

## Short and long-term urodynamic and quality of life assessment after nerve sparing radical hysterectomy: a prospective pilot study



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### ABSTRACT

**Objective:** The aim of this study was to compare pre- and postoperative bladder function and quality of life (QoL) in women diagnosed with gynecologic malignancy and treated with nerve sparing radical hysterectomy (NSRH).

**Study design:** Before and after NSRH for uterine malignancy, bladder function was prospectively assessed in a small cohort of 12 women (39–72 years) suffering from uterine malignancy using urodynamic studies and a validated self-administered condition specific QoL questionnaire. Urodynamic studies were performed one day before (U0) as well as one week (U1) and 22 months (U2) after surgery. The questionnaire was applied at U0 and U2.

**Results:** Cystometry showed detrusor contractions leading to overactive bladder incontinence in six out of nine women at short-term, which persisted in three women at long-term follow-up leading to a significant impaired QoL. Voiding function and bladder sensation remained uncompromised after surgery.

**Conclusions:** NSRH preserves voiding function and bladder sensation. However, short and long-term urodynamic detrusor overactivity and urge incontinence was observed in a significant number of women although symptoms improved over time. These data are important for counselling women and for the design of larger studies to assess the benefits of NSRH versus conventional radical hysterectomy (RH).

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### Introduction

Traditional radical hysterectomy implicates damage of the pelvic nerve plexus, thus causing significant pelvic floor organ dysfunction [1]. Apart from sexual and bowel dysfunction urinary bladder dysfunction is the most frequent type of functional loss including disturbances of sensory and motor innervation in up to 100%, impaired uroflow in 75% and abdominal straining to void in 85% [2,3]. Following concepts in prostate and rectal cancer surgery, nerve sparing radical hysterectomy (NSRH) has been proposed as a surgical technique aiming at preventing dysfunction of the pelvic organs [4–6]. For NSRH, although not based on prospective randomised controlled trial, existing data on tumour control suggests that NSRH is a safe procedure [7–10]. However, data on bladder voiding and storage function in the short and long-term

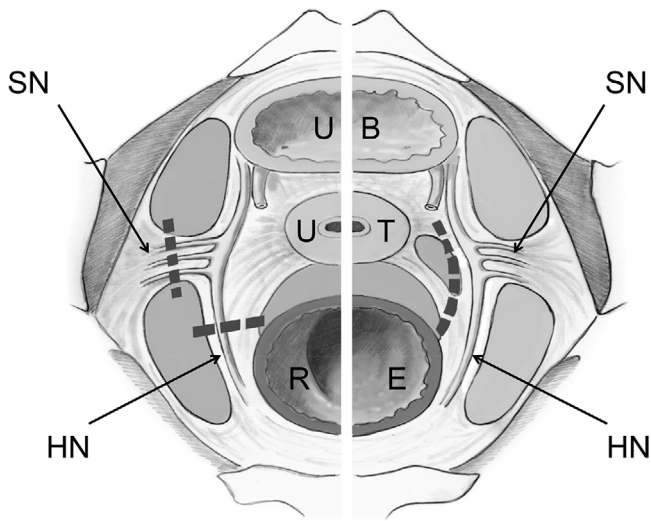
are limited. Apart from safety, improvement of quality of life (QoL) is an explicit aim of NSRH and QoL assessment before and after surgery is important. However, there is a lack of data on QoL and bladder function.

This pilot study therefore aims to assess short and long-term data of bladder function after NSRH applying urodynamic studies and QoL questionnaires.

### Materials and methods

Between 01/2010 and 03/2012 14 consecutive women, diagnosed with gynaecological malignancy and undergoing NSRH were asked to participate, two declined. In all women, a nerve sparing radical hysterectomy according to the method of Höckel et al. was performed by one surgeon (B.S.) (Fig. 1) [7,11]. Starting at the pelvic brim, identification and precise dissection of the components of the hypogastric plexus, the inferior hypogastric nerve and the splanchnic nerves was performed thus leading to a visible preservation of the relevant neural branches to the bladder, rectum and vagina.

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**Fig. 1.** Schematic drawing of the dissection line (dotted line) in RH (left side) and NSRH (right side) in which the hypogastric and splanchnic nerves are visualised and spared. UB = urinary bladder; UT = uterus; RE = rectum; HN = hypogastric nerve; SN = splanchnic nerves.

Exclusion criteria were surgical procedures that did not conform to the NSRH according to Höckel et al., women who were unable to participate in the pre- and postoperative studies and inability to comprehend the questionnaire. Three women had to be excluded because they did not attend the second postoperative examination (U2): one patient left the country and the other two refused any further contact. Of the remaining nine women, three received additional radio-chemotherapy (RCT).

Urodynamic studies were performed one day before (U0) as well as one week (U1) and 22 months (U2) after surgery (median). Using SediaNT<sup>®</sup> equipment. Women were examined in a half-sitting position with legs supported in stirrups. We evaluated residual urine volume (RV), maximum bladder cystometric capacity (Vmax), bladder volume at strong desire to void, average flow rate (Qave in ml/s), maximum flow rate (Qmax in ml/s), maximum detrusor pressure (Pdetmax in cmH<sub>2</sub>O) and detrusor pressure at peak flow rate (PdetQmax in cmH<sub>2</sub>O). RV was measured using clean catheterisation after spontaneous bladder voiding at the end of the urodynamic testing. All measurements were in accordance with the recommendation of International Urogynecological Association/International Continence Society [12].

To monitor frequency and severity of pelvic floor symptoms, their bothersomeness and impact on quality of life (QoL), the German version of the Australian pelvic floor questionnaire was employed at U0 and U2. This validated self-administered questionnaire assesses bladder, bowel, prolapse and sexual

symptoms and provides domain and global scores. The higher the score the worse the function [13–14].

SPSS<sup>®</sup> 16.0 software for Microsoft Windows<sup>®</sup> was used for statistical analysis. Tests used were the paired *t* test and the Wilcoxon's signed rank test due to not-normally distributed variables.

The study has received the approval of the local ethics committee and institutional advisory board and all women provided informed written consent.

**Results**

Of the nine women aged 39–72 years (mean 55), six women were diagnosed with cervical carcinoma and three women with endometrial carcinoma. Of the six women diagnosed with cervical carcinoma three had neoadjuvant radiochemotherapy prior to surgery. Further details are listed in Table 1.

At baseline (U0), seven women showed undisturbed bladder filling and voiding function, based on history and urodynamics. One woman complained about stress urinary incontinence and another had mixed symptoms without urodynamic pathology. Residual urine did not exceed 40 ml and detrusor overactivity was not demonstrated in any woman preoperatively.

Urodynamic assessment one week after surgery (U1) showed intact sensory function in all 9 women and bladder volume at strong desire to void was not statistically different from baseline (U0) (Table 2). Newly developed detrusor overactivity incontinence (DOI) was found in six out of nine women, accompanied by symptoms of urge incontinence in all (UI). At U2, these findings had recovered in three and persisted in three of these six women. In the group of women having received additional RCT, newly developed DOI was found in two out of three women at U1 and persisted in both (Fig. 2). These two women also complained about symptoms of mixed urinary incontinence (U2).

In the group of six women who received surgery alone, four newly developed DOI at U1 and persisted in one of them at U2.

As far as the voiding phase is concerned, mean RV at baseline (U0) was 11 ± 12.7 ml. After an increase at short-term follow-up (U1) up to 77 ± 87.8 ml (*p* = 0.018) there was a decrease of mean RV at the long-term follow-up (U2) down to 10 ± 9.9 ml, which does not differ significantly from U0 (*p* = 0.622). Qave, Qmax, Pdetmax and PdetQmax did not differ significantly between U0, U1 and U2. A detailed presentation of the urodynamic findings is given in Table 2.

Scores in the bladder section of the Pelvic Floor QoL questionnaire assessed at U0 and U2 did not differ significantly before and after surgery for the whole group [bladder section: at U0 1.01 (mean) (SD 1.71) and at U2 2.47 (mean) (SD 2.35)] (*p* = 0.15). However, each of the women who developed urge incontinence after surgery reported a significant increase in QoL scores [U0: 0.07 SD 0.13 and U2: 4.81 SD 2.38] *p* = 0.02] thus indicating reduced QoL after surgery (Table 2).

**Table 1**  
Patients characteristics.

Patient	Age	BMI (kg/m <sup>2</sup> )	Diagnosis	Tumour stage (TNMR)	Clinical stage (FIGO)	OP time	Blood-loss (ml)	Post-operative hospital stay (d)	Preoperative radio/chemotherapy
1	64	20.3	Cervical carcinoma	pT1b1 pN0 (0/43) M0 G3	IB1	3 h 43 min	1000	9	No
2	72	30.9	Endometrial carcinoma	pT1a pN0 (0/17) M0 G2 L0 V1 G2	IA	3 h 04 min	600	6	No
3	39	20.3	Cervical carcinoma	pT1b pN0 (0/23) L0 V0 G2	Ib1	3 h 37 min	500	6	No
4	54	24	Cervical carcinoma	Initial FIGO IIb, G3	IIB	6 h 22 min	1000	14	Yes
5	43	18.7	Cervical carcinoma	pT1b1 pN0 (0/24) G2 L0 V0	IB1	2 h 31 min	900	11	No
6	57	30.1	Endometrial carcinoma	pT1b pN0 (0/41) M0 L0 V0 G2	IB	2 h 27 min	700	8	No
7	71	27.1	Endometrial carcinoma	pT1b FIGO Ib pN0 (0/48) G3 L0 V0	IB	3 h 19 min	600	9	No
8	56	28.4	Cervical carcinoma	ypT1a2 pN0 (0/45) M0 G2 L0 V0 R0	IIA	3 h 57 min	500	9	Yes
9	43	21.7	Cervical carcinoma	ypT1a2 ypN1 (2/18) L1 V0	IVa	6 h 30 min	650	15	Yes

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