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Pregnancy after Fertility-Sparing Treatment for Cervical Cancer in Young Women: A Case Presentation

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ABSTRACT

Introduction: Cervical cancer remains a major global public health challenge despite being largely preventable. Over the past three decades, fertility-sparing surgery has become an increasingly important treatment option for selected patients with early-stage cervical cancer, offering preservation of fertility as an alternative to radical hysterectomy. We present a case report of a young woman who achieved a successful pregnancy after fertility-sparing treatment for cervical cancer.

Case Presentation: A 38-year-old nulliparous woman with a history of recurrent high-grade Cervical Intraepithelial Neoplasia (CIN III) underwent repeat cervical excision after persistent HSIL, which revealed FIGO IA1 microinvasive squamous cell carcinoma without lymphovascular invasion. Following multidisciplinary evaluation, she underwent fertility-sparing simple trachelectomy with negative surgical margins. After one unsuccessful IVF pregnancy, she conceived spontaneously and delivered a healthy male infant by cesarean section at 36 weeks' gestation. At follow-up, she remained disease-free with normal cytology, colposcopy, and negative HPV testing.

Conclusion: Fertility-sparing treatment can provide excellent oncologic and reproductive outcomes in carefully selected patients with early-stage cervical cancer. This case emphasizes the importance of individualized, multidisciplinary management to balance oncologic safety with fertility preservation and achieve successful pregnancy after treatment.

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Introduction

Cervical cancer remains a major public health challenge worldwide, despite being largely preventable through effective interventions [1]. During the last 3 decades, the use of fertility-sparing surgery (FSS) has gained momentum in the management of cervical cancer, whereas standard surgery in earlystage disease is based on a radical hysterectomy (and lymph node dissection), thereby depriving patients of subsequent fertility [2]. The ''cornerstone'' of conservative surgery is the radical trachelectomy (RT), first introduced 3 decades ago by Daniel Dargent [3]. Other treatment modalities or approaches were defined during that period, and at present five different FSS procedures are now available for cervical cancer: conization or a simple trachelectomy, a vaginal RT, an abdominal RT (a laparotomic or a minimally invasive procedure using a pure laparoscopic or a robot-assisted laparoscopic RT), and Neoadjuvant Chemotherapy (NACT) followed by FSS (conizzation/simple trachelectomy or RT). Given national trends toward delayed childbearing, the number of women with early-stage cervical cancer seeking fertility-sparing options, such as cervical conization, Loop Electrosurgical Excision Procedure (LEEP), and simple or radical trachelectomy, is growing [4]. Fertility-spearing surgery is accepted as oncologically safe in well-selected patients [5-7], but the obstetric risks of this approach have been challenging to study because fewer than half of all patients attempt to conceive [4,7.8].

However, those patients who are able to achieve pregnancy after fertility-sparing treatment face specific challenges regarding potential complications and risks associated with that pregnancy, and therefore require specialized and careful management. Accordingly, we present a case report of a young woman who achieved a successful pregnancy after fertility-sparing treatment for cervical cancer.

Case Presentation

Patient's History

In March 2022, a 38-year-old nulliparous woman presented for evaluation due to a Papanicolaou (Pap) smear result classified as IIIb, HSIL (Bethesda classification). Her medical history was significant for a loop electrosurgical excision procedure (LEEP/LEETZ) performed 11 years earlier for cervical intraepithelial neoplasia grade III (CIN III). After that she had normal Pap smear results on regular follow-up until 2020, when cytology once again revealed a class IIIb finding. Subsequent histopathological evaluation confirmed recurrent cervical intraepithelial neoplasia grade II (CIN II). She received a full three-dose series of the human papillomavirus (HPV) vaccine (Gardasil) after that and implemented measures to support her immune system. However, despite these measures, the cervical epithelial changes persisted. At

the time of presentation, the patient was asymptomatic and denied any associated complaints. She had no history of chronic medical conditions. She had not previously given birth and experienced two spontaneous miscarriages following pregnancies achieved through in vitro fertilization (IVF).

Treatment

Given the persistence of cervical lesions, a decision was made to proceed with repeat intervention, including a loop electrosurgical excision procedure (LEETZ) of the cervix and endocervical curettage. The procedures were performed in March 2022. Cervical cone excision and endocervical curettage specimens showed high-grade squamous intraepithelial lesion (HSIL, CIN III) of the cervix with associated chronic cervicitis. Dysplasia of the squamous epithelium was identified in several sections, extending into endocervical gland lumens. Ectocervical resection margins were free of dysplasia. Curettage specimens contained fragments of dysplastic squamous epithelium without cervical stroma and proliferative endometrial fragments. No invasive carcinoma was reported However, at the 3-month follow-up examination, recurrent HSIL was detected, and therefore a repeat loop electrosurgical excision procedure was performed in July 2022. Histopathological examination of the repeat procedure revealed microinvasive squamous cell carcinoma of the cervix, large-cell non-keratinizing type. A single focus of stromal invasion measuring 0.4 mm in depth and 0.4 mm in width was identified, without lymphovascular invasion. Concomitant high-grade squamous intraepithelial lesion (HSIL/CIN III) involving the surface epithelium and endocervical glands was present, with involvement of the endocervical resection margin, while the ectocervical margin was negative. The pathological stage corresponded to pT1a1 (FIGO IA1).

Following multidisciplinary discussion at the institutional Oncology Board, a decision was made to perform cervical amputation (simple trachelectomy), which was subsequently carried out in September 2022. Histopathological analysis confirmed the presence of microinvasive squamous cell carcinoma of the cervix (FIGO IA1), without lymphovascular invasion, with negative resection margins.

Conception, Pregnancy Course, and Outcome

After an appropriate recovery period, the patient initiated a new cycle of ovarian stimulation and achieved pregnancy in June 2023 through in vitro fertilization with embryo transfer (IVF-ET). Unfortunately, this pregnancy also resulted in a missed abortion.

Approximately one and a half years later, in December 2023, the patient conceived spontaneously. Given her prior medical and surgical history, the pregnancy was managed as high risk. At 36 weeks' gestation, spontaneous rupture of the fetal membranes occurred, accompanied by uterine contractions. The patient subsequently delivered successfully at 36 weeks' gestation by cesarean section, giving birth to a healthy male infant weighing 3,820 g and measuring 53 cm.

The Apgar score was 9 at 1 minute and 10 at 5 minutes. The delivery and the postpartum course were without complications.

Follow-Up Evaluation

The patient underwent regular follow-up evaluations, including Pap smear and colposcopic examinations. All cytological and colposcopic findings remained normal, and HPV testing was negative. Hysteroscopy with endometrial and isthmic biopsy is planned after the completion of breastfeeding. The patient continued regular follow-up visits.

Discussion

Advances in fertility-sparing surgical techniques have enabled young women diagnosed with cervical cancer to preserve their reproductive organs and retain the potential to achieve pregnancy. It is estimated that nearly half of patients aged <40 years who underwent radical hysterectomy between 1985 and 2001 would have been eligible for FSS [9]. However, careful selection of patients who are suitable candidates for this type of surgery is essential. FSS can only be considered for patients with good prognostic factors and disease exclusively amenable to surgery without postoperative adjuvant therapy. Consequently, it can only be offered to patients with early-stage disease, negative nodes, and nonaggressive histologic patterns [8,10].

The present case involved a young nulliparous woman diagnosed with FIGO IA1 squamous cell carcinoma following repeat loop electrosurgical excision procedure (LEEP). Histopathological examination demonstrated a single focus of stromal invasion measuring 0.4 mm in both depth and width, without evidence of LVSI. These findings placed the patient in a very low-risk category from an oncological standpoint. Current international guidelines support cervical conization as definitive treatment for FIGO IA1 squamous cell carcinoma without LVSI when surgical margins are negative. However, management becomes more challenging when excision margins are involved or when there is concern regarding residual disease [11]. In the present case, although the ectocervical margin was negative, the endocervical margin was involved by HSIL/CIN III. Furthermore, the diagnosis was established after repeat excisional treatment performed for recurrent HSIL following a previous LEEP, suggesting persistent disease despite prior intervention.

Several factors may have influenced the multidisciplinary decision to perform cervical amputation (simple trachelectomy). First, the presence of a positive endocervical margin raised concerns regarding residual high-grade intraepithelial disease within the endocervical canal. Second, the patient had already undergone multiple excisional procedures, potentially limiting the feasibility and diagnostic reliability of additional conization. Third, cervical amputation provided a fertility-preserving alternative with greater assurance of complete removal of residual disease while avoiding the morbidity associated with hysterectomy [11,12].

Although repeat conization could also have been considered, cervical amputation represents an accepted fertility-sparing option in selected patients with FIGO IA1 disease when margin status is unfavorable or when repeated excisional procedures have been performed (11,12). Importantly, the extent of stromal invasion itself was unlikely to be the primary indication for further surgery, given the minimal invasive focus identified (0.4 mm × 0.4 mm) and the absence of LVSI. Rather, the decision appears to have been driven by concerns regarding residual HSIL and the patient's previous treatment history.

In systematic review from Bentivegna et al. witch included 2,777 patients, more than half of the patients who had undergone RT or another FSS procedure, and wished to become pregnant, achieved at least one pregnancy. Five different surgical procedures were performed and studied. The overall fertility, live birth, and prematurity rates after these procedures were, respectively,

55%, 70%, and 38% [8]. Unfortunately, some patients desiring (and trying to achieve) a pregnancy had become infertile as a result of FSS. Some of them were infertile before the treatment of their cervical cancer (7% in the series by Speiser et al.) [8,13]. In the

study by Kim et al. among 35 patients attempting conception, 18 had recourse to assisted technologies [14]. In our case, the patient had experienced infertility even prior to undergoing cervical procedures, having attempted to conceive for several years. She achieved pregnancy twice through IVF-ET; however, both pregnancies unfortunately ended in missed abortion.

Following cervical amputation, another IVF cycle was performed, resulting in pregnancy; nevertheless, this pregnancy also failed to progress and again concluded as a missed abortion.
Ultimately, the patient conceived spontaneously two and a half years after cervical amputation and successfully carried this pregnancy nearly to term, which makes this case particularly noteworthy.

When patients became pregnant, these pregnancies were at high risk, associated with prematurity, fetal loss and other complications. Given this higher rate of prematurity in this context of FSS, the patient (couples) should be strongly advised to have the pregnancy followed up in a maternity service well versed in the management of high preterm and/or low birth weight infants. The pathogenesis of these fetal losses was most likely associated with a reduced cervical length. In the second trimester, pregnancy loss and preterm birth are frequently linked to premature rupture of membranes (PROM), which in most cases results from subclinical or overt chorioamnionitis [8,15,16]. Two ''specific'' surgical procedures were described to try to reconstruct cervical competency: the prophylactic cerclage after removal of the cervix and before the utero-isthmic anastomosis, and the Saling procedure (a closure of the cervical ostia using vaginal mucosa, done around 14 WG under general anesthesia to decrease the risk of vaginal bacteria contaminating the amniotic fluid) [17]. Additional strategies aimed at reducing the risk of prematurity have been described in the literature. These include minimizing the number of digital vaginal examinations, regular monitoring of vaginal pH, assessment for bacterial vaginosis using the Nugent score, administration of vaginal progesterone and the use of prophylactic antibiotics and antenatal corticosteroids [18,19,20]. In our case, preterm premature rupture of membranes occurred at 36 weeks of gestation, when the fetus was already relatively mature, which was confirmed by the neonate's condition after birth.

When we talk about delivery mode, in these pregnancies, delivery by cesarean section is generally recommended [18]. In accordance with these recommendations, it was also the method of delivery in our case.

Conclusion

Fertility-preserving treatment options for young patients with cervical cancer have significantly improved their chances of future childbearing. However, careful patient selection is crucial when considering this approach. Furthermore, close follow-up and coordinated management by a multidisciplinary team are essential to ensure oncologic safety, optimize reproductive outcomes, and achieve a favorable prognosis. This case highlights the importance of individualized management in early cervical cancer. While conservative treatment with conization alone is often sufficient for FIGO IA1 lesions without LVSI, additional fertility-preserving surgery may be justified when pathological or clinical factors suggest a substantial risk of residual cervical disease. Multidisciplinary evaluation remains essential in balancing oncological safety with fertility preservation in young women diagnosed with microinvasive cervical carcinoma.

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