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Renal ultrasound to detect hydronephrosis: A need for routine imaging after radical hysterectomy?

Menke H. Hazewinkel [a,*], Lieke Gietelink [b], Jacobus van der Velden [a], Matthé P.M. Burger [a], Jaap Stoker [c], Jan-Paul W.R. Roovers [a]

[a] Department of Gynecology, Academic Medical Center, Amsterdam, The Netherlands
[b] Department of Obstetrics and Gynecology, Kennemer Gasthuis, Haarlem, The Netherlands
[c] Department of Radiology, Academic Medical Center, Amsterdam, The Netherlands

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ABSTRACT

Background. Hydronephrosis can be a side effect of radical hysterectomy for cervical cancer. The incidence of clinically relevant hydronephrosis has not been studied in a large sample and the benefit of early detection of hydronephrosis is not clear.

Objective. To assess the incidence of hydronephrosis, following radical hysterectomy and evaluate the usefulness of routine renal ultrasound (RH).

Methods. Retrospective study, January 1998 and December 2008. Cervical cancer patients (FIGO stage IBI-IIA), treated with radical hysterectomy and pelvic lymph node dissection with or without adjuvant radiotherapy, without surgical lesion of the ureter, followed-up 6 months in the Academic Medical Center Amsterdam. Routine renal ultrasound was performed four weeks after RH, and in some on indication before or after the routine ultrasound. We documented which interventions for hydronephrosis were performed and evaluated the profile of patients at risk for hydronephrosis.

Results. 281 patients were included: 252 (90%) underwent routine renal ultrasound and 29 (10%) underwent imaging on indication before routine ultrasound. The overall incidence of hydronephrosis was 12%. In symptomatic patients, the incidence was 21% and 9% in asymptomatic women undergoing routine ultrasound. Four patients were invasively treated for hydronephrosis (1% of the total group) after imaging for clinical suspicion of hydronephrosis. Patients with hydronephrosis were significantly more often treated with radiotherapy than patients without (43% versus 25% ($p = 0.03$).

Conclusion. There is no place for routine renal ultrasound following radical hysterectomy. Patients should be instructed about the symptoms that may be related to hydronephrosis, to allow for renal ultrasound on indication.

Introduction

Treatment of early stage uterine cervical cancer (International Federation of Gynecologic Oncology (FIGO) stage IBI-IIA) fortunately results in high survival rates ranging from 73 to 89% [1]. Treatment primarily consists of radical hysterectomy and pelvic lymph node dissection, especially in younger patients. One of the side effects of cervical cancer treatment is hydronephrosis. The reported incidence is 21% two weeks after radical hysterectomy and lymph node dissection (RH) and 15% three months after this procedure [2,3]. Two mechanisms could explain the dilatation of renal pelvis with or without hydro-ureter after RH: [1] surgical denervation of ureters resulting in reduction of the peristaltic movements, [2] obstruction of the ureter due to a surgical lesion or scar tissue formation [2]. Hydronephrosis after radical hysterectomy resolves in most patients spontaneously within 6 months after surgery [2]. Because severe hydronephrosis might impair renal function and could ultimately result in renal failure, routine imaging of the kidneys during the postoperative phase has been proposed to diagnose this surgery related complication. Less than two decades ago intravenous pyelogram (IVP) was abandoned as a routine check after radical hysterectomy [4]. Following the cessation of the postoperative IVP, in our center routine renal ultrasound at 4 weeks after RH was introduced to detect asymptomatic hydronephrosis at an early stage [5]. However, the number of patients diagnosed and treated for clinically relevant hydronephrosis has not been studied in a large sample and it is not known whether the patient will benefit of early detection of hydronephrosis.

We set up a study with the aim to evaluate the usefulness to routinely perform renal ultrasound after radical hysterectomy with pelvic lymph node dissection (RH).

* Corresponding author at: Department of Obstetrics and Gynaecology, Academic Medical Center, Amsterdam, Meibergdreef 9, 1105 DD Amsterdam, The Netherlands. Fax: +31 206963489.
E-mail address: m.h.hazewinkel@amc.uva.nl (M.H. Hazewinkel).

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Methods

Patients

For this retrospective study we included all patients treated in the Academic Medical Center of the University of Amsterdam during January 1998 and December 2008 who met the following criteria: 1] cervical cancer FIGO stage IBI-IIA; 2] treatment with radical hysterectomy and pelvic lymph node dissection (Wertheim–Okabayashi) with or without adjuvant (chemo-) radiotherapy; 3] presence of a detailed surgical report; 4] absence of known per-operative lesion of the ureter (as these patients did not undergo routine ultrasound at 4 weeks after surgery); 5] follow-up of 6 months in our center. Patients included in the EORTC 55962 study, requiring additional imaging before and after the operation were excluded from this study as they were not followed up with the routine regimen and this different management could influence the results [6].

Data collection

Disease and treatment characteristics collected were: FIGO stage, surgical urological complications, operative blood loss and adjuvant radiotherapy, with or without chemotherapy. The type of radical hysterectomy with pelvic lymph node dissection performed in our center during the study period was according to the Wertheim–Okabayashi procedure, which is done laparotomically [7]. The usual interval in our center between the surgical procedure and start of radiotherapy was 4 to 6 weeks. The criteria for adjuvant radiotherapy were one or more of the following: positive lymph nodes, tumor growth in parametrial tissue and tumor growth in the surgical margins. Usually 45 Gy was administered to the operation field up to L5 and additionally 10 Gy internal radiotherapy when more than one of the above-mentioned criteria was present.

Outcome measurements

The routine renal ultrasound was planned 4 weeks after the RH. The total group of patients was subdivided in group A, who did not have clinical suspicion of hydronephrosis before 4 weeks postoperatively and underwent routine renal ultrasound. Group B had imaging prior to the routine ultrasound as there was clinical suspicion of hydronephrosis. For both groups data were collected concerning the clinical suspicion for hydronephrosis up to 3 months postoperatively; results from subsequent imaging and management were collected. The data of follow-up were studied until 6 months postoperatively. During the inclusion period, the management of hydronephrosis was individualized, but general policy was that severe unilateral and/or bilateral hydronephrosis, or moderate bilateral hydronephrosis, with or without increased serum creatinine levels resulted in an intervention. Interventions were either a double-J catheter or nephrostomy. Of the patients who needed an intervention for hydronephrosis we collected the creatinine-level before and after the intervention. The severity of hydronephrosis was recorded as reported by the radiologist: mild (some ectasia of collecting system en mild dilatation of the ureter), moderate (clear dilatation of the collecting system and ureter, but without ballooning of the pyelocalyceal system) or severe (distortion of the collecting system with ballooning and a dilated, tortuous ureter). Of patients who received imaging for clinical suspicion of hydronephrosis with or without hydronephrosis, medical files were checked to see which clinical signs and symptoms were the indication for imaging.

Statistical analysis

The proportion of patients with hydronephrosis was calculated for patients with and without clinical suspicion of hydronephrosis. We compared age, tumor diameter, operative blood loss and having had radiotherapy for the patients with and without hydronephrosis and for patients with hydronephrosis with and without symptoms using non-parametric independent sample test (Mann–Whitney U test), to evaluate whether patient and disease-related characteristics influence the risk of hydronephrosis. For data analysis we used the SPSS program 16.0.

Results

Between January 1998 and December 2008, 475 patients were diagnosed in our center with early stage cervical carcinoma, of whom 281 patients (59%) were eligible for this study; reasons to exclude patients were: participation in the EORTC 55962 study (n = 67) [6]; no postoperative imaging in our center (n = 38); detailed operation reports were not available (n = 4); no treatment with an RH or treatment elsewhere (n = 81); per-operative lesion of the ureter (n = 4).

Table 1 shows the patient-, disease- and treatment-characteristics of all included patients. Data of 281 patients were analyzed. Most patients (n = 231, 82%) were diagnosed with FIGO stage IBI cervical carcinoma. Eighty-three patients (30%) were adjuvantly treated with radiotherapy with or without chemotherapy.

Fig. 1 displays the results of the imaging procedures. Overall the incidence of hydronephrosis was 12% (34/281). Group A (n = 252) did not have clinical suspicion of hydronephrosis and had a routine ultrasound. Twenty-two (9%) were found to have mild or moderate hydronephrosis, not requiring treatment. Within three months after treatment 4% (11/252) of group A developed signs and symptoms of hydronephrosis and had imaging again. Six of these patients had hydronephrosis, of whom 2 needed intervention for bilateral and or severe hydronephrosis (Table 2, patients 1 and 2). Group B (n = 29) had imaging for clinical suspicion of hydronephrosis before 4 weeks postoperatively, i.e. before the routine ultrasound. Six women (21%) had hydronephrosis, of whom two needed invasive treatment (Table 3, patients 3 and 4). In two of 23 women in group B without hydronephrosis at time of imaging for the first suspicion of hydronephrosis, again rose clinical suspicion of hydronephrosis for which imaging was done; neither had hydronephrosis. Of all patients with clinical suspicion of hydronephrosis (of Group A and B together: n = 42), 12 (29%) had hydronephrosis and four of them had invasive treatment. None of the 22 patients with hydronephrosis found with routine renal ultrasound required invasive treatment.

Follow-up (see Fig. 1) showed that 25 of 34 patients (74%) with hydronephrosis did not have hydronephrosis within 6 months, 8 had mild and 1 had moderate hydronephrosis, one patient did not have imaging during follow-up.

Of all 281 patients four patients (1%) required invasive therapy. Table 2 shows in more detail the characteristics of the four patients who had hydronephrosis requiring invasive treatment. All four

Table 1
Patient, disease and treatment characteristics (n = 281) in number and percentage unless indicated otherwise.*

Age	Mean years (SD) *	43	10
		N	%
FIGO stage	IBI	231	82
	IB2	28	10
	IIA	22	8
Total operative blood loss	Mean milliliters (SD) *	1119	879
		N	%
Adjuvant treatment	Radiotherapy only	44	16
	Concurrent chemotherapy	43	15

Legend: FIGO: International Federation of Gynecologic Oncology, SD: standard deviation.