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Timing of urinary catheter removal after radical hysterectomy for cancer of the cervix and uterus: A single-institution observational study

Jimmy A. Billod[1]

Abstract:

BACKGROUND AND OBJECTIVE: Radical hysterectomy remains to be the first surgery for early-stage cervical and selected stage 2 endometrial carcinoma. Functional disorders of the lower urinary tract are the foremost common complications following radical surgery necessitating catheterization. This study was undertaken to determine the number of postoperative days (POD) of the removal of urinary catheters after hysterectomy and assess the practicability of earlier removal of the catheter without compromising the bladder function.

METHODOLOGY: A descriptive observational study of patients who underwent Type 2 or 3 hysterectomy for cervical or endometrial carcinoma. Clinical, intraoperative, and anesthesia records and results of the histopathologic reports of every patient were reviewed. Demographic, clinical, and histopathologic data needed during this review were recorded. Descriptive statistics were used.

RESULTS: Between January 2016 and December 2019, a complete 45 patients underwent radical hysterectomy (43 patients for cervical cancer and a pair for endometrial carcinoma), with a median age of 50 years. The mean operative time is 2.5 h and also the average blood loss is 500 ml. The mean size of the cervical tumor was 2.2 cm, the mean length of the vagina was 2.5 cm, and the mean lateral width of parametria was 3.6 cm. Catheters were removed between the 3rd and 20th (mean = 6 days) POD. All patients had adequate spontaneous void within 6 h after removal. Five patients had their catheters removed beyond 7 days, 3 patients between POD 8 and POD 14, and 2 patients between days POD 15 and POD 20. All patients were able to return to bladder function within 3 weeks of catheterization.

CONCLUSION: The outcome showed that earlier removal of catheter seems to be a practical and safe option compared to long-term catheterization for patients who underwent radical hysterectomy without causing morbidities.

Keywords:

Bladder function, catheter removal, cervical cancer, endometrial carcinoma, radical hysterectomy

[1]*Department of Obstetrics and Gynecology, Baguio General Hospital and Medical Center, Baguio City, Benguet, Philippines*

Address for correspondence:
Dr. Jimmy A. Billod, Department of Obstetrics and Gynecology, Baguio General Hospital and Medical Center, Baguio General Hospital Driveway, Baguio City, Benguet, Philippines.
E-mail: jabillodmd@gmail.com

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Introduction

Radical hysterectomy has been a primary surgical mode of treatment for selected gynecologic malignancies such as cervical and endometrial cancers. Radical hysterectomy with lymphadenectomy remains to be the first surgery for selected early-stage nonbulky cervical cancer.[1] In the Philippines, the reported 5-year survival rate of cervical cancer patients managed with hysterectomy is above 95%.[2] Radical hysterectomy with lymphadenectomy alone could be a therapeutic option for selected Stage II endometrial carcinoma to avoid the morbidity related to combination therapy.[3,4] Functional disorders of the lower urinary tract (sensory loss, storing,

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voiding dysfunctions, and severe incontinence) are the foremost common complications following radical surgery. The incidence of postoperative bladder dysfunction has been documented to be between 8% and 20%.[5] Higher rates were reported by other authors as high as 85% of cases.[6,7] Since there are expected postoperative vesical dysfunctions following such a procedure, it is advised to maintain the indwelling urinary catheter for a minimum of 10–14 days to push bladder healing and regain bladder function. However, prolonged catheterization may contribute to long-term bladder dysfunction by preventing the bladder from expanding and emptying in its usual fashion and acting as a chronic irritant possibly contributing to vesical pathology.[8] Improved surgical technique, use of perioperative prophylactic antibiotics, treatment of urinary infections, and prolonged urinary catheterization are believed to deliver a diminished rate of postoperative vesical dysfunctions.

Conventionally, the choice of the surgeon whether or not to remove the catheter earlier after radical hysterectomy is affected by his/her previous pieces of training, assessment, practices, and experiences. A local study by Villanueva and Duenas in 2006[9] determined the effects of early removal of indwelling urinary catheter after radical hysterectomy. They compared the effects of early removal of the urinary catheter on the 1st week, 2nd week, and 3rd week postsurgery. Although their study reported that the rate of re-catheterization was inversely proportional to the duration of catheter removal, this was not statistically significant.

This study was undertaken to determine the number of postoperative days (POD) of the removal of indwelling urinary catheter in patients with cervical cancer or endometrial carcinoma who underwent uncomplicated radical hysterectomy that resulted in adequate spontaneous urine output. Specifically, to assess the rate of re-catheterization and readmission because of urinary retention after catheter removal. In addition, assesses the practicability of earlier removal of the catheter without compromising the bladder function. The results of this study would provide additional data on the care of patients undergoing radical hysterectomy in the local setting.

Methodology

This is a descriptive observational study approved by the institutional ethical review board. This research included patients with cervical and endometrial carcinoma who underwent Type 2 or 3 hysterectomy with or without adnexectomy and lymphadenectomy performed by an authorized gynecologic oncologist.

The Society of Gynecologic Oncologists of the Philippines authorizes only certified gynecologic oncologists to perform a radical hysterectomy for cancer patients to make sure proper assessment of patients and accurate performance of the procedure. Cases done by noncertified gynecologic oncologists, those with intraoperative urinary morbidity and with incomplete records were excluded from the study.

The sample size was computed based on the census of patients amenable to primary surgery in our institution. This study needed a minimum of 19 cases wherein the analysis has 95% power at a 95%–99% level of confidence. The number of study subjects is also limited by the completeness of medical charts. This review was done primarily by the investigator in coordination with the health information management office and the department of anatomic pathology. A list of patients who underwent radical hysterectomy was retrieved from the Section of Gynecologic Oncology census. Medical, intraoperative, and anesthesia records and results of the histopathologic diagnosis of every patient were reviewed. Data gathered were encoded in the MS EXCEL spreadsheet. Patients' categorical profiles were expressed in frequency and/or percentages while the remainder of the variables which are quantitative or continuous, for example, days of urinary catheter removal were expressed in median, average, or ranges.

Results

Between January 2016 and December 2019, 45 patients underwent Type 2 or 3 hysterectomy procedures (43 patients for cervical cancer and a pair for endometrial carcinoma), with a median age of fifty. Patients had median gravidity of 4 and a Parity of 3. Preoperatively, in patients with cervical cancer, 5 patients were stage IA2, 27 patients were stage IB1, 4 patients with stage IIA1, and 7 patients had central tumor recurrence after primary concurrent radiation plus brachytherapy [Table 1]. The average operative time is 2.48 h and the average blood loss is 500 ml. No morbidities were reported associated with the surgery. The mean size of the cervical tumor was 2.2 cm, the mean length of the vagina was 2.5 cm, and the average lateral width of parametria was 3.6 cm [Table 2]. There was no parametrial metastasis. Four patients had pelvic node metastasis.

Catheters were removed between the 3rd and 20th POD (mean of 6 days, a median of 4 days). All patients had adequate (more than 100 ml) spontaneous void within 6 h after removal. Five patients had their catheters removed beyond 7 POD; 3 patients between POD 8 and POD 14 and 2 patients between POD 15 and POD 20 [Figure 1]. One patient was readmitted after 24 h for retention after the catheter was removed on the

Table 1: Clinical and pathologic characteristics of patients

Clinical characteristics	Cervix (*n*=43)	Uterine (*n*=2)	Total (*n*=45), *n* (%)
Age			
20-30	4	-	4 (8.9)
31-40	14	-	14 (31.1)
41-50	18	-	18 (40)
51-60	4	2	6 (13.3)
>61	3	-	3 (6.7)
Gravidity			
G0-1	2	1	3 (6.7)
G2-4	27	1	28 (62.2)
G5 and more	14	-	14 (31.1)
Parity			
P0-1	4	1	5 (11.1)
P2-4	31	1	32 (71.1)
P5 and more	8	-	8 (17.8)
Preoperative FIGO 2009 Stage			
Stage IA2	5	-	5 (11.1)
Stage IB1	27	-	27 (60)
Stage IIA1	4	-	4 (8.9)
Central tumor recurrence	7	-	7 (15.6)
Endometrial cancer Stage II	-	2	2 (4.4)
Histopathologic diagnosis			
Squamous cell carcinoma	27	-	27 (60)
Adenocarcinoma	16	-	16 (35.6)
Endometrioid adenocarcinoma	-	2	2 (4.4)

FIGO: International Federation of Gynecology and Obstetrics

Table 2: Measurements of the cervical mass, vagina, and parametria

Specimen part	Measurements (cm)	*n*=45, *n* (%)	Mean (cm)
Cervical mass (largest dimension)	<2	18 (40)	2.2
	2-<4	27 (60)	
Vagina length	1-<2	7 (15.6)	2.5
	>2	38 (84.4)	
Parametrial width	2-<4	24 (53.3)	3.6
	>4	21 (46.7)	

4th POD. The catheter was reinserted and removed on the 10th POD with acceptable urine output. All patients were able to return bladder function within 3 weeks of catheterization. All patients on follow-up 4 weeks after surgery failed to present with urinary problems.

Discussion

Radical hysterectomy with pelvic lymphadenectomy continues to play a major role in the treatment of selected gynecologic malignancies. It is primarily a surgical option for nonbulky early-stage cervical cancer. For early-stage cervical cancer with tumor size >4 cm, radical hysterectomy can still be performed in two scenarios (1) hysterectomy with lymph node dissection and paraaortic sampling after concurrent chemotherapy and pelvic radiation and neoadjuvant chemotherapy, (2)

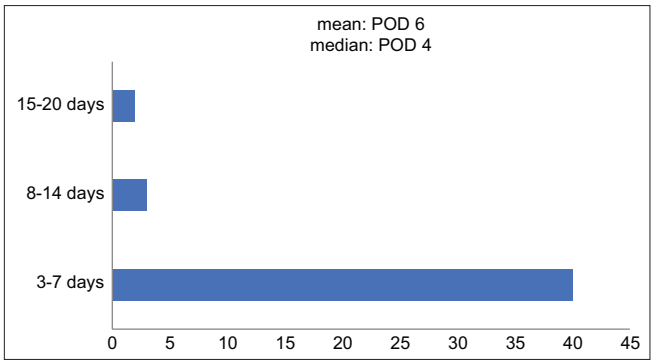

Figure 1: The number of POD of catheter removal that provides normal voiding. POD: post-operative days

Primary radical hysterectomy with lymphoid tissue dissection usually has to be followed with adjuvant chemoradiation, the kind of radiotherapy depends on the surgical-pathologic factors.[10]

Radical hysterectomy is additionally considered within the treatment of recurrent cervical cancer. This procedure is suitable in selected patients with small recurrences following primary concurrent chemoradiation. Such procedure may be a safe substitute for pelvic exenteration in patients treated by primary radiation, who have central tumor recurrence but 4 cm in diameter without evidence of ureteral obstruction or parametrial involvement.[11]

In the review of Boente *et al*. among 202 patients with endometrial adenocarcinoma with cervical involvement, there was a notable survival advantage, particularly for patients with multiple high-risk factors.[12]

As a result of extensive dissection of the pelvic structures, ureters at the bladder base, and transection of the uterosacral ligament, lower tract dysfunction is the most typical postoperative complication related to radical hysterectomy.[8] Urine retentiveness, detrusor hypertonicity, areflexia, diminished vesical sensation, infection, stress incontinence, and fistula formation are the foremost frequently related postoperative complications.[8,13]

Bladder dysfunction after hysterectomy is thought to be secondary to the denervation of the autonomic nerve during the procedure. Oh *et al*. suggested that the transient decrease in maximal bladder capacity and bladder compliance after hysterectomy occurred during the immediate postoperative period when maximal bladder capacity and bladder compliance were improved to a point after 6 months.[14]

Several studies have documented vesical abnormalities in patients managed with hysterectomy. One noted that 13% of patients experienced short-term voiding difficulties. Another study demonstrated decreased functional

bladder capacity following hysterectomy. Patients noted decreased bladder compliance additionally to the retention and decreased bladder sensation.[8] They recommended routine continuous bladder drainage after a hysterectomy. Symptoms such as dysuria, incontinency, fecal incontinence, and constipation, are commonly related to radical pelvic surgeries for cervical cancer.[15,16] Typically, after radical hysterectomy, bladder healing requires keeping the catheter *in situ* for about 7–10 days after surgery to recover bladder healing.[17,18]

The results of this study showed that earlier removal of catheter (average of 6 POD) could be a safe and practical option for patients who had radical (Type 2 or 3) hysterectomy. This conforms with the study of Chamberlain *et al*. that showed early removal of indwelling Foley catheters after hysterectomy appears to be a suitable alternative to long-term catheterization. Foley catheters were removed on the median of the sixth POD. Sixty-nine percent had postvoid residuals (PVRs) of <75 ml 12 h after the removal of catheters. These patients were managed with a strict voiding schedule only. There have been no episodes of retention, fistula, or serious continued intermediate catheterization.[8]

In contrast to the results of this present study, Roh *et al*.[19] showed that the median duration before the accepted PVR urine and attainment of bladder function in radical hysterectomy patients was 18 days (range: 10–85 days). Another paper involving 58 patients who underwent radical hysterectomy for cervical cancer reported that the median duration of postoperative catheterization was 14 days with a range from 13 to 69 days. Almost 30% of patients did not completely empty their bladder at postoperative 2 weeks, requiring re-insertion of urethral catheter.[20]

In the review of Zullo *et al*.,[5] the foremost common bladder dysfunction was the storage dysfunction in 47% of cases. Voiding dysfunction was present in 3% and stress incontinence in 53% of cases. The dimensions of lateral parametria did not differ among the groups with bladder dysfunction, while the length of the vagina was significantly longer in patients with the storage and voiding dysfunctions than in patients with the normal diagnosis. The authors suggested that the foremost damaging step for bladder function was vaginal and paravaginal tissue resection. This might be explained by the anatomy of the parasympathetic fibers which arise from pelvic nerves. The extent of radicality is said to be the reason for bladder disorders. Impaired bladder sensation, bacteriuria, and residual urine were significantly more common among the patients with parametrial resection of >2 cm. This is because the base of the broad ligaments and uterosacral ligaments may damage the pelvic and pudendal nerves, ensuing impaired urethral sphincteric mechanism from loss of the periurethral tonus. Another report by Cibula *et al*.[21] mentioned that radicality of parametrectomy was the most significant parameter affecting the interval to spontaneous voiding recovery.

The average parametrial margin in this study was 3.6 cm while the mean vaginal length was 2.2 cm. Despite the radicality of the procedures, most of our patients had normal urinary functions post removal of the catheter from the 3rd to 7th day postsurgery. Although it absolutely was believed that the extent of dissection contributes to these urinary dysfunctions, it was confirmed in another study that vesical disorders are due only to nerve distractions which disorders of the collecting phase as of the voiding phase of the bladder are mostly transient. Direct operative trauma, with edema, hematoma, and scar formation are suggested reasons chargeable for bladder dysfunctions during the early postoperative stage.[22] This idea is applicable to the results of this present study.

In a study of Nantasupha and Charoenkwan[23] involving 755 early-stage cervical cancer patients who underwent Type C1 radical hysterectomy (nerve-sparing), 383 (50.7%) returned adequate voiding function on the 7th POD 7. Of the 372 patients (49.3%) who failed to attain adequate voiding function, the analysis revealed that factors associated with this are tumor size >4 cm, postoperative urinary tract infection, and grossly visible tumor. Their multivariate analysis showed that length of vaginal and parametrial resection, parametrial margin, tumor size >4 cm, postoperative urinary tract infection, and primary surgeon's technique were significantly associated with the inability to attain adequate voiding function on POD 7. Our present review did not investigate the techniques of the radical hysterectomy and whether there was a nerve-sparing procedure. Likewise, the five patients that required longer than POD 7 catheterization did not seem to have larger cervical tumor sizes, longer vagina, and wider parametrial margins.

A recently concluded international multicenter study did an ad hoc analysis of factors influencing voiding recovery in SENTIX (SENTinel lymph node biopsy in cervIX cancer) trial involving 300 patients in 47 sites in 18 countries. The median voiding recovery time was 3 days. Two hundred and thirty-five (78.3%) patients recovered in <7 days and 293 (97.7%) within 30 POD. Only seven (2.3%) patients recovered more than 30 days postsurgery. Previous pregnancy and type of parametrectomy were significantly associated with voiding recovery of more than 7 days. In addition, time to voiding recovery was not influenced by surgical approach (open vs. minimally invasive), age, or body

mass index. It was observed in this study that voiding dysfunctions after radical surgery are temporary, and the majority of the patients recover in <30 days, including patients after Type 3, nonnerve sparing parametrectomy.[24] Their result is comparable to the data in our institution that the majority of patients achieved their voiding recovery within 7 days' postsurgery, all recovered within 21 days.

Conclusion

The result of this study showed that earlier removal of catheter after radical hysterectomy resulted in adequate spontaneous urine output with no complaints of urinary retention providing shorter voiding recovery. This outcome supports the hypothesis that an earlier removal of the catheter seems to be a safe and practical option compared to long-term catheterization for patients undergoing radical hysterectomy without causing morbidities. Urinary retention for patients whose catheters were removed earlier requires re-catheterization and a delay of indwelling catheter removal.

The decision to remove the bladder catheter after radical hysterectomy should depend on the proper assessment of patients, adequate knowledge of anatomy and physiology, and knowledge of factors that may affect voiding recovery. The technique of radical hysterectomy by the primary surgeons should also be taken into account.

Limitations and recommendations

The limitation of this study is innate in its retrospective design and record-review approach wherein PVR in some patients was not recorded. Likewise, the techniques of the surgeons were not assessed in the study. This study does not intend to discuss the pertinence of radical hysterectomy in the treatment of endometrial cancers.

A prospective study will be able to validate the result of this review, with detailed measurements of the urine output and PVR after removal and considering the techniques of hysterectomy. A correlation study between days of removal and the factors that may affect delays in voiding recovery is substantially suggested. The population in this study does not represent a larger population of patients from other institutions. Hence, a prospective study may involve patients from multiple centers and may employ control groups.

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Conflicts of interest

There are no conflicts of interest.

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