International Journal of Gynecology and Obstetrics 112 (2011) 149–153

Contents lists available at ScienceDirect

International Journal of Gynecology and Obstetrics

journal homepage: www.elsevier.com/locate/ijgo

SURGERY AND TECHNOLOGY

Systematic comparison of radical vaginal trachelectomy and radical hysterectomy in the treatment of early-stage cervical cancer

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ARTICLE INFO

Article history:
Received 4 May 2010
Received in revised form 25 August 2010
Accepted 29 October 2010

Keywords:
Cervical cancer
Controlled trial
Radical hysterectomy
Radical vaginal trachelectomy

ABSTRACT

Objective: To review the effects of radical vaginal trachelectomy (RVT) and radical hysterectomy (RH) on overall progression-free survival rate, and intraoperative and postoperative complications in patients with cervical cancer (FIGO stage IA–IB1). *Methods:* Electronic searches for studies of RVT and RH in the treatment of cervical cancer between 1994 and January 2010 were made on MEDLINE, the Cochrane Library, the China National Knowledge Infrastructure, and the Wan Fang dissertation database. *Results:* No significant differences were found between RVT and RH in 5-year overall survival rate (relative risk [RR] 0.97; 95% confidence interval [CI], 0.93–1.02); 5-year progression-free survival rate (RR 0.99; 95% CI, 0.95–1.02); intraoperative complications (RR 1.99; 95% CI, 0.61–6.52)]; and postoperative complications (RR 0.36; 95% CI, 0.10–1.27). There were fewer blood transfusions (RR 0.33; 95% CI, 0.12–0.90), less blood loss, and shorter hospital stays in patients undergoing RVT. *Conclusion:* Radical vaginal trachelectomy should be considered as a viable treatment option for young patients with early cervical cancer (FIGO stage IA–IB1) who wish to preserve their fertility.

1. Introduction

Cervical cancer is the second most common cancer among women worldwide; there were an estimated 493 000 new cases and 274 000 deaths from cervical cancer in 2002 [1]. The current standard treatment for early cervical cancer is radical hysterectomy (RH) with systematic pelvic lymphadenectomy or pelvic radiotherapy. This treatment may result in significant morbidity, particularly because of the large volume of blood lost, or bowel and bladder dysfunction [2]. Radical hysterectomy also deprives patients of reproductive function and affects their quality of life. A total of 15 081 cases of cervical cancer from 108 centers between 1991 and 2001 were reported at the 26th Annual Meeting of the International Obstetrics and Gynecology Society; 10% of the women younger than 40 years of age presented with FIGO stage IA–IB1 cervical cancer [3]. The parametrium and lymph nodes were not involved in a large proportion of these young patients, and the 5-year survival rate of this cohort was greater than 95% [4]. As a result, preservation of fertility, improving quality of life, and reducing morbidity are essential clinical considerations for this patient group.

In 1994, Dargent et al. [5] reported the use of radical vaginal trachelectomy (RVT) with laparoscopic lymph node dissection for the treatment of early cervical cancer. Subsequently, more than 500 cases of RVT from 8 separate research centers have been reported. Authors [5,6] have advocated the following criteria for performing RVT: a desire to preserve fertility; clinical evidence of impaired fertility; lesions of 2 cm or less and infiltration of less than 5 mm; FIGO stage IA1 with lymphovascular system infiltration (LVSI), IA2–IB1; adenocarcinoma or squamous cell carcinoma; no endocervical involvement on colposcopic examination; and no evidence of pelvic lymph node metastasis or other distant metastasis. Several authors [5,6] have suggested that the main objectives of RVT in early cervical cancer are to maintain reproductive fertility, to achieve a satisfactory overall surgical outcome, and to increase the recurrence-free survival rate. The aim of the present study was to verify the clinical viability of RVT as a primary treatment for patients who satisfy these clinical criteria.

2. Materials and methods

The inclusion criteria for the study were limited to controlled trials of RVT and RH. The study participants included patients in the early stages of cervical cancer (FIGO stages IA–IB1). The primary outcome measures were 5-year overall survival rate and 5-year progression-free survival rate. The secondary outcome measures included volume of blood loss, proportion of patients requiring blood transfusions, duration of operation, duration of hospital stay, intraoperative complications, and postoperative complications.

In January 2010, we searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE (from 1966 to January 2010),

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0020-7292/$ – see front matter
doi:10.1016/j.ijgo.2010.08.020

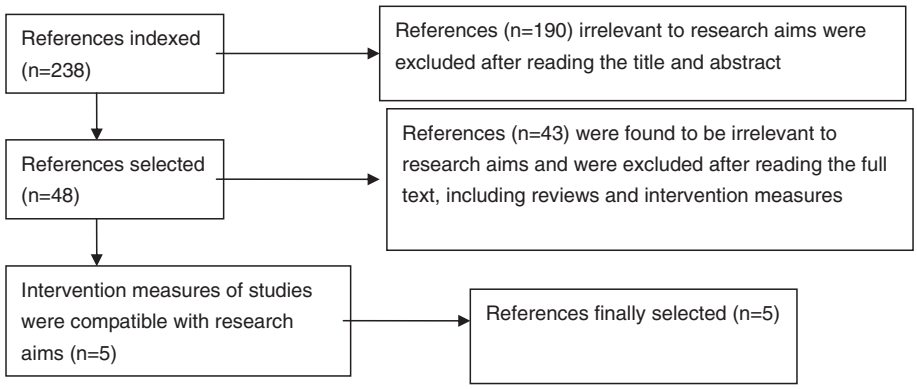

Fig. 1. Data collection and screening.

the Wanfang Dissertation Database (1978–2010), and the China National Knowledge Infrastructure (1994–2010). We combined terms for cervical cancer, trachelectomy, and hysterectomy, followed by standardized methodologic filters for identifying controlled trials as appropriate studies.

Two researchers independently assessed the eligibility of the studies and extracted data for each study. Disagreement between authors was resolved by discussion. Collected data included mainly: authors, year, nation, journal of selected references; general information (mean age, pathologic stage, pathologic type, histologic grade, and tumor size); and outcome indicators (5-year overall survival rate, 5-year progression-free survival rate, volume of blood loss, proportion of blood transfusion, duration of operation, duration of hospital stay, intraoperative complications, and postoperative complications).

Data were analyzed using RevMan version 5.0 (Cochrane Collaboration Network). We expressed study results as relative risk (RR) with 95% confidence interval (CI) for dichotomous data. A fixed-effect model was used if there was no significant heterogeneity ($P>0.10$, $I^2<50\%$) among subgroups. If there was significant heterogeneity ($P<0.10$, $I^2>50\%$), a random-effect model was used to pool the data and to investigate the source of the heterogeneity. Descriptive analysis was performed when collected data from clinical trials could not be analyzed by meta-analysis [7].

3. Results

A total of 238 relevant articles were identified (Fig. 1). Of these 238 articles, only 5 trials met the inclusion criteria (Table 1) [8–12]. Data from 4 trials [8,9,11,12] were available to calculate the RR for 5-year progression-free survival rate (Fig. 2). There was no significant difference in 5-year progression-free survival rate between RVT and RH (RR 0.99; 95% CI, 0.95–1.02).

The 5-year overall survival rate, based on 3 studies [8,9,12] (Fig. 3), did not differ between RVT and RH (RR 0.97; 95% CI, 0.93–1.02). There was no statistical heterogeneity across studies ($\chi^2=2.75$; $P=0.25$; $I^2=27\%$).

Data on the duration of the operation were available in 5 studies [8–12] (Table 2). Two of these studies revealed that there was no significant difference in the duration of the operation between RVT and RH [8,9], whereas 2 studies indicated that the duration of the operation for RVT was longer than that for RH [10,11]. The other study did not provide statistical results [12]. Four of the eligible studies [8,10–12] presented data on the duration of hospital stays. The overall collected data on hospital stay strongly favored RVT. Blood loss was recorded in 4 studies [8,10–12]. The data from 3 studies showed a lower volume of blood loss in RVT compared with RH. Statistical analysis was not performed in the remaining study [12].

On the basis of 5 studies [8–12] (Fig. 4), the proportion of patients requiring a blood transfusion was significantly lower for RVT (RR 0.33; 95% CI, 0.12–0.90). However, there was statistical heterogeneity across trials. We adopted a random model analysis for good clinical consistency.

Intraoperative and postoperative complications were reported in 5 [8–12] and 4 [8,9,11,12] studies, respectively (Figs. 5 and 6). Random model analysis showed that there were no significant differences in intraoperative (RR 1.99; 95% CI, 0.61–6.25) and postoperative complications (RR 0.36; 95% CI, 0.10–1.27) between RVT and RH.

4. Discussion

In recent years, RVT has been used with increasing frequency in the treatment of early-stage cervical cancer to preserve patient reproductive function. Prior clinical trails have revealed that RVT does not increase recurrence rate compared with RH [8–18]. The results of our systematic review of published data confirm that RVT does not result in lower 5-year overall survival rate and progression-free survival rate of patients compared with RH.

This meta-analysis revealed that RVT was associated with fewer blood transfusions, less blood loss, and a shortened hospital stay. The duration of the operation for RVT did not show clinical advantages over RH.

Gynecologic oncologists must possess transvaginal, abdominal, and laparoscopic operative skills to perform RVT successfully. In addition, the limited number of recorded cases and the relatively

Table 1
Studies of radical vaginal trachelectomy and radical hysterectomy in the treatment of cervical cancer.

Author	Country	Journal	Number of cases		5-year total survival rate, %		5-year recurrence-free rate, %	
			RVT	RH	RVT	RH	RVT	RH
Marchiole 2007 [9]	Italy	Gynecologic oncology	118	139	95	95	95.5	94.7
Alexander-Sefre 2006 [10]	UK	Gynecologic Oncology	29	50	–	–	–	–
Renaud 2000 [12]	Canada	Gynecologic Oncology	34	57	94.1	100	94.1	96.5
Beiner 2008 [8]	Canada	Gynecologic Oncology	90	90	95	100	94.4	98.9
Covens 1999 [11]	Canada	Cancer	32	556	–	–	93.8	94.1

Abbreviations: RH, radical hysterectomy; RVT, radical vaginal trachelectomy.