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A new method of surgical margin assuring for abdominal radical trachelectomy in frozen section

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Abstract ***Objectives:*** The aim of this study was to introduce a new method of assuring surgical margins for abdominal radical trachelectomy (ART) and report our experience using the method.
Methods: We combined transverse and perpendicular sections to assess surgical margins of specimens from RT. All surgeries from 1st August 2012 to 1st October 2013 were performed by one surgeon. The frozen section (FS) was consistently performed by a group of gynaecologic pathologists according to the detailed protocol described in this article. All cases were prepared by the same pathologist, and the slides were reviewed by two pathologists.
Results: There were 53 patients treated using the new method in our institution. The patient ages ranged from 20 to 41 years old (median 32). The surgeries were performed for clinical stage IA ($n = 11$) with LVSI and IB ($n = 42$) tumours (40 squamous cell carcinoma, 11 adenocarcinoma, two adenosquamous and two others). In 20 (37.74%) cases, no residual tumour of the ART specimen on frozen section was observed in the specimens as it was cleared by the preceding loop electrical excision procedure (LEEP) or conization. The margins were initially reported as negative in 45 cases and positive in nine cases. In those nine cases, a second slice of cervix was removed and negative in six cases and positive again in two cases, the other one with positive nodes. The results of frozen sections were concordant with the final paraffin-embedded sections. There were no false negative intraoperative assessments. There were no recurrences after a median follow-up of 15.4 months (range, 6–21 months).
Conclusions: Combining transverse and perpendicular sections to assess surgical margins of specimens from RT makes the protocol simple, reliable and produces accurate results.

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1. Introduction

Cervical cancer is the second most common cancer in women in developing countries, and more than 500,000 new cases are diagnosed worldwide every year [1]. Early-stage cervical cancer has a very good prognosis and excellent overall survival rates. Most patients suffering from early-stage cervical cancer are diagnosed at a median age of 40 years old. Due to the increased number of delayed pregnancies, many patients are diagnosed during reproductive ages. This result leads to the issue of whether it is possible to preserve the uterus for future pregnancy without increasing the risk of recurrence.

In 1994, Dargent [2] reported the utility of vaginal radical trachelectomy (VRT) with laparoscopic lymph node dissection for the treatment of early-stage cervical cancer. Smith et al. [3] reported abdominal radical trachelectomy (ART) in 1997, and ART is considered another radical surgical procedure for early cervical cancer. Many studies investigating radical trachelectomy have been published worldwide in the last decade. Most of the publications have focused on the procedural clinical aspects, and there is little emphasis on the specimen handling in the pathology suite.

Corpus uteri invasion is determined by the operative margin and is confirmed by intraoperative frozen section analysis. The lower uterine segment (LUS) or the upper endocervix (EC) surgical margin is the boundary of the trachelectomy specimen. The presence of tumour invasion is a very important indicator for cancer recurrence or adjuvant therapy indications, especially for patients with an endogenous tumour in the cervical canal or cervical stromal invasion. Several published reports of different techniques demonstrate a lack of guidance in the pathology community regarding the accepted guidelines for the most reliable and feasible approach. There is no existing agreement on the best method of sampling a margin of a frozen section. The selection of an appropriate method is dictated by the information required by the surgeon. This study was performed in our centre and presents a new method of frozen section analysis for radical trachelectomy. The new method has the following advantages: (1) it is simple, convenient and less time consuming; (2) no professional gynaecological pathologist is required so the method is easier to popularise; and (3) it ensures margins without residual tumour.

2. Materials and methods

A prospectively maintained database of early-stage cervical cancer patients who were scheduled to undergo abdominal radical trachelectomy was analysed. All of the operations were performed in the Department of Gynecologic Oncology at Fudan University Shanghai Cancer Center from 1st August 2012 to 1st October 2013 by the same surgeon. The initial diagnosis was made on cervical biopsies, loop electrical excision procedure (LEEP) specimens, or cone biopsy specimens. The criteria for preserving the corpus uteri and part of the cervix were as follows: (1) desire to preserve fertility and no clinical evidence of impaired fertility; (2) histologic diagnosis of squamous cell carcinoma, adenocarcinoma, or adenosquamous carcinoma; (3) FIGO stage IA1 disease with lymphovascular space invasion, or positive surgical margin and distorted cervicovaginal anatomy after conisation, and stage IA2 or IB1 disease; (4) tumour size less than 4 cm; (5) no evidence of parametrial involvement and confirmation of tumour limited to the cervix; and (6) no evidence of pelvic lymph node metastases [4].

There are different approaches for submitting sections of the trachelectomy margin for histologic evaluation. However, there is no defined consensus on the best sampling method. Surgeons may prefer transverse (en face) sections [5], while others might prefer a longitudinal (perpendicular) section [6]. Others only take a perpendicular margin if there is a grossly visible tumour [7]. At our institution, we applied both transverse and perpendicular methods. The new combination method is briefly described in the following four steps.

Step 1: When the specimen was sliced from the corpus uteri, the endocervical canal was opened through a longitudinal anterior section at the 12:00 location (Fig 1A). The shape, size and location of the tumour were examined by an unaided eye, described and recorded in the final pathological report. The tumour form in ART specimens was graded into three categories by the gross appearance: (1) no grossly visible lesion, such that the tumour could not be clearly located due to preoperative conisation or LEEP; (2) a nonspecific lesion, which was defined as a granular, irregular, or ulcerated zone that may correspond to the previous biopsy site and in which a gross diagnosis of residual cancer was uncertain; and (3) a grossly visible tumour for which a tumour was clearly identifiable.

Step 2: If the tumour was previously visible or coned, the pathologist then cut off the cervical specimen 8 mm from the margin and cut away a 2-mm-thick en face slice. This requires making a transverse section 10 mm from the end of the specimen for the frozen section (Fig 1B).

Step 3: The section was divided into two slices, which were marked 0–6 o'clock and 6–12 o'clock. Each slice was checked from the mucosal surface to the serosa using a microscope (Fig 1C). The most important aspect of the method is examining the whole endocervical stroma including endocervical clefts deep within the stroma. If no residual tumour was found in the frozen section, then there was a satisfactory margin with no invasive tumour at least 10 mm from the tumour.