

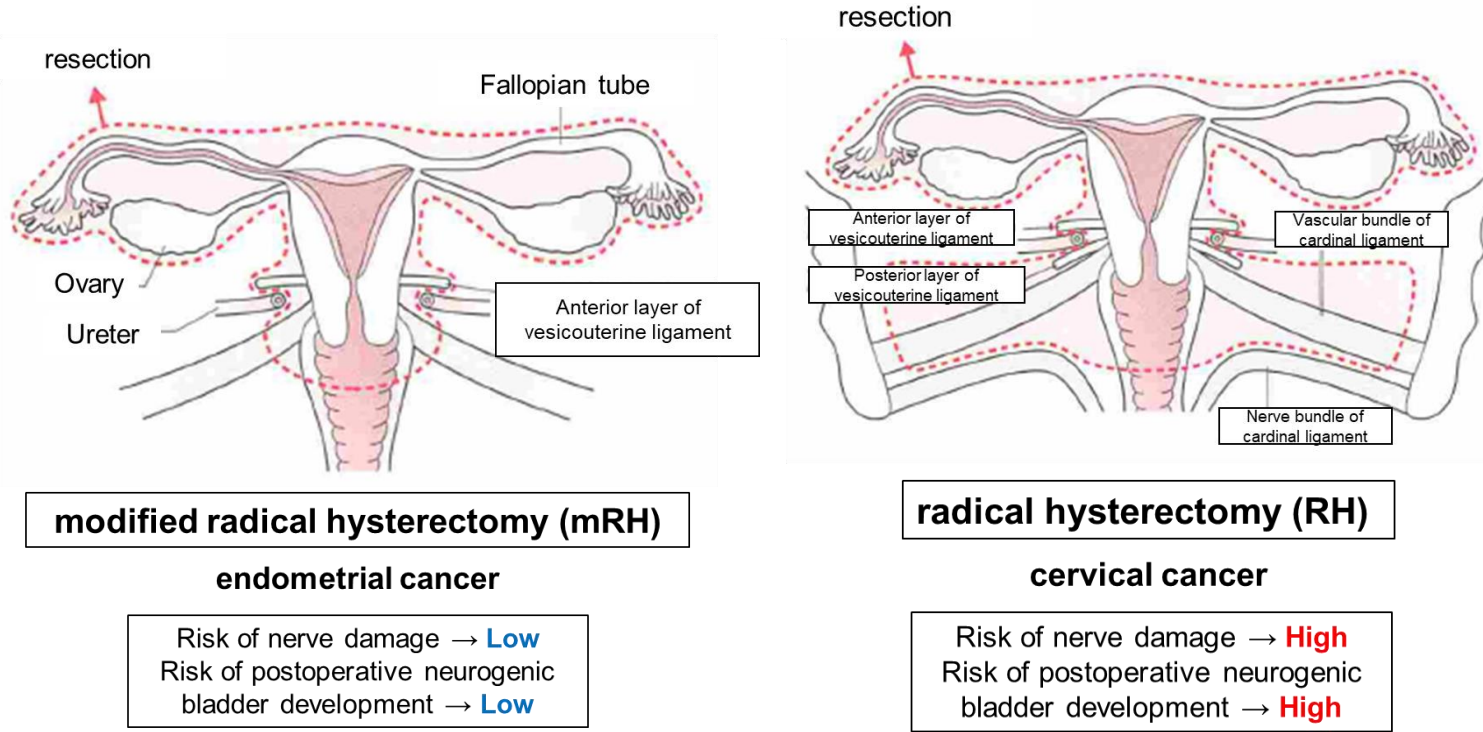


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Hypothesis / aims of study

Neurogenic bladder can develop after modified radical hysterectomy (mRH) and radical hysterectomy (RH) for endometrial and cervical cancer. The incidence of neurogenic bladder following RH has been reported to be 16%–80%; however, there are variations in their evaluation methods. There are very few reports of systematic urodynamic studies (UDS), and the incidence of neurogenic bladder, particularly hypoactive bladder, remains unknown. Nerve-sparing radical hysterectomy (NSRH) is a procedure in which the uterine branch of the pelvic plexus is cut, and the bladder branch is preserved. NSRH is in shorter duration of surgery and less blood loss as well as in a clear improvement in the postoperative urinary status. In this study, UDS and questionnaires were used to investigate lower urinary tract function following mRH and NSRH for endometrial and cervical cancer.



Study design, materials and methods

Of 21 patients who had undergone an mRH or RH for endometrial or cervical cancer between April 2022 and December 2023 at our hospital, 19 were included in this study. Preoperative and postoperative UDS (cystometrography and pressure-flow study) were performed. Also, the patients were evaluated based on the International Prostate Symptom Score (IPSS) and Overactive bladder symptom score (OABSS) questionnaires preoperatively and at 1, 3, 6, 9, and 12 months postoperatively. Patients who had undergone mRH and RH were evaluated with respect to various UDS parameters (FDV, NDV, MCC, VV, Qmax, PdetQmax, DO, DSD, and RV) as well as the IPSS (total score and QOL score) and OABSS, with and without postoperative urapidil medication and also with and without clean intermittent catheterization (CIC) at discharge. The ethical review board of our hospital approved the study.

Results and interpretation

The median ages of 7 patients in the mRH group and 12 patients in the RH group were 69.0 (45–79) and 48.5 (35–69) years, respectively, and the median durations for the removal of urinary catheters were 2.0 (2–3) and 5.0 (4–5) days in the mRH and RH groups, respectively. There were 0 patients in the mRH group and 7 patients in the NSRH group who used urapidil, a significant difference ( $p=0.016$ ). CIC was required of 0 patients in the mRH group and 2 patients in the NSRH group, with no significant difference ( $p=0.386$ ). The RH group had significantly higher IPSS total score and QOL score at 1 month postoperatively than the preoperative values, which reverted to the preoperative values at 6 months postoperatively. The mRH group had higher OABSS values than the RH group, but the differences were not significant. Postoperative UDS varied significantly with respect to MCC (mRH vs. RH, 257.4 ml vs. 354.4 ml,  $p = 0.034$ ) and RV (21 ml vs. 115.8 ml,  $p = 0.021$ ). However, both groups did not demonstrate significant differences for the other UDS parameters, including Qmax (18.1ml/s vs 13.9ml/s,  $p=0.80$ ) and PdetQmax (21.7mmH2O vs 20.6mmH2O,  $p=0.887$ ). The present results showed significant differences between mRH and NSRH in urapidil medication, postoperative RV, and MCC. IPSS showed that bladder dysfunction worsened only in NSRH at 1 month postoperatively, and then improved.

Table 1. Patients’ characteristics and Preoperative outcomes

	modified radical hysterectomy (mRH) (N = 7)	Nerve-sparing radical hysterectomy (NSRH) (N = 12)	P value
Age (y)	69.0 (45-79)	48.5 (35-69)	0.023
Stage	I A: 4 / I B: 2 / III A: 1	IB1: 2 / IB2: 4 / IB3: 4 II A1: 1 / II A2: 1	
Histological type	Endometrioid carcinoma: 5 Clear cell carcinoma: 1 Carcinosarcoma: 1	Adenocarcinoma: 2 Squamous cell carcinoma: 10	
IPSS total score	6.0 (2-16)	2.0 (0-13)	0.110
IPSS QOL score	2.0 (0-6)	1.0 (0-6)	0.418
OABSS	4.0 (0-9)	1.0 (0-11)	0.164
FDV (ml)	170.0 (49-244)	154.5 (74-356)	0.249
NDV (ml)	182.0 (71-310)	224.5 (112-377)	0.134
MCC (ml)	287.0 (73-449)	366.5 (246-524)	0.059
Compliance (ml/mmH <sub>2</sub> O)	47.8 (2.8-225.5)	59.7 (7.5-134)	0.267
DO + (%)	1 (14.3)	0	
DSD + (%)	0	0	
VV (ml)	317.8 (22.0-487.6)	365.4 (274.2)	0.071
Qmax (ml/s)	15.7 (2.9-38.6)	17.4 (8.2-30.7)	0.400
PdetQmax (mmH <sub>2</sub> O)	28.3 (16.0-47.7)	27.0 (11.2-53.2)	0.443
PVR (ml)	0 (0-29)	0 (0-54)	0.346

FDV: First desire to void, NDV: Normal desire to void, MCC: Maximum cystometric capacity, DO: Detrusor overactivity, DSD: Detrusor-sphincter dyssynergia, VV: Voided volume, Qmax: maximum flow rate, PdetQmax: Detrusor Pressure at Qmax, PVR: post-void residual

Table 2. Postoperative outcomes

	modified radical hysterectomy (mRH) (N = 7)	Nerve-sparing radical hysterectomy (NSRH) (N = 12)	P value
Postoperative urethral catheter removal day (day)	2.0 (2-3)	5.0 (4-5)	<0.001
Postoperative PFS performance day (day)	6.0 (4-10)	7.5 (6-15)	0.132
Postoperative maximum residual urine volume (ml)	66.0 (35-400)	250 (32-500)	0.169
Presence of postoperative catheterization (one or more times) (%)	2	7	0.220
Postoperative Urapidil oral administration (%)	0	7	0.016
Urapidil discontinuation day(day)	-	156 (83-218)	
CIC at discharge (%)	0	2	0.386
CIC discontinuation day (day)	-	40.5 (23-58)	

Table 3. Postoperative UDS outcomes

	modified radical hysterectomy (mRH) (N = 7)	Nerve-sparing radical hysterectomy (NSRH) (N = 12)	P value
FDV (ml)	117.0 (28-178)	136.5 (65-307)	0.222
NDV (ml)	182.0 (62-279)	233.0 (150-398)	0.068
MCC (ml)	303.0 (124-381)	352.5 (159-500)	0.034
Compliance (ml/mmH <sub>2</sub> O)	24.8 (8.3-70.0)	24.3 (15.5-51.0)	0.140
DO + (%)	1 (14.3)	0	
DSD + (%)	0	0	
VV (ml)	317.9 (41.3-366.2)	278.0 (67.4-580.2)	0.411
Qmax (ml/s)	16.4 (5.6-40.3)	13.4 (4.7-30.1)	0.168
PdetQmax (mmH <sub>2</sub> O)	18.0 (14.1-30.0)	17.4 (8.2-41.0)	0.397
PVR (ml)	12 (0-82)	80.5 (0-381)	0.010
PIP1 (Qmax+PdetQmax)	weak (< 30) normal (30~75) strong (>75)	4 7 0	0.572

PIP: projected isovolumetric pressure

Figure 1. Postoperative UDS outcomes

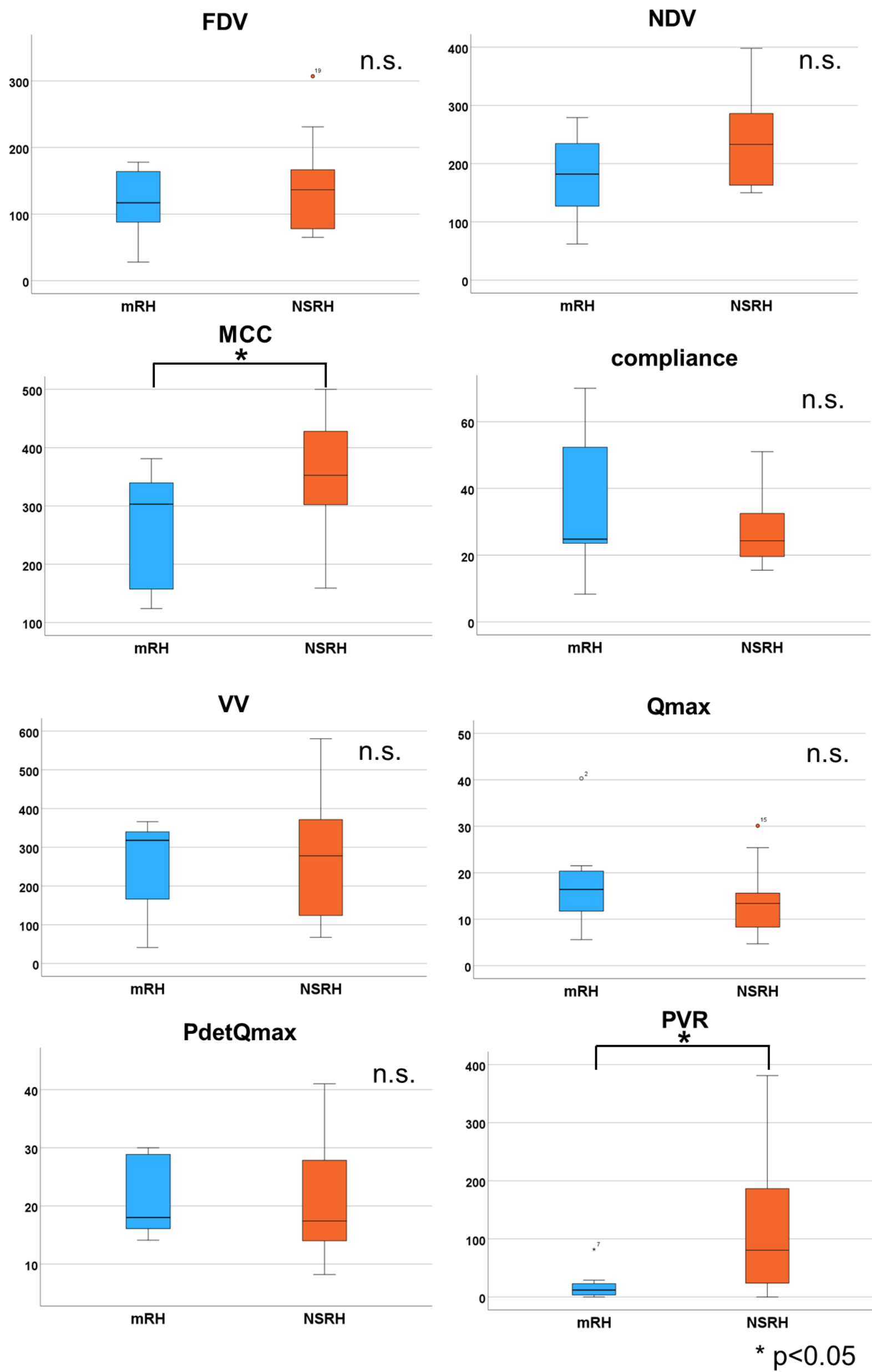
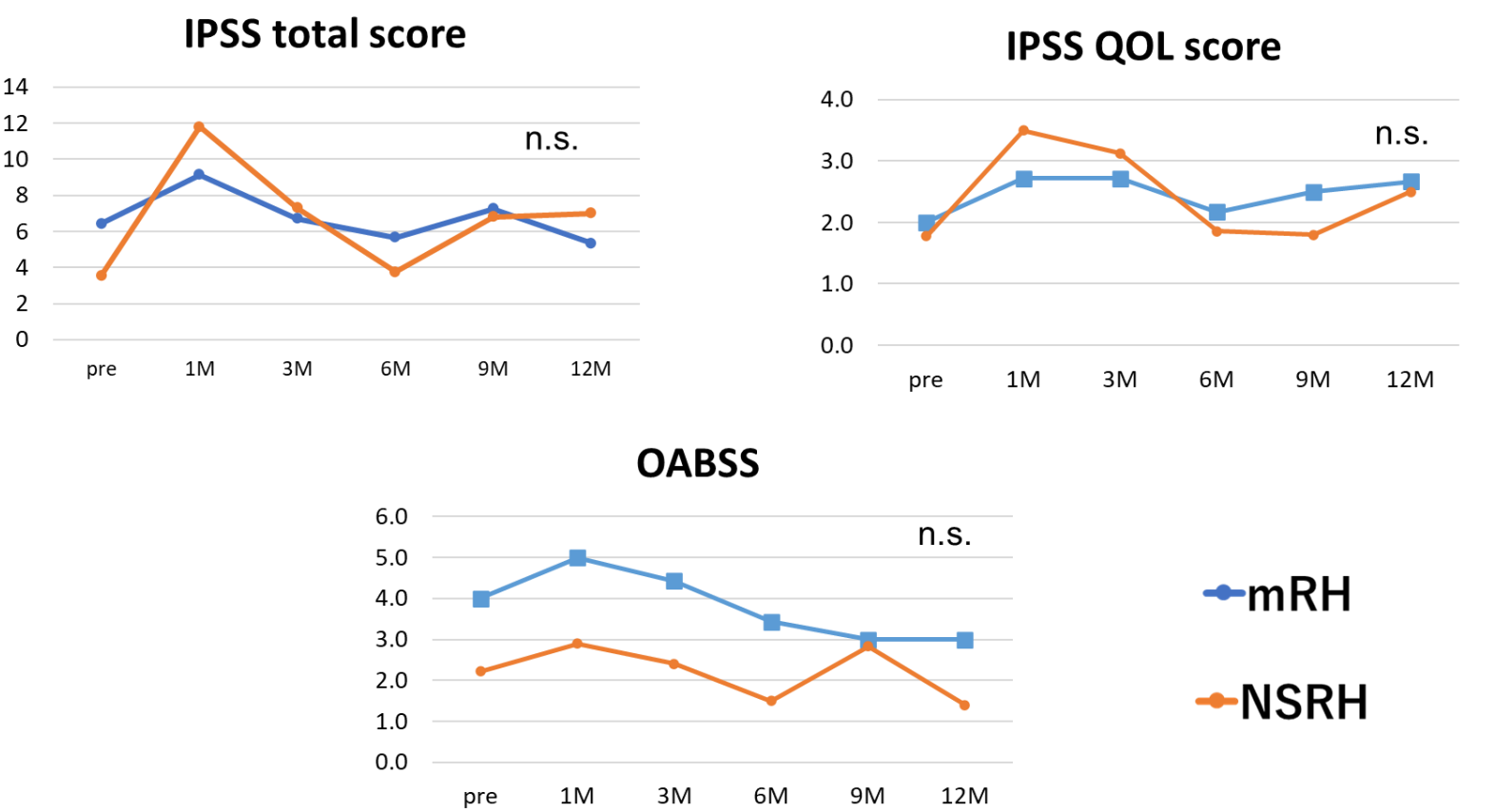


Figure 2. IPSS and OABSS



Conclusions

Although there were more cases of increased residual urine and more cases requiring urapidil medication in NSRH than in mRH, there was no difference in CIC, Qmax, or PdetQmax, suggesting that nerve preservation suppressed lower urinary tract dysfunction due to nerve damage.

References

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