СПИСАНИЕ НА МАКЕДОНСКОТО ЛЕКАРСКО ДРУШТВО
Мак. мед. преглед, 2024; 78(2)

JOURNAL OF THE MACEDONIAN MEDICAL ASSOCIATION
Mac. Med. Preview, 2024; 78(2)

UDK: 61+061.231=866=20 CODEN: MKMPA3 ISSN: 0025-1097

Македонски Медицински Преглед

Macedonian Medical Review

Основано 1946
Founded 1946

www.mld.mk

2/24

MMP

Мак Мед Преглед

Списание на Македонското лекарско друштво

Journal of the Macedonian Medical Association

Наслов на Редакцијата и Издавачот / Address of the Editorial Office and Administration:
1000 Скопје, Даме Груев 3, Градски зид блок 2
tel. 02/3162 577
www.mld.org.mk / mld@unet.com.mk
Жиро сметка / Bank Account
300000000211884 - Komercijalna banka Skopje

Печати: Бранко Гапо графичко производство - Скопје

Македонски медицински преглед се печати три пати годишно. Претплатата за списанието изнесува 10 евра за лекари, 50 ера за установа, странство 80 евра.

Основано 1946 Founded 1946

Содржина/Contents

I. Оригинални трудови/ Original Articles

III. Прикази на случај/ Case reports

Мак Мед Преглед 2024; 78(2): 88-91

ММР

Original article

ПРОЦЕНКА НА ЕФЕКТИВНОСТА НА ПЛИКАТУРИРАНА КОЛПОСУСПЕНЗИЈА КАЈ ПАЦИЕНТКИ СО СТРЕС УРИНАРНА ИНКОНТИНЕНЦИЈА

ASSESSMENT OF THE EFFECTIVENESS OF THE PLEATED COLPOSUSPENSION IN STRESS URINARY INCONTINENCE

Sofija Zlateska Gjurikj[1], Vesna Antovska[1], Irena Aleksioska Papestiev[1], Iva Malahova Gjoreska[1], Katerina Nikoloska[1], Aleksandra Zlateska Damjanovikj[2] and Dejan Damjanovikj[3]

[1]University Clinic for Gynecology and Obstetrics, Faculty of Medicine, Ss. Cyril and Methodius University in Skopje, [2]PHI Ferrty Clinic, Skopje, [3]University Clinic for Orthopaedic Surgery, Faculty of Medicine, Ss. Cyril and Methodius University in Skopje, Skopje, Republic of North Macedonia

Abstract

Introduction. Urinary incontinence (UI) is a common medical issue that can affect women of all ages. UI is rarely life-threatening, but impacts patients' mental, physical and social well-being. Ultrasound in urogynecology enables accurate evaluation of both static and dynamic relationships in the lower urinary tract.
Methods. This study aimed to demonstrate the use of ultrasound in pre- and postoperative evaluation of patients with SUI. Additionally, it assessed the effectiveness of pleated colposuspension. A total of 40 preoperative SUI patients were included, divided into two subgroups with 20 patients each: the first group was underwent an isolated colposusension, and the second, in addition, underwent total abdominal hysterectomy and bilateral salpingo-oophorectomy. Using transperineal 2D ultrasound, α and β angles were measured at rest and during Valsalva maneuver.
Results. The α and β angles were significantly lower in postoperative state compared to the Preoperative one. A t-test confirmed that these increments were statistically significant ($p \leq 0.05$).
Conclusion. By monitoring α and β angles pre- and postoperatively, clinicians can objectively evaluate the success of surgical interventions for SUI.

Keywords: stress urinary incontinence, pleated colposusopension, transperineal ultrasound, α angle, β angle

Апстракт

Вовед. Уринарна инконтиненција (UI) е честа состојба која може да ги афектира жените во било која возраст и е претставена со широк дијапазон на симптоми. Ретко е животно загрозувачка, но влијае на физичката, менталната и социјалната благосостојба. Ултразвукот во урогинекологијата овозможува евалуација на статички и динамички соодноси на долен уринарен тракт.
Методи. Во оваа студија е прикажана употребата на ултразвукот во пре- и пост- оперативно следење на пациентките со стрес уринарна иноктиненција (SUI). Вкупно 40 жени влегоа во оваа проспективна рандомизирана студија. Беа поделени на две групи од по 20. Со помош на трансперинеален 2D ултразвук, се мереа α и β аглите во мир и во тек на Валсалва маневр. Во првата група беше изведена изолирана колпосуспензија, а во втората група беше направена и тотална абдоминална хистеректомија со билатерална салпингоофоректомија.
Резултати. α и β аглите беа сигнификантно помали во тек на постоперативните контроли во споредба со предоперативните вредности на истите. Т-тестот го потврди овој инкремент со медицински значајна статистичка сигнификантност($p \leq 0.05$).
Заклучок. Со мониторирање на овие два агли пред и постоперативно, може да се добие објективност во клиничката евалуција и проценка на успешноста на хируршкиот третман на SUI.

Клучни зборови: Стрес уринарна инконтиненција, пликатурирана колпосуспензија, трансперинеален ултразвук, α агол, β агол

Introduction

Urinary incontinence (UI) is a common condition, that significantly changes the quality of life and affects over 303 million women and 121 million men all over the world [1]. According to the latest epidemiological

Correspondence to: Sofija Zlateska Gjurikj, University clinic for gynecology and obstetrics, 1000 Skopje, R. N. Macedonia; E-mail: dr.sofijazlateska@gmail.com

data, the prevalence in women older than 20 years is 17%, and in women older than 60 years 38% [2]. Despite this high prevalence, urinary incontinence remains insufficiently diagnosed and treated. It is estimated that only 25% of people with incontinence seek help. Untreated incontinence is associated with lower quailty of life, more often hospitalization, depression, social isolation and urinary infections [3]. The prevalence of urinary incontinence is 3 times higher in women than in men in all age groups [4]. The hypermobility of the bladder neck is closely related to the onset of stress urinary incontinence (SUI). Pathophysiology of SUI includes inadequate anatomic support of the blader neck and the proximal urethra, which results in hypermobility and descent because of increased intra-abdominal pressure. One of the noninvasive, but unfortunately not so attractive diagnostic tool is transperineal ultrasound (TPUS) [5]. Previous studies have established that this is a very sensitive method for evaluation of the urethral mobility. A lot of parameters and angles are included enabling a complete evaluation of urethral mobility and research continues in the right direction for determining the most adequate ultrasound technique. In addition, the most commonly used parameters are the front urethral angle (α angle defined with the os that passes through the proximal urethra on one side and os that passes through symphysis pubica on the other side) showing the mobility of the bladder neck, and posterior urethrovesical angle (β angle, located between the proximal urethra and posterior wall of the bladder) showing the mobility of the proximal part of the urethra [6]. Because this is a common condition, the evaluation of the patient should begin with an assessment of the stage of this condition and its impact on her lifestyle. For this purpose, we used a standard questionnaire, detailed anamnesis, obstetric anamnesis, information about urinary infections, surgical or neurological disorders and medications she was taking for other health issues.

Materials and methods

This was a prospective cohort randomized study, conducted at the University Clinic for Gynecology and Obstetrics in Skopje and included 40 patients with diagnosed SUI. The study was approved by the Ethics Committee of the Faculty of Medicine in Skopje and a written consent for participation in the study was obtained.
Patients were divided into two groups:

- First group: 20 patients with isolated SUI without genital prolapse or eventual prolapse of the anterior vaginal wall-urethrocystocellae, in whom pleated colposuspension was performed and
- Second group: 20 patients with intravaginal genital prolapse and SUI, in whom transabdominal hysterectomy with bilateral adnexectomy+pleated colposuspension were performed.

All of the patients were thoroughly investigated (vaginal exam, questionnaire and ultrasound) preoperatively, after 6 weeks and after 6 months of the operation.
Inclusion criteria: SUI treated with pleated colposuspension.
Exclusion criteria: exteriorized genital prolapse, which makes pressure onthe bladder neck and masks SUI, surgical and anesthesiological contraindications, patient's refusal of surgery.The study took place at the University Clinic for Gynecology and Obstetrics, Department of urogynecology and pelvic static, where the patients were recruited. Every patient had:

- A completely filled-out questionnaire for genital prolapse and SUI,
- A clinical exam,
- An ultrasound of the lower urinary tract.

The recruiting was randomized, so the data for the age, BMI and parity were derived from the randomization. The questionnaire consisted of 24 questions regarding everyday signs and symptoms during rest or any activity, both during the day and night, and how incontinence influenced on patients. *Physical exam* was made in lithotomy position, the same position in which the operation for incontinence treatment was made, in order to avoid bias. It included examination for diagnosing a genital prolapse using the POPQ system (Pelvic Organ Prolapse Quantification System) by defining nine point positions on the anterior and posterior vaginal wall, along with the Pozzy maneuver. An examination for the presence of urinary incontinence (Marshall test -the patient should cough while she is in lithotomy position while she is standing) was made, and additionally, *ultrasound of the lower urinary tract*. The bladder was filled with 300-400ml of urine, and the examination was made with the MindrayM5 ultrasound device with convex transducer of 3,5-5MHz. Our Department works in accordance with the recommendations of the German Association for Urogynecology and Functional Sonography, with some modifications.
The application of the transducer can be endosonographic or external. We used an external application with a transperineal transducer with 3.75 MHz. The anatomic orientation is as follows:

- Cranial parts should be presented at the bottom of the image.
- Ventral parts should be presented on the right side of the image.
- It is very important to define the correct position of the bladder neck by using the

coordinate system.

Results

The two investigated groups were treated with different surgical methods. In the first group, an isolated pleated colposuspension was made, and in the second

group, in addition to pleated colposuspension, a total abdominal hysterectomy with bilateral adnexectomy was made. The values of α and β angles were measured before and after the mentioned surgical treatments (Figures 1, 2, 3 and 4) measurments before surgigal treatment). The control of urinary stress incontinence and its dynamic was evaluated using the Marshall test at rest and Valsalva maneuver, and the values of the angles were measured with a transperineal ultrasound at two different time points, at 6 weeks and at 6 post-surgery. Of all the parameters that were included for every single patient, a standard descriptive analysis was made and the results are presented in Table 1 and the results of paired *t* test for changes in α and β angles before and after surgical treatment are presented in Table 2.

Table 1. Results of descriptive statistical analysis for α and β angles in patients

Angle/^{0}	N	Range	Min	Max	Mean	S.E	S.D.	Variance
$\alpha_r{}^0$	40.0	99.0	48.0	147.0	84.9	3.1	19.6	383.2
$d\alpha_v{}^0$	40.0	93.0	34.0	127.0	83.0	3.2	20.1	404.1
$\beta_r{}^0$	40.0	104.0	91.0	195.0	131.9	3.9	24.7	609.7
$\beta_v{}^0$	40.0	141.0	40.0	181.0	126.1	4.6	29.0	843.4
$\alpha_r{}^1$	40.0	72.0	30.0	102.0	63.7	2.7	16.9	285.5
$\alpha_v{}^1$	40.0	59.0	32.0	91.0	60.3	2.9	18.5	341.3
$\beta_r{}^1$	40.0	82.0	63.0	145.0	100.4	3.3	20.9	435.0
$\beta_v{}^1$	40.0	87.0	57.0	144.0	94.1	3.3	21.0	441.5
$\alpha_r{}^3$	40.0	74.0	30.0	104.0	64.6	2.6	16.6	274.7
$\alpha_v{}^3$	40.0	70.0	32.0	102.0	63.8	3.2	20.1	404.3
$\beta_r{}^3$	40.0	92.0	55.0	147.0	101.5	3.4	21.6	465.3
$\beta_v{}^3$	40.0	81.0	64.0	145.0	96.2	3.1	19.6	384.1

$\alpha_r{}^n$ $\beta_r{}^n$; indexes: r (rest); *v* - Valsalva, 0 -pre-surgical (onset), and after surgical treatment

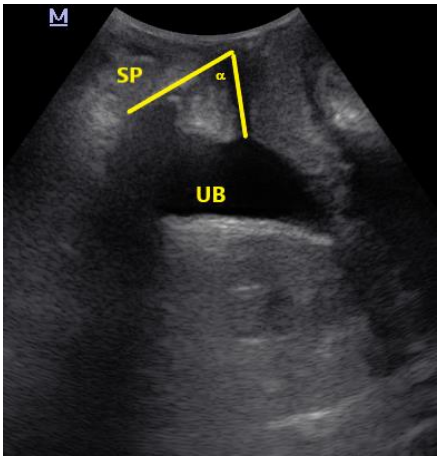

Fig. 1. α angle during rest

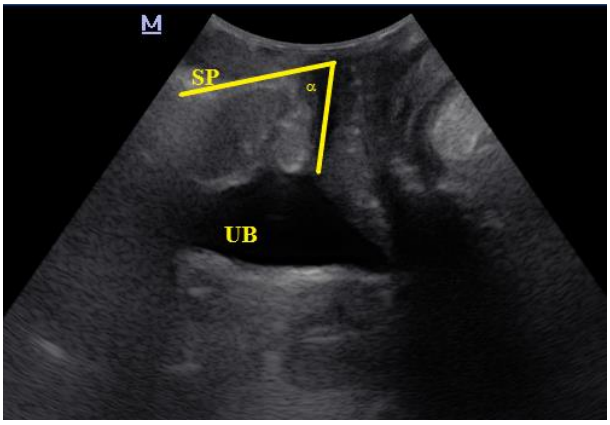

Fig. 3. α angle during Valsalva maneuver

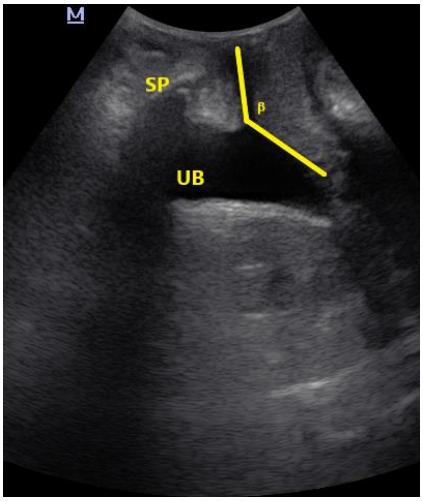

Fig. 2. β angle during rest

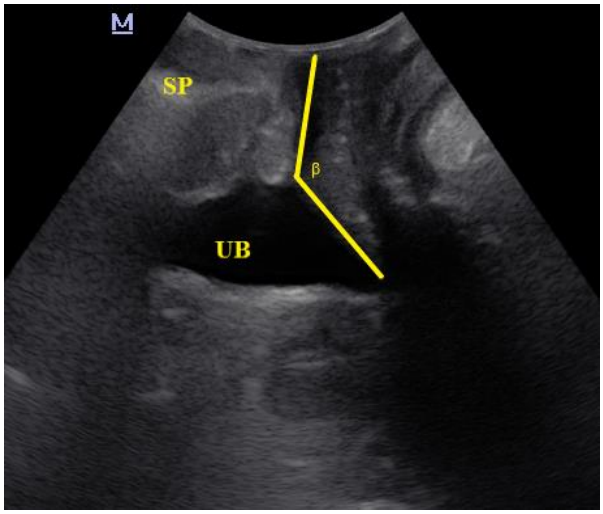

Fig. 4. β angle during Valsalva maneuver

Table 2. Results of paired *t* test for changes in α and β angles before and after surgical treatment

	Mean	S.D	S.E.	Uper and lower limits		t	df	Statistical significance
$\alpha_r^3 - \alpha_r^0$	-16.30	12.55	2.81	-22.17	-10.43	-5.81	19	≤ 0.000
$\alpha_v^3 - \alpha_v^0$	-15.45	18.97	4.24	-24.33	-6.57	-3.64	19	≤ 0.002
$\beta_r^3 - \beta_r^0$	-31.55	25.53	5.71	-43.50	-19.60	-5.53	19	≤ 0.000
$\beta_v^3 - \beta_v^0$	-34.15	21.40	4.79	-44.17	-24.13	-7.14	19	≤ 0.000

$\alpha_r{}^n\beta_r{}^n$; index : *m- r* rest; *v Valsalva*, 0 - preoperative (on onset) and postoperatively

Discussion

Because of the fact that SUI is a significant medical issue, its diagnosis is of exceptional importance. However, even today, the definitive diagnosis is made only with physical examination. Ultrasound (US) is not intended to replace clinical history taking or physical examination, but instead provides a better understanding of the disease entity [7]. Much research regarding diagnosis tends to change the focus towards new methods, such as ultrasound. To be more concrete, transperineal ultrasound can be a standard tool with high repeatability.

Transperineal ultrasound of the lower urinary tract, especially of the bladder neck and its relationships with surrounding structures, like statically during rest and dynamically during Valsalva maneuver,

promise a great step forward in standardization of diagnostics, its objectification and assessment of the success of SUI treatments [6].

In this study, we assessed the success of pleated colposuspension in patients with SUI, who were divided into two groups.

The first group encompassed female patients who underwent isolated pleated colposuspension, and the second group consisted of female patients who, in addition to pleated colposuspension, also underwent total abdominal hysterectomy with bilateral adnexectomy. Measuring α and β angles, before, 6 weeks and 6 months after the operation, showed a significant reduction in these two angles in both groups, especially in the second one, as well as reduced mobility of the bladder neck. This is one step further in finding a definite diagnostic protocol, as well as a predictive factor for follow-up of patients diagnosed with SUI and surgically treated.

There are studies in which comparison of the angles was made, but the control group consisted of healthy individuals, and the other group of patients with SUI [8-10]. The results are consistent with the findings from our study, which makes the applicability of the transperineal ultrasound more convincing as a noninvasive and easily available diagnostic tool.

Conclusion

This study underscores the efficiency of pleated colposuspension in patients with SUI, regardless of whether it is performed isolated or together with total abdominal hysterectomy with bilateral adnexectomy, because it enables repair of the exact physiologic anatomy of the pelvic floor. This helps to correct the symptoms of incontinence, and improves quality of life. We define this improvement not only subjectively by patients' statements, but also objectively by using transperineal ultrasound of the lower urinary tract. To be more concrete, by measuring the α and β angles, we show the mobility of the bladder neck. The results have shown decreased values after surgical intervention, indicating that the mobility of the bladder neck decreased. Clinically, this is manifested by a reduction in symptoms. Based on these results, we can conclude that this noninvasive method, which is easy to be applied, can become a part of the algorithm for diagnosis, evaluation and follow-up of patients with SUI who underwent surgical treatment for incontinence.

Conflict of interests: None declared.

References:

1. Tennstedt SL, Link CL, Steers WD, McKinlay JB. Prevalence of and risk factors for urine leakage in a racially and ethnically diverse population of adults: The Boston area community health (BACH) survey. *Am J Epidemiol* 2008; 167(4): 390-399.
2. Wu JM, Vaughan CP, Goode PS, *et al*. Prevalence and Trends of Symptomatic Pelvic Floor Disorders in U.S. Women. *Obstet Gynecol* 2014; 123(1): 141-148.
3. Lin KY, Siu KC, Lin KH. Impact of lower urinary tract symptoms on work productivity in female workers: A systematic review and meta-analysis. *Neurourol Urodyn* 2018; 37(8): 2323-2334.
4. Milsom I, Gyhagen M. The prevalence of urinary incontinence. *Climacteric* 2019; 22(3): 217-222.
5. Al-Saadi WI. Transperineal ultrasonography in stress urinary incontinence: The significance of urethral rotation angles. *Arab J Urol* 2016; 14(1): 66-71.
6. Pregazzi R, Sartore A, Bortoli P, *et al*. Perineal ultrasound evaluation of urethral angle and bladder neck mobility in women with stress urinary incontinence. *BJOG An Int J Obstet Gynaecol* 2002; 109(7): 821-827.
7. Tseng LH. Ultrasound in urogynecology: An update on clinical application. *J Med Ultrasound* 2007; 15(1): 45-57.
8. Torella M, De Franciscis P, Russo C, *et al*. Stress urinary incontinence: Usefulness of perineal ultrasound. *Radiol Medica* 2014; 119(3): 189-194.
9. Mishra VV, Solanki SB. Transperineal ultrasonography in stress urinary incontinence. *Int J Reprod Contraception, Obstet Gynecol* 2022; 11(6): 1748.
10. Turkoglu A, Coskun ADE, Arinkan SA, Vural F. The role of transperineal ultrasound in the evaluation of stress urinary incontinence cases. *Int Braz J Urol* 2022; 48(1): 70-77.