

Artigo Original/Original Article

Influência dos dados pré-operatórios nos resultados funcionais após cirurgia de reparação da incontinência urinária feminina por via transobturadora

Implications of pre-operative data in the functional results after transobturator approach for surgical repair of female urinary incontinence

Ana Cláudia Rodrigues *, Ana Rita Abreu *, Helena Lopes *, Cristina Frutuoso **, Teresa Rebelo **, Francisco Falcão ***, Carlos Freire-de-Oliveira ****

Departamento de Medicina Materno – Fetal, Genética e Reprodução Humana, Serviço de Ginecologia, Hospitais da Universidade de Coimbra, Portugal; Clínica Ginecológica da Faculdade de Medicina da Universidade de Coimbra

Abstract

Objective: To determine if preoperative variables can predict the functional results after surgical transobturator approach techniques for the treatment of female urinary incontinence.

Population: A total of 359 women submitted to surgical treatment for urinary incontinence using transobturator tape procedures between January 2003 and May 2007.

Setting: A tertiary care university hospital.

Design: Retrospective observational study.

Methods: Patients were divided in two groups: A- those with cure or improvement of urinary incontinence and B- those with persistent postoperative urinary incontinence. The two groups were compared in relation to age, parity, hormonal status, body mass index, co-morbidities, associated uro-genital prolapse, clinical and urodynamic characteristics of urinary incontinence, surgical technique, existence of previous or associated pelvic surgery and peri- or postoperative complications.

Results: A total of 291 women were included in group A and 68 in group B. Mean age at time of treatment was 54.7 vs 56.6 years (p=n.s.). Multiparity, menopause, obesity, co-morbidities and associated prolapse were also similar in both groups. Mixed urinary incontinence (49.8% vs 98.5%; p<0.001), detrusor overactivity (2.3% vs 15.9%; p=0.001) and urethral hypotonia (3.9% vs 27.3 %; p<0.001) were more frequent in group B. Surgical technique, presence of previous or associated pelvic surgery, occurrence of peri- and postoperative complications were similar in both groups. On multivariate analysis, the presence of mixed urinary incontinence or urethral hypotonia remained predictive of less successful results.

* Interna Complementar de Ginecologia/Obstetrícia

** Assistente Hospitalar de Ginecologia

*** Assistente Graduado de Ginecologia

**** Director do Serviço, Professor Catedrático da Faculdade de Medicina da Universidade de Coimbra

Conclusions: The presence of mixed incontinence and urethral hypotonia are factors associated with poorer success rates in surgical treatment of urinary incontinence using transobturator tape procedures.

Keywords: Transobturator approach, urinary incontinence, functional results, preoperative data

INTRODUCTION

Urinary incontinence, defined as the complaint of any involuntary leakage of urine, is an uncomfortable and embarrassing problem, with a negative impact in women's quality of life¹.

The prevalence of urinary incontinence increases with age. Therefore, with the aging of our population, urinary incontinence is becoming a major health issue. It is estimated that 26% of women at reproductive age and 30-40% of post-menopausal women suffer from urinary incontinence².

Besides the age factor, many others play a role in the development and aggravation of urinary incontinence, such as female gender, obesity, smoking, menopause status, obstetric trauma, pelvic surgery or connective tissue abnormalities^{3,4}.

More than 100 operative procedures have been described for the treatment of female stress urinary incontinence. Common to most of these surgical procedures is the restoration of bladder neck or urethral support by the reinforcement of the pubourethral ligaments and by the elevation of the urethrovesical junction⁵.

Transobturator tape procedures are minimally invasive surgical techniques, which are being increasingly performed in the treatment of urinary incontinence. In these techniques, a tape is inserted tension-free in a horizontal plane underneath the middle of the urethra between the two obturator foramina. The main advantage of this approach is its high success rate associated with a reduction in bladder, bowel and vascular injury, as it avoids the retropubic space⁶.

There are few studies analysing the effect of patient characteristics on the outcome of transobturator tape procedures. Thus, the authors aimed to detect if preoperative variables could predict the functional results of surgical transobturator approach techniques for the treatment of female urinary incontinence.

MATERIAL AND METHODS

The present study involved women who underwent a transobturator tape procedure in a tertiary care university hospital between January 2003 and May 2007. The decision to operate took into account the impact of incontinence episodes on daily life and the response to nonsurgical measures. Patients with mixed urinary incontinence were counselled that transobturator tape procedures are not the first line treatment to urge complaints and these are likely to remain the same or worsen postoperatively.

Before surgery, our protocol included a standardized clinical history, a physical examination, a one hour-pad test and a urodynamic study.

Clinical history was elaborated to elucidate the type, duration, frequency and severity of the urinary incontinence and its impact on the patient's life. Women were also asked about their obstetric past, hormonal status, co-morbidities, chronic medication and previous hysterectomy and/or vaginal or bladder surgeries.

The physical examination included an assessment of weight, height and a gynecologic examination. The integrity of the urethra and vaginal walls was assessed and, in cases of pelvic organ prolapse, it was quantified, according to Juma *et al*⁷. The stress test (full bladder) and the cotton-tipped swab test ("Q-Tip Test"), according to Walters⁸, were also included in the physical observation.

The one-hour pad test consisted in the quantification of urine lost (pad weight) under standardized conditions (walking, coughing, hands in water...) after prior ingestion of 500 ml of water. A pad weighing more than 4g was considered positive.

In the presence of urge symptoms, clinical findings not correlated with symptoms or unclear diagnosis, a urodynamic study (uroflowmetry, cystometry, pressure flow study), as described by Karram *et al*⁹, was conducted.

Two surgical transobturator approach techniques for stress urinary incontinence were included: transobturator tape “outside in” (TOT) and tension-free vaginal tape-obturator “inside out” (TVT-O). All procedures remained unchanged over the study period and were made according to the original description by E. Delorm⁶ and by de Leval¹⁰, using a non-elastic polypropylene tape, under deep sedation with ventilatory support. In both techniques, a catheter was inserted into the bladder to provide continuous urinary drainage in the first six postoperative hours. Then at least two post-void residual urine measurements were obtained; a value less than 20% of the urine volume resulting from spontaneous voiding was considered normal.

The patients were postoperatively followed between one and three months and then at the first, third and fifth year; women included had at least one postoperative observation. During the follow up, all patients underwent a quality-of-life questionnaire and a physical examination with stress test (full bladder), to assess the functional results and the postoperative complications. The quality-of-life questionnaire analysed episodes of leakage, extent of patient’s urinary symptoms and limitations on household, social and sexual activities.

Based on postoperative functional results, patients were categorized as having good results (Group A) or as having poor results (Group B). Good results included cure (absence of subjective leakage of urine and a negative stress test) or improvement (global satisfaction of women associated with a significant reduction in the episodes of urinary incontinence and absence of objective leakage of urine in stress test) of urinary symptoms. All other cases - which remain the same or worsen and/or had a positive stress test - were considered poor results.

The following aspects were evaluated and compared between the two groups: age at time of treatment, rate of multiparity (parity ≥ 2), menopause, obesity (BMI ≥ 30 kg/m²), co-morbidities, associated uro-genital prolapse (grade ≥ 2), mixed urinary incontinence, detrusor overactivity, urethral hypotonia, surgical technique (TOT or TVT-O), previous or associated pelvic surgery (hysterectomy or vaginal/bladder surgery), and per or postoperative complications.

Co-morbidities included hypertension and cardiovascular diseases, psychiatric diseases, neurological diseases, chronic lung diseases, diabetes mellitus and obstipation.

Mixed urinary incontinence was defined as the presence of stress urinary incontinence, associated with overactive bladder symptoms such as urgency, frequency and nocturia, and/or urge incontinence.

Detrusor overactivity refers to involuntary detrusor contractions observed during urodynamic studies. Urethral hypotonia was defined by a Valsalva leak point pressure (VLPP) below 60 cm H₂O or a maximal urethral closure pressure (MUCP) below 20cmH₂O on urodynamic study.

The statistical analyses were performed using the program SPSS® 14. Comparisons were made using the student’s t-test for continuous variables, and the chi-squared test for categorical variables, as appropriate. $p < 0.05$ was considered to denote statistical significance.

The variables with a p value less than 0.05 on univariate tests were analysed by a binary logistic regression model.

RESULTS

Of the assessed women, 291 had good results (Group A) and 68 poor results (Group B).

The study results according to the postoperative functional results are summarised in Tables I.

Mean age at time of treatment was 54.7 vs. 56.6 years in group A and B, respectively ($p = n.s.$). The percentage of multiparous women was similar in both groups (82.8% vs. 80.9%, $p = n.s.$). Obesity affected 84 women in group A and 25 in group B (28.9% vs. 36.8%, $p = n.s.$). A larger proportion of women in group B had co-morbidities, but without statistical significance (70.1% vs. 73.5%). Associated pelvic organ prolapse was present in 70 women in the group with good results and 16 in the group with poor results (24.0% vs. 23.5%, $p = n.s.$).

Mixed urinary incontinence was more frequent in Group B (49.8% vs. 98.5%; $p < 0.001$).

One hundred and seventy-seven women (60.8%) in Group A and 44 (64.7%) in Group B were submit-

Table I. Preoperative data and functional results after transobturator tape procedures.

	Group A(n=291)	Group B(n =68)	p
Epidemiological variables			
Mean age (standard deviation)	54.7 (±9.6)	56.6 (±9.9)	NS
Multiparity n (%)	241 (82.8%)	55 (80.9%)	NS
Post-menopausal status n (%)	198 (68.0%)	49 (72.1%)	NS
Obesity n (%)	84 (28.9%)	25 (38.8%)	NS
Co-morbidity n (%)	204 (70.1%)	50 (73.5%)	NS
Associated prolapse n (%)	70 (24.0%)	16 (23.5%)	NS
Clinical and urodynamic variables			
Mixed urinary incontinence n (%)	145 (49.8%)	67 (98.5%)	<0.001
Detrusor overactivity n (%) *	4 (2.3%)	7 (15.9%)	0.001
Urethral hypotonia n (%)*	7 (3.9%)	12 (27.3%)	<0.001
Surgical variables			
TOT n (%)	50 (17.2%)	15 (22.1%)	NS
TVT-O n (%)	241 (82.8%)	53 (77.9%)	NS
Prior pelvic surgery n (%)	35 (44.0%)	128 (51.7%)	NS
Associated pelvic surgery n (%)	88 (30.2%)	15 (22.1%)	NS
Per and postoperative complications			
Overall morbidity n (%)	39 (13.7%)	14 (19.1%)	NS

* Expressed as % of those who were submitted to urodynamic evaluation.

ted to a urodynamic study (p=n.s.). There were four cases of detrusor overactivity on urodynamic study in group A and seven in group B (2.3% vs. 15.9%; p=0.001). Urethral hypotonia was found in nineteen cases: seven in group A and 12 in group B (3.9% vs. 27.3%; p<0.001).

Concerning the surgical technique, TOT was the selected procedure in 17.2% vs 22.1% and TVT-O in 82.8% vs 77.9%. Other pelvic surgery was associated in 30.2% vs. 22.1%. Fifty-two percent vs. 44% had a previous pelvic surgery. None of these characteristics differed significantly between the two groups.

The overall complication rate was similar in the two groups (13.7% vs. 19.1%, p=n.s.). Per and postoperative complications included one case of intraoperative bowel injury, two cases of hemorrhage

(<100mL), 22 cases of persistent pain, nine cases of lower urinary tract infection, 10 cases of bladder retention, two cases of vaginal hematoma, three cases of vaginal erosions and four cases of *de novo* urge incontinence.

The multivariate analysis showed that the presence of mixed urinary incontinence (OR 0.044, IC95% 0.006-0.321, p=0.002) or urethral hypotonia (OR 0.175, IC95% 0.040-0.770, p=0.021) were risk factors for poor results (Table II).

DISCUSSION

There are only a few studies regarding predictive factors for persistent urinary incontinence after surgical treatment using midurethral slings. The majority of

Table II. Multivariate logistic analysis

	OR (IC 95%)	p value
Mixed urinary incontinence n (%)	0.044 (0.006-0.321)	0.002
Detrusor overactivity n (%)*	0.952 (0.144-6.281)	NS
Urethral hypotonia n (%)*	0.175 (0.040-0.770)	0.021

those concerned the retropubic route and had contradictory results. Identification of factors associated with poor results after surgery is important, because it may prove helpful in women's counselling and in the choice of therapeutic measures.

Aging and urinary incontinence are closely associated. Incontinence in aging women results of a decrease in the storage capacity, a reduction on receptor response, a loss in muscle tone and the long-term effects of denervation injury experienced during parturition⁴. In our population, mean age at time of treatment was similar in both groups. Moreover, in a study of Purnichescu *et al*¹², aging not appears to affect the surgical results.

In spite of a few inconsistencies of the available data regarding the role of pregnancy and route of delivery on urinary incontinence, several publications^{3,4} reported damage of pelvic floor neuromusculature during pregnancy and childbirth, resulting in future urinary incontinence. Our results suggested that multiparity did not seem to be a predictor of poor outcomes, corroborating Purnichescu *et al*¹².

Because the urethra and the trigone are estrogen-dependent tissues, menopausal status and hypoestrogenism may contribute to urinary incontinence¹³. In our data, functional results were not related to the patient's hormonal status, maybe because most of the menopausal women were under local estrogen therapy. The majority of published studies¹² found similar results.

Evidence suggests that the prevalence of urinary incontinence increases proportionately to a rising BMI, by reduction of the continence gradient between the urethra and the bladder¹⁴. As with the aging of the population, the high prevalence of obesity is likely to increase urinary incontinence⁴. The present study, as previous researches^{12,15}, did not find any relation between poor results and obesity.

Certain diseases, such as chronic coughing from lung diseases and chronic constipation, may increase the abdominal pressure and contribute to the development and/or aggravation of urinary incontinence¹⁴. Cardiovascular and neurological illness can provoke overactive bladder¹⁶. Diabetes is associated with an increased risk of urinary incontinence, but the causes

for that are unknown¹⁷. In the assessed population, no association between co-morbidities and less successful results was established. On the contrary, Paick *et al*¹⁸, who evaluated the outcome at least 6 months after tension-free vaginal tape or transobturator tape in a total of 464 women, concluded that co-morbidity was an independent risk factor for postoperative persistent urinary incontinence.

Urinary incontinence and pelvic organ prolapse are strongly associated; both have a high incidence in the elderly population and similar risk factors⁴. Our results were in keeping with those who suggested that the presence of associated uro-genital prolapse does not mean a poor outcome¹². However, Paick *et al* associated severe grade of cystocele with persistent urinary incontinence¹⁸.

Between 29 and 61% of women with incontinence had mixed urinary incontinence¹⁹. The first line treatments for urge urinary incontinence are medical and conservative measures, such as anticholinergics and pelvic floor exercises, but if urge symptoms result from the stretching of the pelvic nerves when the abdominal pressure increases or from urine entrance in the proximal urethra in cases of intrinsic deficiency sphincter^{20,21}, they can be alleviated by the restoration of urethral support²². Nevertheless, the presence of overactive bladder symptoms, urge urinary incontinence, involuntary bladder contractions and intrinsic sphincter deficiency has been associated with lower objective and subjective postoperative cure rates than those of genuine stress urinary incontinence with urethral hypermobility¹⁸. A hypothesis to explain why women with mixed urinary incontinence, detrusor overactivity and urethral hypotonia had poor results is that those may be due to more severe forms of stress urinary incontinence²³. Our results were concordant with these authors. However, in a study of 70 women who underwent transobturator tape, maximal urethral closure pressure and clinical vesical hyperactivity did not appear to influence results¹². Latthe *et al*¹⁵ also showed that the cure rate after transobturator tape was not related to the preoperative urodynamics.

In the present study, the use of TOT or TVT-O procedures had no influence in surgical results. Similar finds were already published by Lee *et al*, in a pro-

spective randomized trial²⁴ comparing the outcome after TOT and TVT-O, which concluded that both techniques are a simple, safe and effective treatment for urinary female stress urinary incontinence and equals in terms of cure, improvement, failure, operation time and complications.

Previous pelvic surgery can produce pelvic-floor nerve injury resulting in urinary incontinence. On the other hand, women who require surgical correction of urinary incontinence frequently require concurrent surgery for pelvic organ prolapse correction²⁵. These additional procedures, as well as previous pelvic surgery, seem to not affect the outcome¹⁵.

Transobturator tape procedures have no bladder injuries and fewer postoperative complications⁶. Latthe *et al.*¹⁵ found no relation between complications and postoperative functional results, which is in concordance with our results.

The authors founded a rate of positive results of 81%. Inferior results of those observed in literature are probably explained by the higher preoperative mixed incontinence index^{12,15,18}.

In spite of the limitations of the present study, we can conclude that the outcome of transobturator procedures for urinary incontinence seems to be influenced by the type of urinary incontinence and their preoperative urodynamic characteristics. Therefore, randomized trials are needed to confirm these findings.

REFERENCES

- Abrams P, Cardozo L, Fall M, Griffiths D, Rosier P, Ulmstein U et al. The standardisation of terminology of lower urinary tract infection: report from the standardisation sub-committee of the International Continence Society. *Neurourol Urodyn* 2002; 21:167-78.
- Seller RH (eds.). *Differential Diagnosis of Common Complaints*. 4th edn. Philadelphia PA: Elsevier Science, 2000. pp 394-401.
- Parazzini F, Colli E, Origgi G, Surace M, Bianchi M, Benzi G et al. Risk Factors for Urinary Incontinence in women. *Eur Urol* 2000; 37: 637-43.
- Luber KM. The definition, prevalence and risk factors for stress urinary incontinence. *Rev Urol* 2004; 6 (Suppl 3): S3-S9.
- Petros PE, Ulmstein UI. An integral theory and its method for the diagnosis and management of female urinary incontinence. *Scand J Urol Nephrol* 1993; 153: 1-93.
- Delorme E. Transobturator urethral suspension: mini-invasive procedure in the treatment of stress urinary incontinence in women. *Prog Urol* 2001; 11: 1306-13.
- Juma S, Little NA, Raz S. Evaluation of stress urinary incontinence. In: Buchsbaum HJ, Schmidt JD (eds.). *Gynecologic and Obstetric Urology*. Philadelphia WB: Elsevier Saunders, 1993. pp 251-63.
- Walters MD. Evaluation of urinary incontinence: history, physical examination and office tests. In: Walters MD, Karram MM (eds.). *Urogynecology and Reconstructive Pelvic Surgery*. 2nd edn. St Louis MO: Mosby, 1999. pp: 45-53.
- Karram MM, Miklos JR. Urodynamics: cystometry, voiding studies, urethral pressure profilometry and leak point pressures. In: Walters MD, Karram MM (eds.). *Urogynecology and Reconstructive Pelvic Surgery*. 2nd edn. St Louis MO: Mosby, 1999. pp: 55-93.
- de Leval J. Novel surgical technique for the treatment of female stress urinary incontinence: transobturator vaginal tape inside-out. *Eur Urol* 2003; 44: 724-30.
- Kershen RT, Appell RA. De novo urge syndrome and detrusor instability after anti-incontinence surgery: current concepts, evaluation and treatment. *Curr Urol Rep* 2002; 3: 345-53.
- Purnichescu V, Cheret-Benoist A, Eboué C, Von Theobald P. Surgical treatment for female stress urinary incontinence by transobturator tape (outside in). Study of 70 cases. *J Gynecol Obst Biol Reprod* 2007; 36: 451-8.
- Batra SC, Losif CS. Female urethra: target for estrogen action. *J Urol* 1983; 129: 418-20.
- Hannestad YS, Rortveit G, Daltveit AK, Hunskaar S. Are smoking and other lifestyle factors associated with female urinary incontinence? The Norwegian EPINCONT Study. *Br J Obstet Gynaecol*. 2003; 110: 247-54.
- Latthe PM, Patodi M, Constantine G. Transobturator tape procedure in stress urinary incontinence: UK experience of a district general hospital. *J Obstet Gynaecol* 2007; 27: 177-80.
- Clare J. Neurological disorders of micturition and their treatment. *Fowler Brain* 1999; 122: 1213-31.
- Brown JS, Vittinghoff E, Lin F, Nyberg LM, Kusek JW, Kanaya AM. Prevalence and Risk Factors for Urinary Incontinence in Women with Type 2 Diabetes and Impaired Fasting Glucose: findings from the National Health and Nutrition Examination Survey. *Diabetes Care* 2006; 29: 1307-12.
- Paick JS, Cho MC, Oh SJ, Kinn SW, Ku JH. Factors influencing the outcome of mid urethral sling procedures for female urinary incontinence. *J Urol* 2007; 178: 985-9.
- Sandvick H, Hunskaar S, Vanvik A, Bratt H, Seim A, Hermstad R. Diagnostic classification of female urinary incontinence: an epidemiological survey corrected for validity. *J Clin Epidemiol* 1995; 48: 339-43.
- Serels SR, Rackley R, Appell R. Surgical treatment for stress urinary incontinence associated with Valsalva induced detrusor instability. *J Urol* 2000; 163: 884-7.
- Koonings P, Bergman A, Ballard CA. Combined detrusor instability and stress urinary incontinence: where is the primary pathology? *Gynecol Obstet Invest* 1988; 26: 250-6.
- Walters M. Retropubic operations for genuine stress urinary continence. In: Walters MD, Karram MM (Eds.). *Urogynecology and reconstructive pelvic surgery*. 2nd edn. St. Louis MO: Mosby, 1999. pp.159-69.
- Bump RC, Norton PA, Zinner NR, Yalcin I. Mixed urinary symptoms: crodynamic finding, incontinence severity and treatment response. *Obstet Gynecol* 2003; 102:76-83.
- Lee KS, Choo MS, Lee YS, Han JY, Kim JY, Jung BJ et al Prospective comparison of the 'inside-out' and 'outside-in' transobturator-tape procedures for the treatment of female stress urinary incontinence. *Int Urogynecol J Pelvic Floor Dysfunct*. 2008; 19: 577-82.
- Hart SR, Moore RD, Miklos JR, Mattox TF, Kohli N. Incidence of concomitant surgery for pelvic organ prolapse in patients surgically treated for stress urinary incontinence. *J Reprod Med* 2006; 51: 521-4.