher than the hymen it is recorded as a negative and if it protrudes past the hymen it is recorded as a positive. All measurements are recorded in centimeters using a ruler or tape measure.**
- **All measurements for each location are recorded on a grid as shown below:**

Staging of Prolapse:

Once all measurements have been made the stage of the prolapse can be identified in relation to hymen;

Stage 0: No prolapse is observed (points Aa, Ba, C, D, Ap and Bp are all < / = -3cm).

Stage 1: The most proximal portion of prolapse is greater than 1 cm above the level of the hymen (points Aa, Ba, C, D, Ap and Bp are all < -1cm).

Stage 2: The most proximal portion of prolapse is found between 1 cm higher than hymen and 1cm beneath hymen (points Aa, Ba, C, D, Ap and Bp can set at -1cm and +1cm).

Stage 3: The most distal part of the prolapse extends more than 1cm beneath the hymen but no further than 2 cm, resulting in no measurement larger than TVL (points Aa, Ba, C, D, Ap and Bp can be >/= +2cm and </= TVL -3cm).

Stage 4: vaginal eversion has taken place or eversion to with 2cm of TVL (points Aa, Ba, C, D, Ap and Bp can be >/= to TVL -2cm).

Statistical analysis

The collected data was revised, coded, tabulated and introduced to a PC using Statistical package for Social Science (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.). Data were presented and suitable analysis was done according to the type of data obtained for each parameter. Shapiro-Wilk test was done to test the normality of data distribution. Significant data was considered to be nonparametric. Descriptive statistics: Mean, Standard deviation (± SD) for parametric numerical data, while Median and range for non-parametric numerical data. Frequency and percentage of non-numerical data. Analytical statistics: Student T Test was used to assess the statistical significance of the difference between two study group means. Chi-Square test was used to examine the relationship between two qualitative variable

3. Results

Mean age of studied cases was 42.2 years, mean BMI was 28 kg/m2. Median parity was 2 children, median NVD was 2 ranged from 1 to 5, median CS was 1, ranged from 0 to 2, 58.8% were premenopausal, 41.3% were post-menopausal. All studied cases had positive cough test. Median POP-Q was 2.5, median ICIQ was 15, mean FSFI was 10.3, mean Q-max was 19.8 and mean PVRU was 20. POP-Q was assessed, no significant differences were found between bot groups before or after treatment ($p1>0.05$ for both). POP-Q decreased significantly after treatment in group I and group II ($p2<0.001$ for both). No significant difference between those treated with autologous rectus sheath graft and those treated with four arm mesh across time ($p3>0.05$), even after adjusting for age, BMI, parity, mode of delivery, frequency of NVD, CS and menopausal status ($p4>0.05$). Figure 1

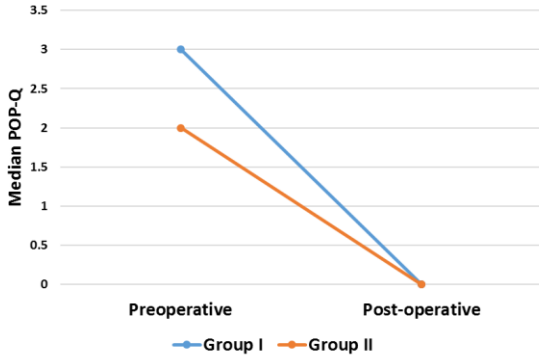

Figure (1): POP-Q in group I and II pre and post operative.

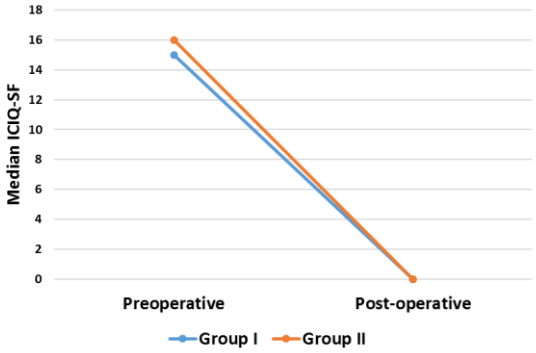

Figure (2): ICIQ-SF in group I and II pre and post operative.

ICIQ-SF was assessed, no significant differences were found between both groups before or after treatment (p1>0.05 for both).ICIQ-SF decreased significantly after treatment in group I and group II (p2<0.001 for both). Both groups sowed no significant differences in ICIQ-SF improvement across time (p3>0.05), even after adjusting for age, BMI, parity, mode of delivery, frequency of NVD, CS and menopausal status (p4>0.05).

Group II was associated with significantly higher frequency of erosion (p=0.023), non significantly difference in hemoglobin drop, bladder injury, retention, vaginal infection. On the other hand, group I was associated with significantly higher frequency of abdominal scar formation, dehiscence, higher median VAS (p=0.038, 0.040, 0.034 respectively).VAS score was used for postoperative pain assessment. Both groups improved after 2 weeks with non steroidal anti inflammatory drugs, figure 3

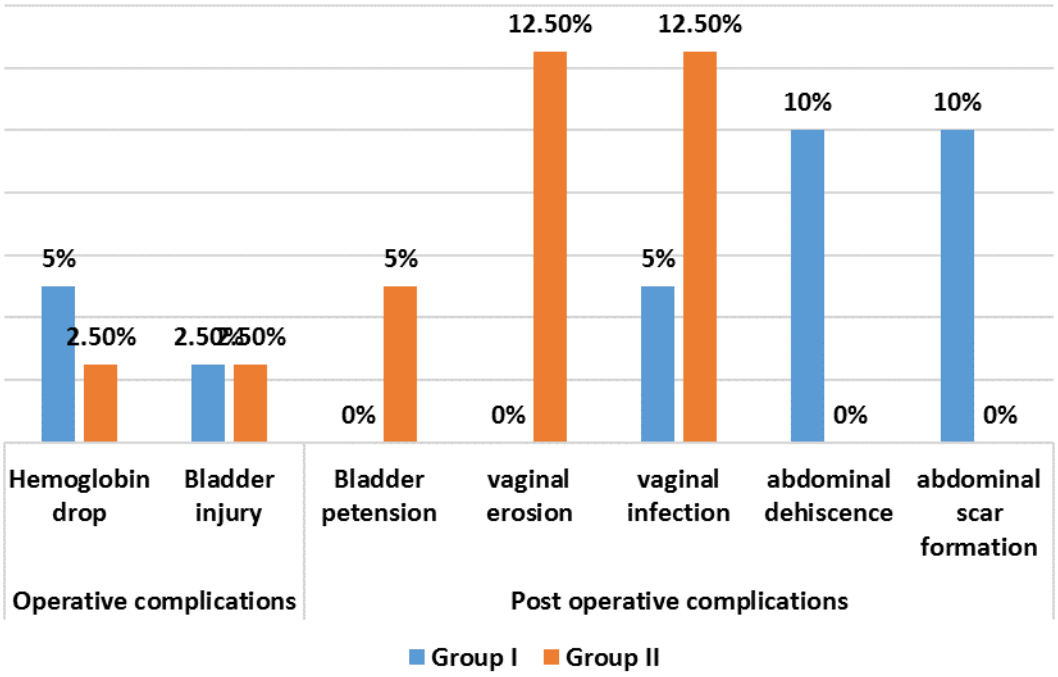

Figure (3): Complications in studied groups.

POP-Q improvement showed significant positive correlation with age, BMI, parity, frequency of NVD, preoperative POP Q, ICIQ. ICIQ-SF improvement showed significant positive correlation with preoperative POP Q, ICIQ. FSFI improvement showed significant positive correlation with preoperative FSFI. PVRU improvement showed significant positive correlation with BMI. Otherwise,

no significant correlations were found between improvement of POP-Q, ICIQ, FSFI, Q-max and PVRU with preoperative parameters, table 1

Table (12): Correlation of improvement of POP-Q, ICIQ, FSFI, Q-max and PVRU with preoperative parameters

		POP-Q improvement	ICIQ-SF improvement	FSFI improvement	Q-max improvement	PVRU improvement
Age	***rs***	0.336	0.179	-0.119	0.018	0.143
	p	**0.003**	0.112	0.294	0.878	0.208
BMI	***rs***	0.243	0.115	0.145	-0.043	0.319
	p	**0.032**	0.311	0.203	0.709	**0.004**
Parity	***rs***	0.295	0.101	0.018	-0.132	0.139
	p	**0.009**	0.372	0.875	0.247	0.222
NVD frequency	***rs***	0.257	0.087	0.030	-0.023	0.152
	p	**0.023**	0.441	0.791	0.842	0.181
CS frequency	***rs***	0.116	-0.016	0.005	-0.165	-0.047
	p	0.313	0.886	0.962	0.147	0.682
Preoperative POP-Q	***rs***	0.547	0.394	-0.127	-0.058	0.066
	p	**<0.001**	**<0.001**	0.264	0.612	0.564
Preoperative ICIQ-SF	***rs***	0.280	0.277	-0.079	-0.014	-0.092
	p	**0.013**	**0.013**	0.487	0.900	0.422
Preoperative FSFI	***rs***	0.050	0.150	-0.731	0.026	-0.044
	p	0.664	0.184	**<0.001**	0.822	0.699
Preoperative Q-max	***rs***	-0.014	-0.213	0.128	-0.151	-0.045
	p	0.905	0.058	0.259	0.185	0.693
Preoperative PVRU	***rs***	0.046	0.033	0.042	0.065	0.205
	p	0.687	0.768	0.715	0.571	0.070

rs, Spearman's correlation coefficient.

4. Discussion

Pelvic organ prolapse (POP) is a common condition for women. It affects 30–50% of parous women and it may be concomitantly present with stress urinary incontinence in some women [7].

Cystocele [anterior vaginal wall prolapse (AVWP)] is the most common type of POP in women and is due to herniation of the bladder through anterior vaginal wall. It may be lateral or central due to loss of support or weakness of the pubocervical facia between bladder and vagina [8].

Female stress urinary incontinence (SUI) is a significant health problem which is considered to be a common condition for adult female with prevalence rates ranging from 12.8 to 46%. Popular techniques for repair of stress urinary incontinence are implantation of midurethral slings (MUS) by placing transvaginal or transobturator tape made of polypropylene [9].

POP and SUI are most probably simultaneous conditions. Repair of the two conditions in the same operation has been a point of controversy. When the two procedures are performed in the same session a midurethral sling is implanted after repair of cystocele.

One of the most popular procedures for the management of AVWP is anterior colporrhaphy (AC) which may be done alone or with sling operation. Traditional methods for the repair of anterior wall prolapse using native tissue have a high recurrence rate. Also, transabdominal or laparoscopic paravaginal repair have not yielded different results than anterior repair [10].

A synthetic mesh has been widely used and proved its efficacy in the management of SUI and POP due to high recurrence rates and failure of native tissue. Many procedures used polypropylene mesh on a large scale of patients suffered from SUI and POP with high success rates. Four-arm mesh is designed to fix the mesh at four points to the pelvic side wall by passing the needle through four anatomic routes which is relatively easier and safer. Double transobturator four arms polypropylene mesh was introduced for the management of SUI beside anterior compartment repair. Complications related to placement of mesh or passage of needle entrance such as visceral or vascular injury, also pelvic pain or mesh extrusion was reported [11].

In the United States more than 300,000 surgeries for POP are performed each year with anterior colporrhaphy the most common operation for cystocele/ anterior compartment prolapse repair. However, failure rates of 40% to 60% have been reported following this procedure as it uses weakened tissue and addresses only midline defects with no apical support [12].

To avoid failures related to using weak native tissue synthetic grafts have been introduced and the AMSC procedure has gained popularity. AMSC provides the highest cure rates for apical/vaginal vault prolapse but this benefit must be balanced against a long operative time, a long time to return to activities of daily living and an almost 20% risk of de novo SUI [10].

Following the success of AMSC for apical prolapse repair TMS has increasingly been performed for cystocele repair. In comparison with anterior colporrhaphy TMS has higher short-term rate of successful treatment but also a higher rate of surgical complications and postoperative adverse events, the latter mainly due to mesh exposure. In fact, in 2008 and 2011 the United States FDA (Food and Drug Administration) issued 2 Public Health Notifications on serious complications associated with TMS. The latest update warned that surgical meshes represent a source of concern since serious complications associated with their use for transvaginal POP repair are not rare [13].

5. Conclusion

Graft demonstrated a strong association with variability in the combined dependent variables (improvement of POPQ, ICIQ, Q max, PVRU and FSFI); while BMI, NVD and CS frequency reflected a more modest association with the combined dependent variables, but the relationship was significant. However, age and menopausal status showed no significant contribution explaining the change in the dependent variables.Based on our findings, we recommend for further studies on larger sample size and on large geographical scale to emphasize our conclusion.

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