ORIGINAL ARTICLE

Mid-Urethral Sling for Stress Incontinence: Does Urodynamic Pressure Reading Affect Post-Operative Outcome?

Abdullah Ghazi[1], MD, SSC-UROL, **Ali Alabbad**[1], MD, SSC-UROL, **Malak Abuzgaya**[1], MD, **Mai A. Banakhar**[2], MD, SSC-UROL, **Dean S. Elterman**[1], MD, FRCS, **Sidney Radomski**[1], MD, FRCS, PhD, **Magdy Hassouna**[1], MD, FRCS, PhD

[1]*Department of Urology, Toronto Western Hospital, Toronto, Canada*
[2]*Department of Urology, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia*

Correspondence
Dr. Mai A. Banakhar
Department of Urology, Faculty of Medicine
King Abdulaziz University
P.O. Box 80215, Jeddah 21589
Saudi Arabia
e.M: drmaibanakher@hotmail.com

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Abstract

The aim of our study was to determine the effect of preoperative urodynamic reading of Valsalva leak point pressure on the result of mid-urethral sling surgery. From January 2010 to December 2014, a total of 207 patients underwent mid-urethral sling surgery at the Toronto Western Hospital. An incontinence questionnaire was sent to 94 patients who accepted to be involved in the study to examine satisfaction post-surgery. Forty-five patients replied and were included in the analysis. The patients were divided into three groups according to valsalva leak point pressure (< 60, 60-80 and > 80 cm H_2O) determined on urodynamic testing. Of the forty-five patients who responded to the questionnaire, seven were excluded for only having had stress testing done and two were excluded due to intermittent catheterization. Thirteen patients had evidence of detrusor overactivity on urodynamic testing. Simple linear regression analysis was done for the three groups of the Valsalva leak point pressure values and correlation to satisfaction was found -0.263, -0.236, and -0.148, respectively. In this current study, we could not find a relation between valsalva leak point pressure values and the self-reported satisfaction post-surgical correction.

Keywords

Stress incontinence; mid-urethral sling; Valsalva leak point pressure center

Introduction

Urodynamic reading of Valsalva leak point pressure (VLPP) is associated with stress urine incontinence in the absence of detrusor overactivity[1,2]. It is used to classify urine incontinence severity and differentiate between women who have intrinsic sphincter deficiency and those who have urethral hypermobility[3].

However, the use of VLPP value in patients with stress urine incontinence to help in the decision making

to cure the stress incontinence of urine surgically remains undecided partly because the methodology of performing these measurements has not been standardized[4-6].

In the current study we examined the role of VLPP in predicting the satisfaction rate in the surgical outcome of female patients who undergo a mid-urethral sling procedure irrespective to the manufacturer of the sling.

Patients and Methods

This retrospective study reviewed the charts of 207 patients who underwent mid-urethral sling procedures for stress urinary incontinence from January 2010 to December 2014 at the Toronto Western Hospital. Research ethics board at the University Health Network accepted the protocol. The consent and validated questionnaire (Norwegian Female Incontinence Questionnaire for Urinary Incontinence. Appendix 1) was mailed to 94 patients who accepted to be involved in the study with a prepaid return envelope. Forty-five patients replied and were included in the analysis. Nine patients were excluded, two on intermittent catheterization and seven whom had only a stress test. Patients were divided into three groups according to the VLPP values:

- Group 1: VLPP < 60 cm H_2O (n = 9)
- Group 2: VLPP 61-80 cm H_2O (n = 14)
- Group 3: VLPP > 80 cm H_2O (n = 13)

All patients underwent a mid-urethral sling surgery based on the surgeon's preference, which are tension-free vaginal tape (TVT) (1), in/out transobturator tape (TOT) (23), out/in TOT (6), single incision TOT (5) and TVT cadaveric graft (1).

Table 1. Patients demographics

Total Number	N = 45
Age	Mean 60 y
Questionnaire	Mean score 18.62 (min 0 – max 51)
VLPP < 60 cm H_2O 61-80 cm H_2O > 80 cm H_2O Excluded	9 14 13 2 on CIC 7 only stress test done
Detrusor over activity	12 Yes 23 Absent

VLPP: Valsalva leak point pressure

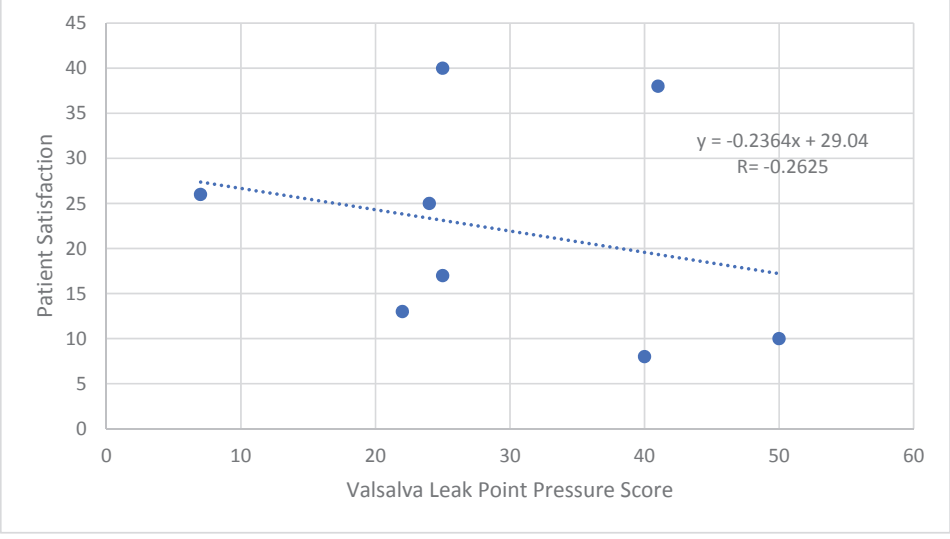

Figure 1. Correlation between Valsalva leak point pressure score (< 60 cm H_2O) and patient satisfaction.

Results

The questionnaire was mailed to 94 patients. Forty-five patients replied and were included in the analysis. Their mean age was 60.2 (42-89) years old. Mean questionnaire total score was 18.62 (score range from 2-40, with questionnaire scoring 0 totally satisfied and 58 totally unsatisfied). Nine patients were excluded. Two on intermitted catheterization and seven of whom had only a stress testing performed. Twelve patients had evidence of detrusor overactivity on urodynamic test (Table 1).

After the simple linear regression analysis, and the correlation variable was calculated it was discovered that patients who have stress urinary incontinence that undergo surgery with a VLPP score of < 60 cm H_20, 61-80 cm H_20, and > 80 cm H_20 were found to have a negative correlation variable of -0.263, -0.236, and -0.148, respectively (Fig. 1, 2 and 3).

Therefore, it is concluded for patients with VLPP scores of < 60, 61-80, and > 80 cm H_20 that there is a weak negative correlation between the patients VLPP score and their satisfaction.

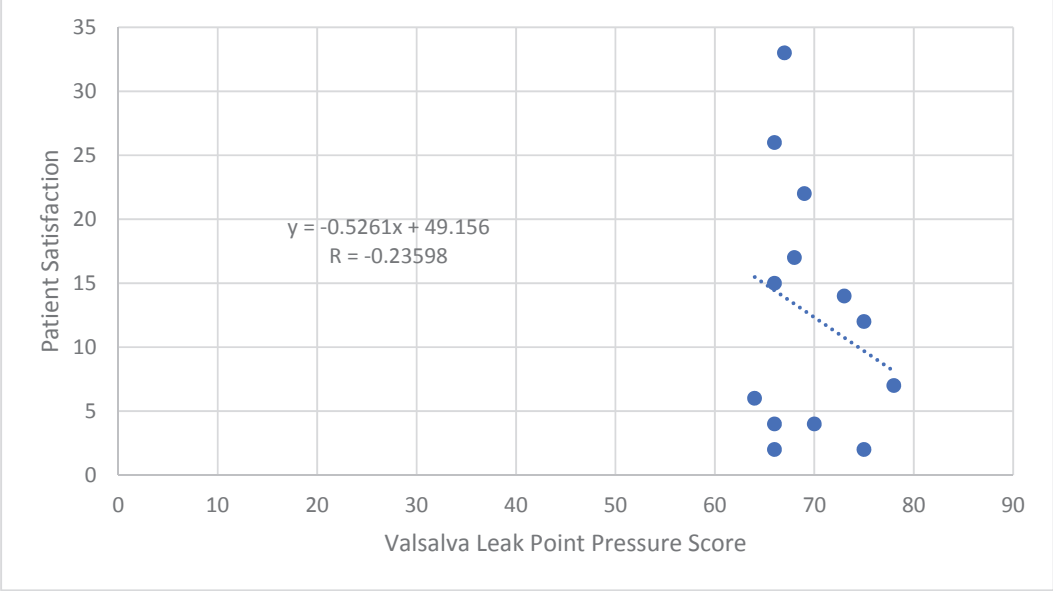

Figure 2. Correlation between Valsalva leak point pressure score (61-80 cm H_2O) and patient satisfaction.

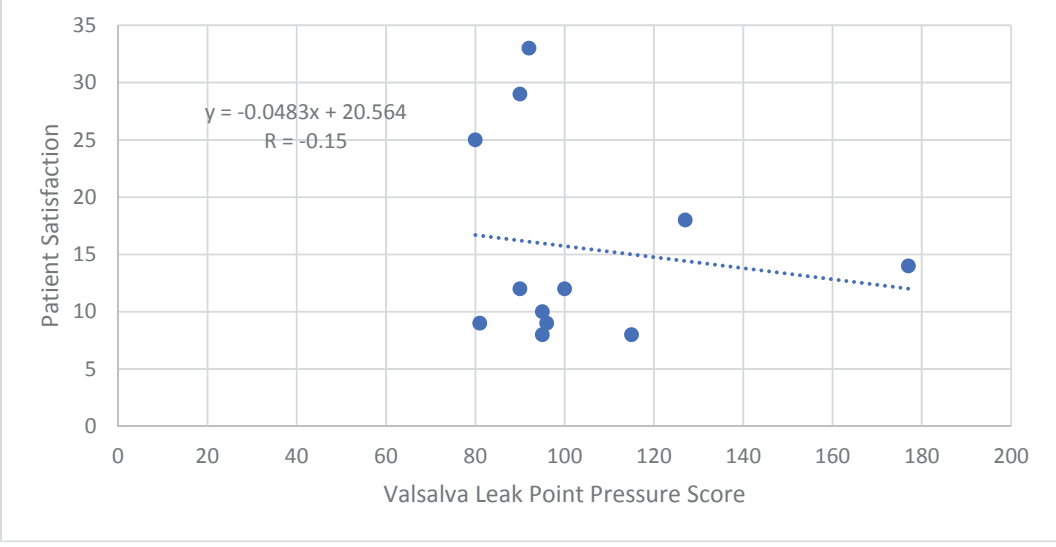

Figure 3. Correlation between Valsalva leak point pressure score (> 80 cm H_2O) and patient satisfaction.

Table 2. Simple linear regression analysis between the three groups

Variable	VLPP (cm H_2O)	Number	Mean Rank	Significance
Questionnaire	< 60	9	21.55	P = 0.26
	61-81	14	13.5	P = 0.24
	> 80	13	13	P = 0.15
	Mean 16.6 (Min 2- Max 40)			

VLPP: Valsalva leak point pressure

Table 3. Chi-squared test for detrusor overactivity categories against Valsalva leak point pressure groups

Variable	VLPP < 60 cm H_2O	VLPP 61-80 cm H_2O	VLPP > 80 cm H_2O
Detrusor Overactivity			
Present	6	2	5
Absent	3	11	8
	P = 0.269	P = 0.265	P = 0.45
Age			
40- 50	1	1	5
51- 60	4	7	5
61- 70	2	3	1
>70	2	3	2
	P = 0.818	P = 0.797	P = 0.681

VLPP: Valsalva leak point pressure

Pearson's chi-squared test for age and detrusor overactivity categories between VLPP groups showed no significant difference (Table 2 and 3).

Discussion

Currently there is no clearly defined consensus on the necessity of preoperative urodynamics (UDS) before offering any surgical correction for female patients with stress urinary incontinence. It seems reasonable to perform UDS investigations in patients with mixed symptoms, failed previous surgery, persistent symptoms[7] or with the presence of genital prolapse[8].

In a series reported by Abdel-Hady and Constantine[9] they found high efficacy of TVT as the first choice of treatment for women with stress urine incontinence, including those with low VLPP. In a different study, Spinosa and Dubuis[10] reported effect of VLPP on patient outcome.

McGuire *et al.*[11-13] suggested that stress incontinence is due to intrinsic urethral sphincteric deficiency if the VLPP was under 60 cm H_2O.

But in a recent report by Iancu and Peltecu[7], they reported that a low VLPP (usually less than 60 cm H_2O) on urodynamic studies may be considered to be a risk factor for treatment failure[7,14-18].

In the present study, we include all patients who had evidence of stress urinary incontinence based on patient history and UDS finding. All patients underwent a mini-urethral sling surgery based on the surgeon's preference which where TVT, TOT both autologous, synthetic and /or cadaveric. The purpose of the present study was not to compare the satisfaction of any surgical technique, but our main objective was to correlate the VLPP value with the outcome of the surgical procedure. We divided the patients for this aim according to the VLPP values into three categories: VLPP values (< 60, 60-80 and > 80 cm H_2O). Despite those categories the VLPP did not show a statistical difference in the outcome of the mid-urethral sling surgery. The Norwegian Female Incontinence Questionnaire for Urinary Incontinence was used to evaluate the postoperative symptoms and it did not show a difference in satisfaction score between different VLPP values.

We are aware of some limitation in this study: it is retrospective. The number of patients was limited small and there were different procedure techniques used in those patients. The questionnaire for the patient satisfaction was done only in the postoperative period.

Conclusion

We could not find a relation between VLPP values satisfaction outcome of mid-urethral sling surgical correction for stress urinary incontinence.

Conflicts of Interest

The authors declare no conflict of interest.

Disclosure

The authors did not receive any type of commercial support either in forms of compensation or financial for this study. The authors have no financial interest in any of the products or devices, or drugs mentioned in this article.

Ethical Approval

Obtained.

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Appendix 1

Norwegian Female Incontinence Questionnaire for Urinary Incontinence

Pre- and Postoperative Recording

Date for questionnaire completion …….. **Patient number ……**

Please answer all questions.

(Mark yes, no or not relevant for each alternative in question 1)

1. Do you leak urine?

when you cough	☐ Yes	☐ No	☐ Not relevant
when you sneeze	☐ Yes	☐ No	☐ Not relevant
when you laugh	☐ Yes	☐ No	☐ Not relevant
when you walk up or down the stairs	☐ Yes	☐ No	☐ Not relevant
when you get out of bed	☐ Yes	☐ No	☐ Not relevant
when you lift heavy objects	☐ Yes	☐ No	☐ Not relevant
during physical activity (*e.g.* running to catch the bus)	☐ Yes	☐ No	☐ Not relevant
during sports	☐ Yes	☐ No	☐ Not relevant
during intercourse	☐ Yes	☐ No	☐ Not relevant

(Mark only one alternative for each question from 2 - 6)

2. How often do you leak urine in relation to physical activity, when you laugh, cough or sneeze?

- ☐ Never
- ☐ 1-4 times each month
- ☐ 1-6 times each week
- ☐ Once per day
- ☐ More than once per day

3. How much urine do you usually leak during physical activity or when you laugh, cough or sneeze?

- ☐ Nothing
- ☐ Drops/ moist underwear
- ☐ Dripping/ wet underwear
- ☐ Running/ passes through all your clothes
- ☐ Running down your legs or down onto the floor

4. How often do you experience sudden and imperious urge to void leading to urinary leakage before you reach the toilet?

- ☐ Never
- ☐ 1-4 times each month
- ☐ 1-6 times each week
- ☐ Once per month
- ☐ More than once per day

5. How large is the amount of urine you usually leak when you experience sudden and imperious need to void and urinary leakage?

- ☐ Nothing
- ☐ Drops/ moist underwear
- ☐ Dripping/ wet underwear
- ☐ Running/ passes through all your clothes
- ☐ Running down your legs or down onto the floor

6. If you experience both the symptoms described in question 2 and question 4, what is troubling you the most?

- ☐ Leakage during physical activities more than leakage related to urgency?
- ☐ Leakage related to urgency more than during physical activity?
- ☐ Equally trouble by leakage related to urgency as by a leakage during physical activity?
- ☐ I don't have leakage as described in question 2 or question 4

Appendix 1 (CONTINUED)

(Mark only one alternative for each question 7 - 11)

7. How many incontinence pads do you use?

☐ None ☐ 1-3 per week ☐ 4-6 per week ☐ 1-4 per day ☐ More than 4 per day

8. How many times have you been treated for cystitis the last 6 months?

☐ None ☐ 1-3 per week ☐ 4-6 per week ☐ 1-4 per day ☐ More than 4 times

9. How often do you avoid activities (*e.g.* a hobby, physical training or going out) because you are afraid of leaking urine)?

☐ Never ☐ Seldom ☐ Sometimes ☐ Often ☐ Always

10. How often do you avoid places and situations where you are aware of that a toilet is not easily available?

☐ Never ☐ Seldom ☐ Sometimes ☐ Often ☐ Always

11. Is your sexual life influenced by your leakage problem? (To be answered before treatment)

☐ Not relevant ☐ Unchanged ☐ Some deterioration ☐ Substantial deterioration

(Mark yes, no or not relevant for each question under 12)

12. Does your urinary leakage influence?

Your vacations?	☐ Yes	☐ No	☐ Not relevant
Your family life?	☐ Yes	☐ No	☐ Not relevant
Your social life (going out, meeting friends)	☐ Yes	☐ No	☐ Not relevant
Your sleep?	☐ Yes	☐ No	☐ Not relevant

(Mark only one alternative for each question 13 - 14)

13. Is your sexual life influenced by your leakage problem? (To be answered after treatment)

☐ Not relevant ☐ Substantial improvement ☐ Some improvement ☐ Unchanged
☐ Some deterioration ☐ Substantial deterioration

14. Are you satisfied with the result of the treatment you have received to cure your urinary leakage?

☐ Very satisfied ☐ Moderately satisfied ☐ Neither satisfied nor unsatisfied
☐ Moderately unsatisfied ☐ Very unsatisfied

Please do not fill in. Will be filled in by a physician

Investigator ID number ……..
Date of incontinence surgery
……..
Surgeon ID number ……
Surgical procedure number ……
Number of previous earlier surgical incontinence procedures to cure incontinence ……..
Incontinence surgery performed previously in our department
☐ Yes ☐ No
Incontinence surgery combined with vaginal surgery
☐ Yes ☐ No
Number of micturitions/ 24 hours
……
Mean voiding volume (ml)
……
Leakage during 24 hours pad test (gr) ……

Maximum closure pressure (cm H20)
……
Leakage during stress test (gr)
……
Residual urine (ml) ……
Maximum flow (ml/sec) ……..
Height (cm) ……..
Weight (kilo) ……
Date of interrupted and not completed incontinence surgery
……
Date of tape surgically adjusted
……
Date of tape transected
……
Date of erosion surgically treated
……

Complication ☐ Yes ☐ No
Bladder perforation ☐ Yes ☐ No
Hematoma >3cm ☐ Yes ☐ No
Superficial wound infection ☐ Yes ☐ No
Deep wound infection ☐ Yes ☐ No
Catheter >1 week <1 month ☐ Yes ☐ No
Catheter >1 month ☐ Yes ☐ No
Tape adjusted surgically ☐ Yes ☐ No
Intestine perforation ☐ Yes ☐ No
Vascular lesion ☐ Yes ☐ No
Bleeding >500ml ☐ Yes ☐ No
Urethral lesion ☐ Yes ☐ No

Pain 0 to 10 ……
Duration of pain: ☐ None
☐ Less than 2 weeks
☐ 2 to 12 weeks
☐ More than 12 weeks

Other complications:

تاثير ضغط المثانه في سلس البول الاجهادي وتاثيره على نتائج عمليات شريط المثانه

عبدالله غازي[1] و علي العباد[1] و ملك ابو زيقا[1] و مي احمد بانخر[2] و دين التيرمان[1] و سيدني ريدومسكي[1] و مجدي حسونه[1]

[1]قسم المسالك البوليه، مستشفى تورونتو الغربيه، تورونتو - كندا

[2]قسم المسالك البوليه، كلية الطب، جامعه الملك عبدالعزيز، جده - المملكه العربيه السعوديه

المستخلص. في هذا البحث تم دراسه العلاقه بين ضغط المثانه في سلس البول الاجهادي وتقسيم المرضى الى ثلاث مجموعات اعتمادا على الضغط اثناء عمل ديناميكيه البول ومن ثم معرفه مدى تاثير نتائج قراءه ضغط المثانه على نتائج عمليات شريط المثانه في كل مجموعه.