ABDOMINAL RADICAL TRACHELECTOMY AS A METHOD OF PRESERVING FERTILITY IN PATIENTS WITH CERVICAL CANCER

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ABDOMINAL RADICAL TRACHELECTOMY AS A METHOD OF PRESERVING FERTILITY IN PATIENTS WITH CERVICAL CANCER (Abstract): Cervical cancer is the 4th most common type of cancer in women across EU. However, in women of reproductive age, the incidence of this pathology is high, therefore, over the last decades various strategies have been developed with the purpose of preserving fertility in oncological patients. This paper aimed at reviewing the existing literature information regarding the use of abdominal radical trachelectomy as a method of fertility sparing treatment for patients with early invasive cervical cancer injuries, without neglecting to emphasize on the surgical, obstetrical and oncological outcomes of this procedure. Keywords: CERVICAL CANCER, FERTILITY PRESERVING, ABDOMINAL RADICAL TRACHELECTOMY.

Apart from breast cancer, which is the most frequently encountered cancer in women, cervical cancer is the second most common malignancy in women, over 12,000 cases of invasive cervical cancer being annually diagnosed. Although the average patient age at diagnosis is around 50 years old, younger women are also being at risk of developing it, around 20% of the patients diagnosed being under their ’40.

Over the past decade, several screening programs have been developed for the most frequent types of cancers in women, aiming at systematically applying a routine test in the asymptomatic population to identify people with pre-cancerous, incipient lesions, perfectly curable by appropriate treatment.

The European Union Public Health provided financial support for the development of screening programmes for cancer thereby, in many EU countries, there is a trend in the implementation of screening programs for reproductive age women, thereby, many oncological patients may be diagnosed with cervical cancer in the early-stage (FIGO IA1-IB1), an essential condition if fertility preservation is desired. In contrast to the global rate, in the EU, the incidence of cervical cancer is low due to the effective implementation of cervical cancer screening programs. The incidence
of cervical cancer is comparatively low in the EU due to the effective implementation of cervical cancer screening.

Unfortunately, the incidence of cervical cancer in our country, as well as mortality from this cause, places Romania at the top of the Eastern Europe region and European Union ranking despite the screening programs that have been implemented through the national health system in our country (1).

The treatment for cervical cancer has evolved considerably in the recent years and is now focused on preserving fertility of the oncological patients of reproductive age. Dissimilar to standard cancer treatment which may include surgery, chemotherapy, radiotherapy or a combination thereof, and aims solely at treating the condition, the radical trachelectomy represents a new surgical approach that emphasis on treating the malignant disease and retain fertility in patients wanting to conceive (2).

This paper aimed at reviewing the existing literature information regarding the use of abdominal radical trachelectomy as a method of fertility sparing treatment for patients with early invasive cervical cancer injuries, without neglecting to emphasize on the surgical, obstetrical and oncological outcomes of this procedure.

**Selection of eligible patients using determinant criteria**

To achieve the best oncologic results while ensuring the preservation of fertility is essential to consider a series of determinant criteria that will enable the medical team to select the eligible patient that might benefit from this surgery. The eligibility criteria for patients that undergo this procedure were firstly proposed by Roy and Plante (1998) and included aspects regarding the size of the lesion, which should be 2 cm or even smaller, diagnosed as FIGO Stage IA1, without any vascular invasion, FIGO stage 1A2 or 1B1(3). Additionally, the authors recommended at least 5 mm clear margin after the resection and proposed that any possible involvement of the upper endocervical canal, as well as any lymph node metastasis should be excluded by magnetic resonance imaging (MRI).

The outcome of this procedure depends crucially on the selection of the patients, thereby there are specific contraindications. For example, in the case of neuroendocrine and small cell tumors, this procedure may not be considered an option due to the poor prognosis and the high risk of distant metastasis, which are frequently observed in these cases (4, 5). The dimensions of the tumors, the amount of unaffected cervical stroma, as well as the possible involvement of the parametrium may be determined using ultrasonography or magnetic resonance imaging (MRI). Generally, tumors larger than 2 cm are accompanied by invasion of the vascular space, extension of the lesions towards the upper endocervix or parametrium.

Unlike magnetic resonance imaging (MRI) or computed tomography (CT), which have proven ineffective in detecting any possible lymph node metastases, sentinel lymph node mapping (SLNM) performed during pelvic lymphadenectomy appears to be the most precise way for assessing the status of the pelvic lymph nodes.

The approach depends on the tumor type, for example in the case of type IA1 tumors, without lymphovascular space invasion, a cone biopsy may be taken into consideration, whereas in the case of type IA1 tumors with lymphovascular space invasion, it is necessary to combine the cone biopsy with lymphadenectomy. On
the other hand, IB1 tumors larger than 2 cm and IB2 tumors may be highly challenging due to the risk of lymph node involvement, therefore in these cases the fertility preservation may not be an option.

Types of radical trachelectomy techniques

Radical trachelectomy, which may be approached vaginally or abdominally represents a conservative procedure that implies the resection of the cervix, parametria (tissue adjacent to the cervix), and paracolpos while the uterine corpus and fundus are preserved, thereby ensuring the ability to carry a pregnancy (6).

Vaginal radical trachelectomy (VRT), was first developed in the late ‘80, for the treatment of stages IA2 to IIA type of cancers, and involves the removal of the cervix, a part of the parametrium, as well as the one third of the upper part of the vagina, while preserving the uterine fundus. The procedure may be associated with pelvic lymphadenectomy. One disadvantage of this method is a higher recurrence rate, possible due the incomplete removal of the parametrium, where metastases are often confirmed by histopathological exam, as highlighted in 1996 by Beneditti-Panici (7).

Abdominal radical trachelectomy (ART) is a procedure firstly described by Romania gynecologist Eugen Aburel in the early ’30, but in 1997, Smith was the one who proposed this approach as a fertility-preserving method in oncological patients (8). In contrast to vaginal radical trachelectomy, the abdominal approach resembles more the traditional hysterectomy, thereby being more easily implemented in hospitals since it does not require advanced laparoscopic skills with are essential for performing VRT. Besides, due to its radical approach, the complete removal of the parametrium is more achievable.

Moreover, ART with pelvic lymphadenectomy is an alternative procedure in cases with distorted cervicovaginal anatomy in which the vaginal approach may not be feasible, or in patients who have severe cervical and upper vaginal scarring, such as those with repeated conization of the cervix.

Abdominal radical trachelectomy – surgical technique steps

The first step consists in opening the abdomen using a vertical incision on the midline. The external and internal iliac fossae lymph nodes and as well as the obturator one is removed and subsequently, frozen sections are prepared for histopathological examination. Like radical hysterectomy, the ureters are dissected, and the ureteric tunnels are the opened (9). The uterosacral ligaments and the parametrium must be divided. The next step consists in opening the vagina, retrace the uterus, cervix and parametrium superiorly and subsequently amputate the cervix, parametrium and vagina. Histopathological examination by frozen section is used to analyze the superior margins of the amputated cervix, as well as the margins of the still existing cervical tissue to ensure that the margins are tumor-free. These investigations are conducted to establish that after the reconstruction, there are no cancerous cells at the level of the uterus and vagina (10). If a proper margin is available after the amputation, then the surgeon may perform cerclage suture which will be inserted at the level of the cervical stump thereby ensuring future cervical competence. Further on, the occlusion of the surgical-formed cervical canal may be prevented by inserting
and fixing a catheter in the external region of the uterus. Finally, the vagina is sutures and the abdomen is closed.

The general complication rate for this intervention has been reported to be like that of radical abdominal hysterectomy. Specific complications for radical trachelectomy include cervical stenosis, amenorrhea, cerclage expulsion, an increased risk of spontaneous abortion and premature delivery (11) and Chorioamnionitis caused by disruption of the endocervical glands and reduced secretion of mucus (12). In the case of a pregnancy, patients that undergo such a procedure must deliver via classical Caesarean section. There is a minimal risk of secondary infertility since the mucous secretions are indispensable for the endocervical ascension and maturation of sperm. Additionally, the occurrence of adhesions following surgical intervention is not excluded.

The emergence of a new branch of oncology named oncofertility and oncogenetics led to the development of new approaches for pregnancy and birth monitoring consecutive radical trachelectomy with or without iliac lymphadenectomy, a procedure which is performed as a treatment for cervical cancer. In this particular situation, a uterine tranche is sutured directly to the vaginal stump and it has been demonstrated that if a pregnancy occurs, the gestational sac may be restrained through the contraction of the segmental uterine muscle at the level of the isthmus, even in the absence of the cervix.

Surgical and obstetrical outcomes after abdominal radical trachelectomy

The abdominal radical trachelectomy has the advantage of enabling the excision of even larger cervical tumors (up to 4 cm) stage IB1 or IB2. However, according to studies conducted by Wethington, the obstetric outcome after abdominal trachelectomy is less favorable (13). Furthermore, in one of the studies, conducted in two hospitals from Romania, the authors reported that 7 women from a total number of 23 patients that underwent the surgery, attempted to conceive, only 3 of them succeeding. Eventually, only one of the pregnancy was finalized with the birth of a healthy baby at term, while the other two were miscarriages (14).

Accordingly, a study regarding the reproductive and obstetrical outcomes of 114 patients who underwent a radical abdominal trachelectomy previous their pregnancy was retrospectively analyzed. The pregnancy rate in this case was 36.2%, nevertheless, 64.7% of the patients gave birth prematurely. In addition, a study conducted by Okugawa on 151 patients, revealed that pregnancy rate among the patients that tried to conceive after abdominal radical trachelectomy was 25%, 15 women from a total of 61, achieving pregnancies, which were delivered by C-section (15). It is worth mentioning that premature rupture of the uterine membranes occurred in 6 of cases.

Martínez-Chapa highlighted the crucial role that cerclage plays in delivering the baby at term (16). In fact, increasing the rate of full-term birth is one of the ultimate goals of specialists as reported by Tamauchi, since presently, only one third of the pregnancies are delivered at term (17). A study led by Okugawa, also emphasized on the necessity of preventing possible complications that may arise during pregnancy and often result in rupture of the membranes and premature delivery (18).

The patients must wait at least six months following radical tracheectomy
before attempting to conceive. Because of trachelectomy, the cervix or lower uterus becomes scarred and beside cervical stenosis, difficulties in becoming pregnant naturally may occur. This inconvenient may be over fulfilled through assisted reproductive techniques, such as intrauterine insemination, in vitro fertilization, or even embryo or oocyte cryopreservation before surgery. Given the increased risk of second trimester pregnancy loss and preterm birth, an eventual pregnancy must be followed closely, and serial ultrasound examinations will be performed to monitor cervical length (19).

In the event of a preterm delivery, the cervix opens or thins earlier than normal. In this case, antenatal glucocorticoids will be administered to ensure fetal lung maturation (20). Vaginal delivery should be avoided because a lateral cervical tear in the short-scarred cervix may extend into the nearby uterine vessels, resulting in catastrophic hemorrhage.

When it comes to oncological outcome, a study conducted by Pareja highlighted that only 3.8% of patients presented cancer recurrence, from a total of 485 patients that underwent a procedure of abdominal radical trachelectomy (21). In 9.5% of the cases, several postoperative complications were identified, the most common being cervical stenosis. Notwithstanding, over 85% of the patients managed to preserve their fertility and 67 patients from a total of 113 who tried to conceive, manage to obtain a pregnancy (59.3%).

Nevertheless, monitoring a pregnancy after abdominal radical trachelectomy requires special attention and should involve a multidisciplinary team composed of obstetrician, surgeon, neonatologist and oncologist.

**CONCLUSIONS**

We may conclude that abdominal radical trachelectomy represents a fertility-sparing procedure for patients diagnosed with early invasive cervical cancer that intend to conceive.

The pregnancy rates have improved significantly over the last years, however, only one third of the pregnancy are delivered at full-term, which is why the medical management is extremely complex.

**REFERENCES**

Abdominal radical trachelectomy as a method of preserving fertility in patients with cervical cancer


