Functioning of the Lower Urinary Tract after Abdominal Hysterectomy

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Abstract

Objective: To assess the objective influence of abdominal hysterectomy on the functioning of the bladder and urethra 3 months after the surgery.

Study design: Cross section study

Setting: Department of obstetric and gynaecology / Baghdad Teaching Hospital, Medical City. Ghazy – Al-Hareery Hospital.

Time of study: November 2009 to November 2010.

Materials and methods: Urodynamic examination was performed in 25 women before and three months after total abdominal hysterectomy for benign disease .None of the patients had neurological, psychiatric diseases, diabetes, recurrent or present UTI and stress urinary incontinence. Urinalysis and urine culture were done in all patients before and 3months after the operation. Urodynamic study done for the patients which includes. Uroflowmetry, cytometry & urethral pressure recordings.

Results: 25 patients examined before and three months after surgery. There were (2,4,2,3 and 1) patients complaining of increased day time frequency , dysuria , nocturea, urgency and feeling of incomplete emptying consequently and after surgery it changed to (0,0,2,3 and 0) in the same consequences. The mean of the maximum cystometric capacity, the mean of the average flow rate and the mean of the voiding time were (355.6 ml, 10.9ml/s and 28.82s) consequently .It changed post operatively to (678.75ml, 9.8ml/s, and 38.82s) in the same consequences.

Conclusion: We observed, increased maximum bladder capacity, increased voiding time, decreased average urethral flow rate. The assessment of the lower urinary tract symptoms revealed improvement in frequency, dysuria and feeling of incomplete emptying.

Introduction

Various types of pelvic surgery may influence on the function of female urogenital tract, hysterectomy has been reported to cause disruption in both the storage and voiding phases of the micturation cycle [(1)] .

The disruption of the storage phase may include stress incontinence, urgency, frequency and urge incontinence.

Disruption of the voiding phase including incomplete emptying or overt retention [(1)].

Hysterectomy may alter bladder function by either the disruption of the spatial relationships between the bladder and cervix/uterus and/or disruption of innervations the bladder [(1,2)].

The pelvic plexus contains the terminal axons of the pelvic sympathetic and para sympathetic nerves. This plexus is intimately related to the bladder and cervix , it is responsible for normal urinary storage and micturation [(3)].

There are four areas of potential damage to the pelvic plexus at the time of hysterectomy:

1- At the level of the cardinal ligament [(4)].
2- At the level of the bladder base.
3-Lateral pararvaginal dissection of the pelvic plexus [(5)].
4-removal of the cervix and/or lower uterine segment may result in loss of the associated nerves which remain attached [(6)].

Damage to one or more of these areas during hysterectomy may potentially be responsible for the genesis of dysfunction in the storage and/or micturation phases of voiding cycle [(7)].

Patients and methods

This is study include 25 women (14 premenopausal, 11 menopause).

It was done from November 2009 to November 2010 in the department of obstetrics and gynaecology – Baghdad Teaching Hospital and urology department in Ghazy- ALHareery Hospital and Ibn Alqaf Hospital, with the help of the urology staff.

Exclusion criteria for our patients;

1- Neurological disease
2- Psychological disease
3- Diabetes
4- Recurrent or present urinary tract infection
5- Stress incontinence
6- Medications which could influence the function of the lower urinary tract such as diuretics, anticholinergic, tricyclic anti depressant.
7- Smokers and chronic lung disease.

Before the operation and by taking history ,we found some patients had urgency, frequency, nocturea, dysuria, and feeling of incomplete emptying.

Urine analysis by midstream specimen and urine culture was done in all patients before the operation and after 3 months of the operation.

A simple test done to our patients to objectively exclude stress incontinence. This is by asking the patient with full bladder to lie supine then abduct the thigh and flex the hip and knee, we see if there is any drippling of urine.

The urodynamic study includes Uroflowmetry, cytometry and urethral pressure recordings. We advice the patients to be on fluid diet one day before the test and fasting at the day of the test. First the

patient with full bladder should urinate in a special equipment to measure the urine flow rate. Then multi channel Cytometry (subtracted Cytometry) can be performed by filling the bladder with saline at body temperature and the pressure is measured via narrow fluid filled catheter, using large external pressure transducer. The rectal pressure is recorded to represent the intra abdominal pressure, and this was subtracted from the intra vesical pressure to give the detrusor pressure.

Total abdominal hysterectomy was performed in all patients, intra operatively, 1 g of cefazolin was administered as prophylaxis of infection.

The indication to this surgery includes uterine fibroids in 85% of patients, benign ovarian tumors in 10% and metro menorrhagia in 5% of women.

Normal voiding pressure 20 -40 cm H2O, any voiding pressure above this value considered detrusor overactivity and below this value considered detrusor underactivity.

Results

The characteristics of the patients included in this study are presented (56% of women delivered at least three times vaginally) table 1.

The assessment of the lower urinary tract symptoms before the surgery and during 3- month follow up visits revealed improvement in this respect after the operation , table 2.

After urodynamic examination , we diagnosed overactive bladder in 3 patients and in one patient detrusor under activity during voiding which resulted in prolonged bladder emptying.

Detruser over activity in the former 3 women persisted for 3 months postoperatively, but difficulty during voiding was not observed and not reported by the patients during voiding follow up visit. The data are presented in table 3.

Three months post operatively, urodynamic studies revealed a statistically significant increase of maximum cytometry capacity, increase of voiding time and decrease of average flow rate .Urodynamic data are presented in table 4.

Table 1: Characteristics of the study group according to known urinary incontinence factors

Parameters	value	Numbers of patients	%
Age (yrs)	41-50	12	48%
	51-60	9	36%
	61-70	4	16%
BMI (kg/m2)	18.5-24.9	8	32%
	25.0-29.9	12	48%
	30.0-39.9	5	20%
	40.0	0	0%
Parity	Only caesarean delivery	2	8%
	Nulliparous	2	8%
	1 vaginal delivery	3	12%
	2 vaginal deliveries	4	16%
	≥ 3 vaginal deliveries	14	56%

Table 2: Number of patients reported lower urinary tract symptoms before and after 3 months of surgery.

Symptom	Before the surgery (No. of patients)	3 months after the surgery (No. of patients)
Increased daytime frequency	2	0
Dysuria	4	0
Nocturia	2	2
Urgency	3	3
Feeling of incomplete emptying	1	0
Urinary incontinence	0	0

Table 3: Quantitative changes in lower urinary tract functioning revealed by urodynamic examination before and 3 months after surgery.

Urodynamic diagnosis	Before surgery (No. of patients)	3 months after surgery (No. of patients)
Detrusor over activity	3	3
Detrusor under activity	1	0

Table 4: The comparison of urodynamic finding before and after 3 months of the surgery

Urodynamic parameters	Before surgery M/SD	After surgery M/SD	t- students test
First sensation (ml)	146.2/17.27	155.6/18.83	ns
Maximum cystometric capacity(ml)	355.6/14.4	678.75/24.62	0.009 (s)
Average flow rate(ml/s)	10.9/1.15	9.8/0.8	0.04 (s)
Voiding time(sec)	28.82/1.5	38.82/1.62	0.03 (s)
Detrusor pressure at maximum flow(cmH2O)	29.6/6.5	29.9/6.59	ns
Maximum flow rate(ml/s)	27.36/2.7	30.11/2.24	ns
Post void residual(ml)	6.04/3.4	3.89/0.56	ns

Discussion

The potential influence of various types of pelvic surgery on the function of female urogenital tract calls for properly designed clinical trials evaluating bladder function before and after the operation.

Urinary disorders such as, dysuria, frequency, slow bladder emptying, sensation of residual urine as well as stress and urge incontinence were observed pre-operatively and 3 months post operatively, we observed statistically significant decrease in frequency, dysuria, feeling of incomplete emptying after surgery .

One can speculate that bladder compression caused by myomatous uterus could cause over active bladder symptoms among patients. In one patient with preoperative post voiding residual exceeding 10% of total bladder volume, Uroflowmetry performed at 3 months after operation revealed a substantial decrease of post voiding residual accompanied by proper voiding function.

Virtanen et al studied 102 women who underwent abdominal hysterectomy and demonstrated significantly decrease in stress incontinence, frequency and nocturia (8).

We obtained very similar results to those reported by El-Toukhy et al, who evaluated 187 women who underwent hysterectomy, after 6 months of surgery, urinary symptoms occurred less frequently ($p \leq 0.06$) and urodynamic studies remained unchanged (9).

Moreover, the patients reported significantly lower rates of stress incontinence ($p=0.005$), urgency ($p=0.03$) than before the operation, regardless of hysterectomy technique used (9).

We found that most of the patients postoperatively had increased cystometric capacity, increased voiding time and decreased flow rate , because of mobilization of bladder to the level that needed to expose the vault of the vagina ,it leads to disruption of certain numbers of nerves endings that supply the bladder tonicity (the tone of the detrusor muscle) and this leads to increase the maximum capacity and slower contraction of the detrusor muscle and prolonged voiding time.

Several studies comprising 122 patients have compared pre and post-hysterectomy urodynamic studies (10-15). All have found that there are statistically significant changes in mean cystometric capacity, mean maximum urethral closure pressure, but no changes in post-void residual and/or Uroflowmetry parameters following hysterectomy.

In addition Vervest et al.(14) found no intra-hysterectomy variations with the abdominal or vaginal approaches in 21 patients(13 abdominal ,8 vaginal hysterectomies). Based on this data , it is reasonable to conclude that hysterectomy results in no consistent clinically significant changes in bladder physiology.

Finally, we concluded that abdominal hysterectomy can decrease some subjective urological symptoms and can cause changes in urodynamic findings.

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