ELSEVIER

European Journal of Cancer 40 (2004) 375–378

European Journal of Cancer

www.ejconline.com

'State of the art' of radical hysterectomy; current practice in European oncology centres☆

J.B. Trimbos[a,*], M. Franchi[b], F. Zanaboni[c], J.v.d. Velden[d], I. Vergote[e]

[a]*Department of Gynecology, Leiden University Medical Centre, The Netherlands*
[b]*University Hospital, Verona, Italy*
[c]*Gynecologic Oncology Unit, National Cancer Institute, Milan, Italy*
[d]*Academic Medical Centre, Amsterdam, The Netherlands*
[e]*University Hospitals Leuven, Belgium*

Received 26 June 2003; received in revised form 15 August 2003

Abstract

Quality control of medical performance requires adequate 'state-of-the-art' data and this is currently not uniformly defined for radical hysterectomy. We have used data from a randomised multicentre clinical trial examining the clinical significance of surgical drains following radical hysterectomy (European Organisation for Research and Treatment of Cancer (EORTC)-55962). Although the study was not designed to analyse the quality of the surgical procedure *per se*, surgical data during and after the operation were carefully noted. A total of 234 patients from 12 European institutes were included in the study. We reported on the clinical and surgical characteristics, the radicality of surgery and short- and long-term complications of radical hysterectomy: median duration of surgery: 240 min; median number of nodes removed: 26; lymph node metastases: 22%; post-operative mortality: <1%; urinary tract infection: 42%; deep venous thrombosis: 3%; fistula: 2%. The data from our study provides an honest and realistic picture of the current practice of radical hysterectomy among European oncology centres and may be considered as the 'standard of care' in this part of the world.

Keywords: Radical hysterectomy; 'State-of-the-art'; Surgical practice; EORTC; Surgery; 'Standard of care'; Quality control; Oncology surgery; Gynaecological oncology

1. Introduction

Radical hysterectomy is considered the standard procedure for the treatment of early stage cervical cancer [1]. Although numerous reports have been published on the surgical methods and extent of radical resection, they basically represent the experience of single, specialised oncology centres [2]. Such institutes often have a special interest in cervical cancer or report on selected patients. A result of this is a wide range of incidence figures of local and regional spread of the disease [3], per- and post-operative complications [4,5], the extent of parametrial resection [6], possible adjuvant therapy and long-term sequelae [7,8]. Therefore, it is difficult to define the 'state of the art' standard for radical hysterectomies. In terms of quality control and requirements for surgeons and institutes selected to perform this specialised kind of oncological surgery, it is extremely important to come up with such a standard regarding the radicality and per- and post-operative morbidity of the procedure. Ideally, detailed clinical data of a number of respected oncology centres should therefore be collected prospectively. The European Organisation of Research and Treatment of Cancer Gynecological Cancer Group (EORTC-GCG) performed a prospective, randomised trial to study the value of surgical drains following radical hysterectomy. The study was conducted between 1998 and 2000 and registered comprehensively the pre- and post-operative clinical and surgical data. A total of 234 patients were

☆ Conflict of interest: None of the authors of this article had a conflict of interest.

* Corresponding author. Tel.: +31-71-5262845; fax: +31-71-5258181.
E-mail address: j.b.m.z.trimbos@lumc.nl (J.B. Trimbos).

0959-8049/$ - see front matter © 2003 Elsevier Ltd. All rights reserved.
doi:10.1016/j.ejca.2003.09.017

entered by 12 European Institutes, but 72% of patients were entered by the four major contributors. The primary endpoint of this study (drains or no drains) will be reported elsewhere. We report here on the surgical and clinical data of the 234 patients to define a realistic 'state of the art' standard of radical hysterectomy in Europe.

2. Patients and methods

Patients were entered in EORTC-trial 55962 between 23 February 1998 and 3 July 2000 and randomised to either pelvic drainage or no drainage following surgery in order to define the significance of drainage in the prevention of lymphocyst formation following radical hysterectomy. Exclusion criteria for randomisation were excessive blood loss during surgery (>3000 ml) or persistent oozing at the end of the procedure requiring postoperative drainage. The accrual rate was 107 patients per year. Follow-up was closed on 2 October 2002 and the median duration of follow-up was 13.3 months.

Twelve European cancer centres accrued 234 patients, but 169 patients (72%) came from the four major institutes: Academic Medical Centre, Amsterdam (54); Leiden University Medical Center (47); Ospedale di Circolo, University Insubria, Varese (34) and University Hospitals, Leuven (34). All data were collected at the EORTC Data Centre in Brussels, Belgium.

3. Results

The general surgical and clinical characteristics of the 234 procedures are summarised in Table 1. Antibiotic prophylaxis (dose and type at the discretion of the attending surgeon) was generally given as was thromboprophylaxis (Table 1). Blood loss during surgery was not included in the table because it was biased by the exclusion criteria of less than 3000 ml bleeding and no oozing at the end of surgery necessitating pelvic drainage. To provide more data on this, the number of patients requiring red blood cell transfusion was noted and this number was approximately 30% (Table 1).

Various parameters relating to the radicality of surgery are demonstrated in Table 2. Peri-aortic (PAO) lymph node dissection was performed only in 10% of the patients. In these cases, there was a specific indication such as palpable abnormalities or positive common iliac lymph nodes. Complications were divided into short-term (Table 3) and long-term (Table 4) events. The only post-operative mortality was caused by post-operative haemorrhage, multi-organ failure and subsequent pulmonary insufficiency. Out of seven cases of deep venous thrombosis, a pulmonary embolism occurred in two. In only two out of 20 patients with bowel obstruction, was surgical intervention necessary.

Table 1
Clinical and surgical characteristics of 234 patients undergoing a radical hysterectomy in a prospective randomised trial (EORTC 55962)

Median (range) age (in years)			46.2	(26–81)
Cervical cancer		196		
FIGO stage	Ia	13		
	Ib1	120		
	Ib2	25		
	IIa	22		
	IIb	11		
	IIIa	1		
	IIIb	4		
Endometrial cancer		36		
Figo stage	Ia	2		
	Ib	11		
	Ic	5		
	IIa	1		
	IIb	8		
	IIIa	3		
	IIIc	5		
	IVb	1		
Vaginal cancer		2		
Median weight (in kg) (range)			65	(4.2–115)
Prophylactic antibiotics			233	(99.6%)
Thromboprophylaxis			234[a]	(100%)
Median operating time (in minutes) (range)			240	(75–450)
Transfusion of red blood cells (patients)			74	(32%)
Transfusion of frozen plasma (patients)			9	(4%)
Median postoperative hospital stay (days) (range)			13	(5–53)
Median time to resumption of bowel sounds (days) (range)			2	(0–15)
Median time to removal of intravenous lines (days) (range)			3	(0–34)
Transposition of one or two ovaries			31	(13%)

EORTC, European Organisation for Research and Treatment of Cancer; FIGO, International Federation of Gynecology and Obstetrics.
[a] Low dose heparin: 114. Fractionated heparin: 120.

None of the patients with symptomatic ureteral stenosis required surgical repair and two of the seven patients with incisional hernia underwent corrective surgery for this condition (Table 4). During the follow-up period (median: 13.3 months), 21 out of 234 patients died, of whom 17 patients died of their disease (81%). The other causes of death included one patient with HIV, one with obstructive jaundice, one of post-operative pulmonary insufficiency (see above) and one of unknown causes.

4. Discussion

This paper combines a detailed prospective analysis of the characteristics of radical hysterectomy with data

Table 2
Characteristics of the radicality of surgery in 234 patients undergoing radical hysterectomy

Median number of nodes removed (range)	26	(10–75)
PAO[a] nodes removed (number of patients%)	24	(10%)
Patients with lymph node metastases	51	(22%)
Transsection of uterine artery		
medially to the ureter	11	(5%)
at origin from hypogastric artery	223	(95%)
Resection of uterosacral ligaments		
less than one third	3	(1%)
one third to a half	25	(11%)
more than a half	136	(58%)
total	70	(30%)
Resection of cardinal ligaments		
less than one third	2	(1%)
one third to a half	16	(7%)
more than a half	82	(35%)
total	134	(57%)
Length of vaginal cuff		
less than one third of the vagina	104	(44%)
one third to a half	106	(45%)
A half	24	(10%)
Pubovesical ligament removed underneath ureteral level		
yes	181	(77%)
no	53	(23%)

[a] PAO: peri-aortic.

Table 3
Short-term complications in 234 patients undergoing radical hysterectomy

Post-operative mortality	1	(<1%)
Wound infection ⩾G1[a]	9	(4%)
Pelvic infection ⩾G1[a]	2	(1%)
Urinary tract infection	98	(42%)
Respiratory tract infection	6	(3%)
Deep venous thrombosis	7	(3%)
Bowel obstruction	2	(1%)
Post-operative haemorrhage	2	(1%)
Urinary tract injury	1	(<1%)

G1, grade 1.
[a] According to Ref. [9].

Table 4
Long term complications in 234 patients undergoing radical hysterectomy

○	Symptomatic lymphocysts (patients)	11	(5%)
○	Ureteral stenosis (patients)	7	(3%)
○	Incisional hernia (patients)	7	(3%)
○	Fistula requiring surgical repair		
	✓ vesico vaginal	1	(<1%)
	✓ uretero vaginal	3	(1%)
	✓ recto vaginal	1	(<1%)

collected from a randomised clinical trial to study the significance of post-operative drainage to prevent lymphocysts. Furthermore, these data were collected from 12 gynaecological oncological departments from across Europe: The Netherlands: five, Italy: two, United Kingdom (UK): two, Belgium: one, Portugal: one, Austria: one. Therefore, we believe that these data represent a realistic and unbiased overview of the current practice of performing radical hysterectomy in specialised centres in Europe. These results can therefore be used to define a 'state-of-the-art'-standard for this kind of surgery.

Table 5
Standard of care of radical hysterectomy as derived from a current practice by 12 European gynaecological oncology centres in 234 patients

Median duration of surgery (in min) (range)	240	(75–450)
Patients with red blood cell transfusion	74	(32%)
Median number of nodes removed (range)	26	(10–75)
Resection of cardinal ligament >50% (number of patients (%))	216	(92%)
Vaginal cuff >one third of vagina (number of patients (%))	130	(56%)
Lymph node metastases (number of patients (%))	51	(22%)
PAO-nodes removed (number of patients (%))	24	(10%)
Post-operative mortality (number of patients (%))	1	(<1%)
Urinary tract infection (number of patients (%))	98	(42%)
Deep venous thrombosis (number of patients (%))	7	(3%)
Symptomatic lymphocysts (number of patients (%))	11	(5%)
Fistula (patients)	5	(2%)

Quality assessment attracts more and more attention in oncological treatment practices and this is even more important in relatively rare operations where accreditation has to be restricted to a few institutes with sufficiently high 'standards of care'. Radical hysterectomy has become a relatively rare operation in the Western world since the incidence of cervical cancer has dropped to well below 10 per 100 000 women in this part of the world [10]. For example, in the Netherlands, 725 new cases of cervical cancer occur yearly. This represents 0.4 potential candidates for radical hysterectomy per gynaecologist and 2–3 candidates per hospital.

Our study was limited with regard to the monitoring of blood loss during surgery since the amount of bleeding was part of the exclusion criteria of the randomised trial into which these patients were accrued. Therefore, we restricted ourselves to reporting on the number of patients for whom red blood cell transfusions were required (32%).

Comparison of our findings with the reports of single institutions is hampered by the fact that we analysed material collected from 12 institutions. Nevertheless our data was prospective, whereas many papers on radical hysterectomy in the literature involve retrospective data [11]. In addition, we should comment on the median hospital stay noted for our patients. The median post-operative stay was 13 days in our study, whereas in the United States, for example, this time has been reported to be much shorter [12]. The most plausible explanation for this difference is that in Europe there seems to be less pressure on hospital beds than in the United States and this might reflect differences in their financial systems of health care.

There was a high percentage of cases (56%) in which more than one third of the vagina was resected and this might be a reflection of the number of patients with locally advanced disease in our study population: of the 196 patients with cervical cancer, 63 (32%) had FIGO stage lb2 or higher. Of the 36 patients with endometrial cancer, 18 (50%) had FIGO stage lla or higher (Table 1).

In Table 5, we summarised the most important findings of our study to provide a simple 'state-of-the-art' overview of radical hysterectomy in Europe. We believe that we have provided a honest and realistic picture of the current practice of radical hysterectomy among the major oncology centres in Europe. These data might be considered as the 'standard of care' in this part of the world.

References

1. Lee YN, Wang KL, Liu MH, *et al*. Radical hysterectomy with pelvic lymphnode dissection for treatment of cervical cancer: a clinical review of 954 cases. *Gynecol Oncol* 1989, **32**, 135–142.
2. Averette HE, Nguyen HN, Donato DM, *et al*. Radical hysterectomy for invasive cervical cancer. A 25-year prospective experience with the Miami technique. *Cancer* 1993, **71**, 1422–1437.
3. Chen CA, Cheng WF, Wei LH, Su YN, Hshich CV. Radical hysterectomy alone or combined with neo-adjuvant chemotherapy in the treatment of early stage bulky cervical carcinoma. *J Formos Med Assoc* 2002, **101**, 195–202.
4. Yang YC, Chang CL. Modified radical hysterectomy for early lb cervical cancer. *Gynecol Oncol* 1999, **74**, 241–244.
5. Michalas S, Rodolakis A, Voulgaris Z, Vlachos G, Gianna Koulis N, Diakomanolis E. Management of early-stage cervical carcinoma by modified (type II) radical hysterectomy. *Gynecol Oncol* 2002, **85**, 415–422.
6. Landoni F, Manco A, Cormio G, *et al*. Class II versus class III radical hysterectomy in stage Ib-IIa cervical cancer: a prospective randomised trial. *Gynecol Oncol* 2000, **80**, 3–12.
7. Kenter GG, Heintz AP. Surgical treatment of low stage cervical carcinoma: back to the old days? *Int J Gynecol Cancer* 2002, **12**, 429–434.
8. Powell JL, Burrell MD, Franklin EW 3rd. Radical hysterectomy and pelvic lymphadenectomy. *South Med J* 1984, **77**, 596–600.
9. Chassagne D, Sismondi P, Horiod JC, *et al*. A glossary for reporting complications of treatment in gynecological cancers. *Radiother Oncol* 1993, **26**, 193–202.
10. Krul EJT, Peters AAW, Vandenbroucke JP, Vrede MA, van Kanten RW, Fleuren GJ. Cervical cancer in Surinam; incidence and staging of cervical carcinoma between 1989 and 1994. *Cancer* 1996, **77**, 1329–1333.
11. Ayhan A, Tuncer ZS. Radical hysterectomy with lymphadenectomy for treatment of early stage cervical cancer: clinical experience of 278 cases. *J Surg Oncol* 1991, **47**, 175–177.
12. Lerner HM, Jones HW 3rd, Hill EC. Radical surgery for the treatment of early invasive cervical carcinoma (Ib): review of 5 years' experience. *Obstet Gynecol* 1980, **56**, 413–418.