

Surgical cure of nocturia using 4 different methods based on strengthening the structural supports of the vaginal apex - a short review

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Abstract: Data is presented indicating that nocturia and other “posterior fornix” symptoms such as urgency, abnormal emptying and chronic pelvic pain can be cured/improved in up to 86% of patients using 4 different surgical operations, all of which suspend the vaginal apex: uterosacral ligament plication, infracoccygeal sacropexy sling, posterior TFS (Tissue Fixation System) sling and abdominal sacrocolpopexy. Besides nocturia, other symptoms such as urgency and chronic pelvic pain were also improved by all methods. An anatomical hypothesis for cure of nocturia is presented: a vaginal apex competently supported by the posterior ligaments of vagina prevents activation of the bladder base stretch receptors. A simple test for this hypothesis is to insert a large tampon into the apex overnight to support it; many patients report relief of their nocturia.

Keywords: Nocturia; Urgency; Chronic pelvic pain; Abnormal bladder emptying; Apical laxity; Uterosacral ligaments.

INTRODUCTION

Nocturia increases linearly with age, occurring in more than 50% of women ≥ 80 years old.¹ A recent supplement in Neurourology and Urodynamics more extensively investigated this problem, summarizing current thoughts on etiology,² renal physiology³ economic impact,⁴ effect on patient Quality of Life,⁵ Role of pharmacotherapy⁶ and future research.⁷ The conclusions were that nocturia has a major effect on quality of life,⁵ costs the community up to 62 billion dollars p.a.⁵ The authors of the nocturia supplement concluded there was no effective treatment to date.

Not mentioned was the Integral Theory paradigm which describes nocturia in women as part of a complex of symptoms caused by laxity in the apical supports of the vagina, “Posterior Fornix Syndrome”: nocturia, chronic pelvic pain, urgency and abnormal emptying.⁸ The ultimate pathogenesis of all these symptoms relates to inability of the three directional vector forces to stretch the vaginal membrane sufficiently to support the bladder base stretch receptors because the vector insertion point, the uterosacral ligament, is loose.⁹ Cure in up to 80% of nocturia cases has been reported in the literature for almost 20 years using operations which mechanically support the posterior vaginal fornix.¹⁰⁻¹⁸

The purpose of this submission is to open a scientific debate by presenting peer review data of nocturia cured by strengthening the uterosacral ligaments.

Simple uterosacral ligament plication, figure 1

This simple operation, plicating lax uterosacral ligaments (USL) under LA (local anesthesia) gave good initial cure rates for Posterior Fornix symptoms,⁹ but was abandoned by 1994 in favour of the posterior sling (Infracoccygeal Sacropexy or Posterior IVS)¹⁰ because of diminishing longer term cure rates. However, in the context of nocturia being an “incurable disease”,^{1,6} given that the more effective sling operations are not widely available, a simple posterior fornix repair, fig1, will give significant relief in $>50\%$ of patients⁸ if improvement is seen on inserting a large tampon in the apex overnight.

Infracoccygeal sacropexy (Posterior IVS)

This operation attaches the vaginal apex to the fascia of the sacropinus ligament using thin strips of polypropylene mesh tape.¹⁰ Nocturia was cured in 80% of patients,

with varying cure rates for the other posterior fornix symptoms: frequency 85% (n = 42), urge incontinence 86% (n = 74), emptying symptoms 50% (n = 65), mean residual urine >50 ml from 110 ml to 63 ml. Equal numbers of patients had 1st or 2nd degree apical prolapse (Baden Walker classification).

In 2002 Farnsworth reported cure rates for urgency 79%, nocturia 82% and pelvic pain 78%.¹¹ In 2005, Sivaslioglu reported cure rates for pelvic pain 82%, urgency 75%, nocturia 86%, ‘obstructed’ micturition 93%.¹² In 2007, Abendstein reported cure rates for urge incontinence 76%, pelvic pain 79%, nocturia 86%.¹³

Sacrocolpopexy (SCP)

A 4-5cm wide mesh suspends vaginal apex to the sacral promontory. In 1999, Pilsgaard et al reported cure of urge incontinence, frequency, nocturia and voiding problems in 75%, 80%, 50% and 100% of patients after abdominal sacrocolpopexy.¹⁴ In an RCT between Posterior IVS and SCP in 2011 for apical prolapse, Sivaslioglu reported statistically significant cure rates for nocturia and chronic pelvic pain for the PIVS posterior sling, but no change with abdominal sacrocolpopexy.¹⁵

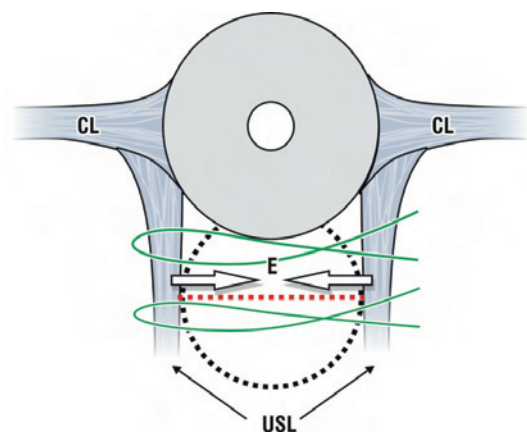


Figure 1. – Simple posterior fornix repair. A transverse incision is made in the posterior fornix 3-4cm below the cervix. A large No1 needle is inserted widely laterally below the vaginal skin and the loose uterosacral ligaments (USL) are approximated (arrows) with a strong Vicryl or polypropylene sutures. CX= cervix; CL=cardinal ligament; E=enterocele.

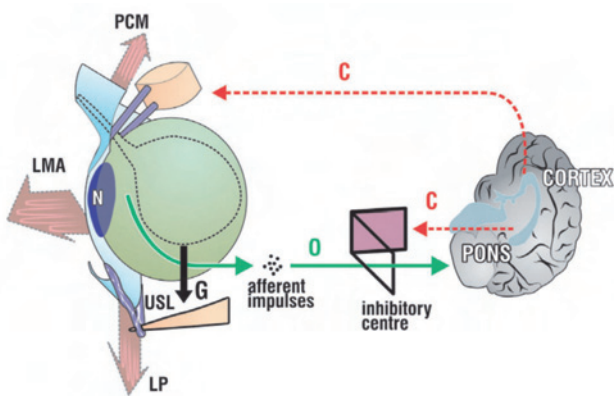


Figure 2. – **A mechanical hypothesis for nocturia causation** - patient asleep, supine Pelvic muscles (arrows) are partly relaxed. As the bladder (broken outline) fills, it is distended downwards by gravity G. If the uterosacral ligaments (USL) are loose, the bladder base continues to descend until the stretch receptors ‘N’ are stimulated, activating the micturition reflex. Once the closure reflex ‘C’ has been overcome, the afferent impulses reach the pons and activate the micturition reflex.

TFS (Tissue Fixation System)

Thin 0.7 mm wide polypropylene tapes attached to a 4x11mm soft tissue reinforced the uterosacral ligaments using theTVT neoligament principle.¹⁶ Cure rates reported after posterior TFS (Tissue Fixation System) sling¹⁶ in 67 patients were: frequency>10/day 63% (n=27); nocturia >2/night 83% (n=47); urge-incontinence >2/day 78% (n=36); abnormal emptying, 73% (n=54); pelvic pain, 86%(n=46) fecal incontinence, 87% (n=23). One third of patients had only 1st degree apical prolapse (Baden-Walker classification).

In 2013,¹⁷ Inoue published TFS data in 337 patients with the following cure rates, incidence in brackets, 82.7% (n=52), frequency> 10/Day 84.9% (n=179), nocturia > 2/night, 60.5% (n=129), urge incontinence >2/day, 91.2% (n=171), chronic pelvic pain 71.1% (n=76). These findings were more recently confirmed by Sekiguchi who repaired cardinal and USL ligaments under LA.¹⁸ All patients¹⁷⁻¹⁹ had either 3rd or 4th degree POP (POPQ).

Hypothesis for nocturia causation

Loose uterosacral ligaments cannot support the anterior vaginal wall which is stretched downwards by the force of gravity. This activates the bladder base stretch receptors to send afferent signals to the brain arouse the patient from her sleep- nocturia, figure 2.

Tampon test

A simple test for this hypothesis is to insert a large tampon into the apex overnight to support it; many patients report relief of their nocturia and other posterior fornix symptoms.

CONCLUSIONS

Surgical cure of nocturia and other “posterior fornix” symptoms by 4 distinctly different operations all of which surgically correct deficient apical support seem to validate the concept that nocturia is largely caused by laxity in the structural supports of the vaginal apex.

The simplest surgical method is uterosacral ligament plication. It gives acceptable results in the shorter term. Prediction of surgical cure of nocturia can often be achieved by inserting a large tampon to support the apex and observing change in symptoms, nocturia, urgency and chronic pelvic pain.

REFERENCES

- Petros PEP, Chapter 2: The Anatomy and Dynamics of Pelvic Floor Function and Dysfunction, in textbook *The Female Pelvic Floor, Function, Dysfunction and Management* according to the Integral Theory, 3rd Ed., 2010, Springer, Heidelberg, 17-76.
1. Lose G, Alling-Moller, Jennum P, Nocturia in women. *Am J Obstet Gynecol* 2001; 185:514-21.
 2. Van Kerrebroeck P, Andersson K-A , Terminology, epidemiology, etiology, and pathophysiology of nocturia *Neurourology and Urodynamics*,2014; 33: S1, S2-5.
 3. Verbalis JG Renal physiology of nocturia *Neurourology and Urodynamics*,2014;33;S1, S6-9.
 4. Holm-Larsen T. The economic impact of nocturia *Neurourology and Urodynamics*, 2014; 33: S1, S10-14.
 5. Bliwise DL, Rosen RC, Baum N Impact of nocturia on sleep and quality of life: A brief, selected review for the International Consultation on Incontinence Research Society (ICI-RS) nocturia think tank *Neurourology and Urodynamics*, 2014; 33: S1, S15-18.
 6. Weiss JP, Juul KV, Wein AJ, Management of Nocturia: The Role of Antidiuretic Pharmacotherapy, *Neurourology and Urodynamics*, 2014; 33: S1, S19-24.
 7. Weiss JP, Wein AJ, Van Kerrebroeck P , Future Research Guidance for Nocturia, *Neurourology and Urodynamics*, 2014; 33: S1, S25.
 8. Petros PE & Ulmsten U. The posterior fornix syndrome: a multiple symptom complex of pelvic pain and abnormal urinary symptoms deriving from laxity in the posterior fornix. *Scandinavian Journal of Urology and Nephrology* 1993 ; 27 Supplement 153: PART IV: 89-93
 9. Petros PE & Ulmsten U. An Integral Theory and its Method, for the Diagnosis and Management of female urinary incontinence. *Scandinavian Journal of Urology and Nephrology* 1993; 27 Supplement 153-1-93.
 10. Petros PE New ambulatory surgical methods using an anatomical classification of urinary dysfunction improve stress, urge, and abnormal emptying. *Int J Urogynecology* 1997; 8, 5: 270-278.
 11. Farnsworth BN. Posterior intravaginal slingplasty (infracoccygeal sacropexy) for severe posthysterectomy vaginal vault prolapse, a preliminary report on efficacy and safety *Int. Urogynecol J.* 2002; 13: 4-8.
 12. Sivaslioglu AA, Gelisen O, Dolen I et al. Posterior sling (infracoccygeal sacropexy): an alternative procedure for vaginal vault prolapse. *Aust N Z J Obstet Gynaecol* 2005; 45: 159-160.
 13. Abendstein B, Letter to the editor, Posterior IVS, *American Journal of Obstetrics & Gynecology* 2007; 196:3 e18-e19.
 14. Pilsgaard K, Mouritsen L. Follow-up after repair of vaginal vault prolapse with abdominal colposacropexy. *Acta Obstet Gynecol Scand.* 1999; 78:66-70.
 15. Sivaslioglu AA, İlhan TT, Aydogmus S, Uzun M, Dolen I, The comparison of the anatomical and symptomatic outcomes of sacrocolpopexy and posterior intravaginal slingoplasty *Int Urogynecol J* , 2011; 22:1363–1368, DOI 10.1007/s00192-011-1442-5.
 16. Petros P, Richardson P. TFS posterior sling improves overactive bladder, pelvic pain and abnormal emptying, even with minor prolapse. A prospective urodynamic study. *Pelvipereineology* 2010; 29: 52–55.
 17. Petros PEP, Inoue H Letter - Pelvic pain may be caused by laxity in the uterosacral ligaments as part of the “Posterior Fornix Syndrome”. *ANZJOG* 2013; 53(3):325-6. DOI:10.1111.
 18. Sekiguchi Y1, Kinjo M, Maeda Y, Kubota Y. *Int Urogynecol J.* Reinforcement of suspensory ligaments under local anesthesia cures pelvic organ prolapse: 12-month results. 2013; Dec 7. DOI 10.1007/s00192-013-2281-x [Epub ahead of print].
 19. Petros PEP, Richardson PA TFS posterior sling improves overactive bladder, pelvic pain and abnormal . *Int Urogynecol J* 2014; 25: 465-470.

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