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EFFECT OF ADJUVANT RADIATION THERAPY ON URODYNAMIC PARAMETERS IN PATIENTS WITH UTERINE CERVIX CANCER

Hypothesis / aims of study

Uterine cervix cancer is the second most common cancer among women and is one of the leading causes of cancer-related deaths in females [1]. Standard treatment for cervical cancer has been radical hysterectomy. Though many studies reported lower urinary tract dysfunction was the most common complication after radical pelvic surgery, there have been few studies on pathophysiologic changes related to urodynamics after adjuvant radiation therapy (RT). Many studies have reported RT can cause a smaller cystometric capacity and poor bladder compliance[2]. The aim of this study was (1) to assess the effect of radical hysterectomy on the storage function of the lower urinary tract and (2) to evaluate the impact of radiation therapy on postoperative bladder function using urodynamic parameters.

Study design, materials and methods

This was a prospective study measuring pre- and post-operative urodynamic variables. All women (n=42) during the period 2006-2008, who underwent rardical hysterectomy for cervical cancer with stage of 1B1 to 2B with or without adjuvant radiation therapy were enrolled in this study. Exclusion criteria were the presence of diabetes mellitus, neurogenic bladder, interstitial cystitis and history of previous pelvic surgery. All operations were performed by the same gynecologist (NHP). All patients were divided into two groups, RT group who underwent radiation therapy and non-RT group who did not undergo radiation therapy after radical hysterectomy. RT group underwent radiation therapy at postoperative 3 weeks.

Urodynamic studies were performed before, 10 days after, and 6 months after radical hysterectomy. Urodynamic study (UDS) were conducted by the same examiners using the same protocol (UD-2000, Medical Measurement System, Enschede, the Netherlands) throughout the study period.

Results

Data set of total of 42 patients were analyzed. In uroflometry and cystometrography, pre- and post-operative parameters were measured as shown in Table 1. Average maximal flow rates were 18.7±2.2 , 4.6±0.9, and 4.6±0.9 ml/sec respectively. At postoperative 10th day parameters, bladder capacity and bladder compliance were 349.2±15.4 ml, 21.1±4.4 ml/ cmH_2O,respectively. In comparison to RT group, non-RT group showed significant increase of bladder compliance and percentage of increased bladder compliance (Table 2). After postoperative 6th month, bladder compliance in non-RT group increased 8 times or more than that of postoperative 10th day. However, it increased only 1.5 times in RT group at same period(p=0.005).

Table 1. Changes in uroflowmetry and water cystometrography in total 42 patients

	Preoperative	Postoperative 10th day	Postoperative 6th month
Uroflometry			
Qmax (ml/sec)	18.7±2.2	4.6±0.9	17.8±2.4
Voided Volume (ml)	172.1±26.4	58.8±14.7	209.9±34.2
PVR (ml)	23.5±6.6	163.5±18.8	78.3±20.1
Cystometrography			
Normal desire to void (ml)	302.6±15.6	296.8±16.9	348.3±22.7
MCC (ml)	404.8±13.5	349.2±15.4	434.6±21.5
Compliance (ml/ cmH_2O)	94.7±7.3	21.1±4.4	75.7±12.0
PdetQmax (cmH_2O)	33.0±1.9	28.6±3.2	26.4±2.8

Values are given as mean±SD.

Qmax; maximal flow rate, PVR; post-voided residual, MCC : Maximal cystometric capacity, Compliance; bladder compliance

Table 2. Comparison of urodynamic parameters between non-RT group and RT group

		non-RT group	RT group	p-value ‡
Patient number		28	14	
Age (year)		50.6±2.4	54.6±3.1	0.326
Preoperative	MCC (ml)	389.5±16.7	435.5±21.5	0.109
	Compliance (ml/cmH_2O)	94.8±9.8	94.5±10.5	0.986
Postoperative 10th day	MCC (ml)	341.7±18.1	363.6±29.1	0.506

	Compliance (ml/cmH_2 O)	22.7±6.3	17.7±3.4	0.597
Postoperative 6th month	MCC (ml)	461.7±17.8	360.1±58.7	0.135
	Compliance (ml/cmH_2 O)	92.0±14.8	30.8±7.6	0.022
Percentage of change in MCC (%)*		-11.0±4.4	-12.2±8.9	0.891
Percentage of change in bladder compliance (%)*		-73.1±6.3	-79.6±4.1	0.497
Percentage of change in MCC (%)†		44.9±9.0	20.5±26.1	0.264
Percentage of change in bladder compliance (%)†		806.6±199.2	149.6±75.5	0.005

Values are given as mean±SD.
* Calculated between preoperative and postoperative 10th day parameters
†Calculated between postoperative 10th day and postoperative 6th month parameters
‡ Student's t-test was used for data analysis

Interpretation of results

Our results corresponded well with previous reports[2]. It was suggested that radical hysterectomy causes an alteration in emptying function[3]. Changes of urodynamic parameters among three period as shown in Table 1 may support postoperative bladder dysfunction is transient. Nevertheless, as shown in Table 2, patients who underwent adjuvant radiation therapy revealed slow return of bladder compliance till 6 months after radical hysterectomy.

Concluding message

Radical hysterectomy gives rise to transient alteration of neurophysiology of lower urinary tract. Though this change returns within a certain period of time, it is likely to pay attention to low bladder compliance especially in patients who had adjuvant radiation therapy after radical hysterectomy. Further studies with larger numbers and long-term follow-up are needed to explore upper urinary tract damage.

References

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Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**No**