

INTRODUCTION

Class III radical hysterectomy (RH) plus pelvic lymphadenectomy is the standard treatment for patients diagnosed with early-stage cervical cancer. RH of cervical cancer frequently entails the resection of parametrium including autonomic nerve fibers, ligaments, and pelvic vessels. Frustratingly, the unintended interruption of pelvic floor nerves could lead to various postoperative morbidities such as bladder, defecation disorders, and sexual dysfunction[1]. Bladder dysfunction following RH, as the most common postoperative complication, mainly manifests as dysuria, urinary incontinence, and frequency/urgency, seriously impairing the quality of patients' life. In clinical practice, timely detection of bladder dysfunction and rehabilitation of bladder function are warranted. Therefore, to provide a novel objective indicator for the clinical assessment of postoperative bladder function alterations, we explored the urodynamic characteristics of bladder function in patients with abnormal urination after RH of cervical cancer by comparing the urodynamic parameters.

METHODS

A total of 84 patients with IB to IIA cervical cancer meeting the preoperative inclusion criteria from January 2017 to June 2022 were enrolled. Inclusion criteria were: no preoperative pelvic surgery history; no urinary symptoms before surgery; no abnormalities in preoperative renal ultrasound examination, urine routine, and urine bacterial culture; the surgery was performed by the same trained practitioners. Exclusion criteria were: diagnosis of tumors in other parts of the uterus; combined with severe cognitive dysfunction, and other neurological disorders; combined with severe heart, liver, kidney, and other vital organ diseases; combined urinary tract infection, pelvic organ prolapse, and other diseases before surgery.

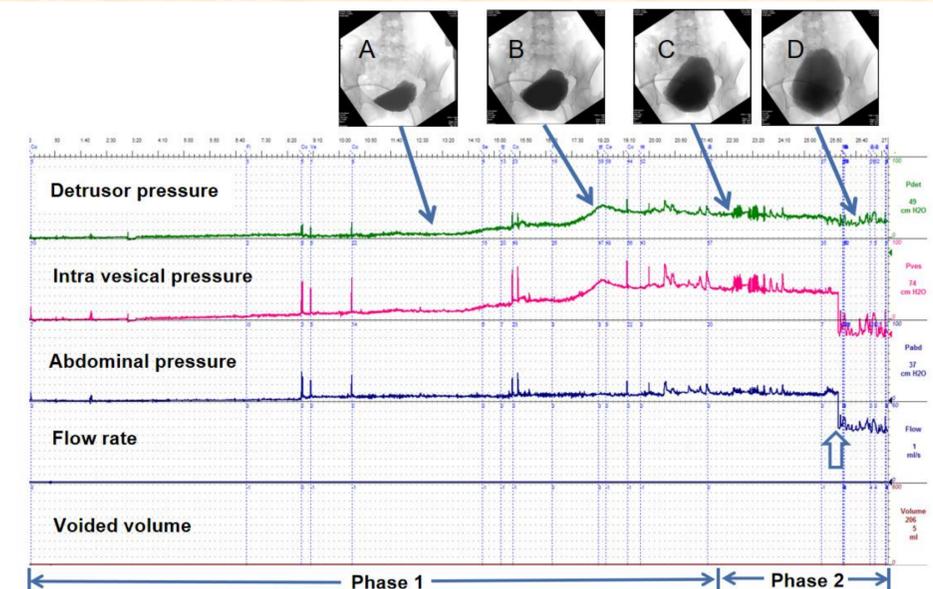
The study applied ICS criteria for judging abnormal urination involving frequency (≥ 8 times in 24h), urgency, incontinence, dysuria, urinary retention, nocturnal enuresis, and other lower urinary tract symptoms. All patients signed ICS standard urodynamics protocol and were examined for urodynamics 1 week before and 6 months after surgery, encompassing uroflowmetry, cystometry, pressure-flow studies, and urethral pressure profile to assess lower urinary tract function[2]. The study observed and assessed patients' lower urinary tract symptoms before and after surgery and analyzed the characteristics of urodynamic findings.

RESULTS

Of 84 cases (mean age 66.6 ± 5.0 years), 58 patients (69%) developed abnormal urination after RH (abnormal group), and 26 patients (31%) were no abnormal urination (normal group). Abnormal urination after RH included dysuria (55%), frequency with a feeling of urination not complete (34%), stress urinary incontinence (7%), and urge urinary incontinence (4%). Notably, the two groups presented no significant difference in age, clinical stage, pathological diagnosis, and preoperative UDS parameters (All $P > 0.05$), while the difference in the postoperative urodynamic parameters was statistically significant (All $P < 0.05$). In the normal group, only one case showed abnormal urodynamic parameters (mainly bladder sensory desensitization) and differences in the urodynamic parameters between pre- and post-operative were not statistically significant (All $P > 0.05$). In the abnormal group, 43 patients (74%) presenting normal urination patterns before surgery required abdominal pressure to assist urination after surgery (Figure 1). There were significant differences between preoperative and postoperative for most urodynamic parameters in the abnormal group. Among them, the maximum flow rate (Q_{max}), the average flow rate (Q_{ave}), the volume voided, maximal detrusor pressure, bladder compliance, and functional urethral length were significantly lower than those before surgery, while volume at normal desire to void, maximum bladder capacity, and post-void residual volume (PVR) were higher than those before surgery ($P < 0.05$). In addition, voiding time, maximum urethral pressure, and maximum urethral closure pressure did not differ significantly before and after surgery ($P > 0.05$, Table 1).

CONCLUSIONS

Most patients following RH experience a broad range of lower urinary tract symptoms. The urodynamics could provide objective clinical indicators for the diagnosis of bladder dysfunction. Notably, the characteristics of urodynamics in postoperative patients following RH are mainly manifested as decreased bladder sensory function and abnormal detrusor contraction.



Phase 1: the filling phase; Phase 2: the voiding phase
Figure 1. Reduced bladder sensitivity and bladder compliance and higher maximum cystometric bladder capacity during the filling phase. Prolonged waiting and change in sitting position during voiding (hollow arrow), abdominal pressure assists in voiding and very little urine discharge is seen. A and B: Hairy bladder wall during the filling phase. C and D: Increased bladder volume and insignificant bladder neck opening and urethral opening during the voiding period.

Table 1. The results of preoperative and postoperative urodynamic parameters in patients with abnormal voiding after radical resection of cervical cancer

	Preoperative (n=58)	Postoperative (n=58)	t	P
maximum flow rate (ml/s)	25.1 ± 11.4	12.9 ± 10.3	6.06	<0.001
average flow rate (ml/s)	11.4 ± 6.6	6.0 ± 4.2	5.22	<0.001
voided volume (ml)	318.6 ± 96.4	148.0 ± 36.8	12.59	<0.001
voiding time (s)	29.2 ± 18.5	32.9 ± 22.1	0.97	>0.05
post-void residual (ml)	29.9 ± 21.5	260.2 ± 219.2	7.96	<0.001
maximal detrusor pressure (cmH2O)	31.9 ± 21.4	12.1 ± 8.9	6.49	<0.001
bladder compliance (ml/cmH2O)	78.1 ± 33.9	16.1 ± 4.3	13.81	<0.001
volume at normal desire to void (ml)	258.2 ± 185.5	354.5 ± 204.3	2.66	<0.05
maximum bladder capacity (ml)	335.1 ± 124.9	587.4 ± 152.5	9.75	<0.001
maximum urethral pressure (cmH2 O)	96.4 ± 33.9	97.6 ± 33.1	0.19	>0.05
maximum urethral closure pressure (cmH2O)	88.5 ± 35.2	89.9 ± 36.4	0.22	>0.05
functional urethral length (mm)	37.2 ± 7.2	29.6 ± 6.5	5.92	<0.001

REFERENCES

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