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Modified Radical Abdominal Trachelectomy in Cervical Cancer in Young Women

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ABSTRACT

A modification of traditional fertility-sparing abdominal radical trachelectomy (ART) has been developed to reduce the opportunity for intra-operative injuries to occur through better management of the surgical field. The technique is similar to the standard abdominal radical trachelectomy. The ART modification developed by us enables to perform total or partial resection of the affected part of the uterine cervix after total mobilization of the cervix and excision of the upper and middle parts of the vagina. We have performed 204 modified fertility-sparing ARTs for CC women of reproductive age (27 to 37 years) at the early stage of the disease (T1A, T1B). On average the surgery lasted 140 ± 28.7 min, blood loss was 420 ± 50 ml. Epithelization of the uterine stump after surgery lasted 5 - 8 weeks. No intra-operative injuries of the nearby organs occurred. The follow-up period has lasted for 42 months. Oncological outcomes. No patient had CC recurrence and metastasis (till 42 months after the first surgery).

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INTRODUCTION

Cervical cancer (CC) is known to be the second most common malignancy in women worldwide [1]. According to WHO, some 550,000 cases of cervical cancer (CC) are registered worldwide each year, and over half of these women die from the disease [2]. In 2012 in the Republic of Uzbekistan, 1,323 patients with cervical cancer were registered and 623 of them died [3]. Recently, the CC incidence among women of reproductive age has increased. The disease more often develops at the age of 28-45 years. In our country, about 60% of CC cases are revealed at stages 1-2.

According to the Globocan 2012-data [4], nearly 83% of annual CC deaths are reported in low-income countries. However, over 25 000 new CC cases are registered annually in the EC countries and 11 000 ones were registered in the USA. In Uzbekistan, CC led in the 2003-list of female malignancies and death-causes (5.8% and 3.9%, respectively) [5]. The CC burden is mainly associated with the lack of women's screening [6]. According to Jemal et al. [6], Asians have higher cervical cancer incidence and mortality rates than U.S. whites, but lower rates than their counterparts in Latin America.

Traditional antineoplastic treatment for early-stage CC enables to save life of most patients; however, it leads to irreversible loss of fertility that greatly deteriorates the life quality of young women who have not previously realized their reproductive function. Physiological and psychological impact of infertility caused by

conservative treatment is extremely negative. Besides, most young women in this group suffer from depressions of different severity, stress and sexual dysfunction due to unrealized reproductive function [7, 8, 9, 10].

The characteristics of CC morphogenesis and carcinogenesis, high survival rates at early stages of the disease and an increase in the number of reproductive-age patients in Uzbekistan are motivating oncogynecologists to improve the quality of life for CC young women by retaining their fertility. It necessitates further development and implementation of organ-preserving surgery, i.e. abdominal radical trachelectomy (ART).

Cervical cancer is mainly characterized by the local spread of the neoplastic process. Most often the tumor involves the upper part of the vagina, parametral tissue and sacro-uterine ligaments. As our experience shows, the tumor spreading to the upper parts of the uterine is observed less often (13-15%). In 28-34% of patients, the tumor is localized in the lower part of the cervical channel, in 15% it develops in the middle part of the cervix and in 2% - in its upper part. The middle and lower thirds of the vagina are affected at later CC stages and were seldom observed.

CC metastasis development depends on the histological structure of the tumor. According to the findings of different researchers, in squamous cell CC, metastases incidence to the ovaries varies from 0.2% to 2.2%, while in adenocarcinoma it reaches 2-10%. The necessity of ovaries resection is disputable because the risk of metastasis development in this period is not high. Lymphogenic metastases in CC involve parametral, obturator, iliac, sacral, presacral, lateral and aortal lymph nodes. The most significant CC predicting factors influencing selection of treatment tactics are tumor size, invasion depth, parametral tissue infiltration, metastases in regional lymph nodes.

Objective of the research: was to develop an organ-preserving surgical technique resulting in improvement of quality of life for young CC patients through better management of the surgical field.

MATERIAL AND METHODS

Traditionally radical abdominal trachelectomy (ART) consists of total or partial resection of the uterine cervix, upper third part of the vagina, the tissue around the uterine cervix and vagina, uterovesical, sacrouterine and cardinal ligaments as well as general common, internal and external ileac vessels. The fertility-sparing ART modification developed by us enables to perform total or partial resection of the affected part of the uterine cervix after total mobilization of the cervix and excision of the upper and middle parts of the vagina. The modification provides better management of the surgical field that helps avoid accidental intra-operative injuries of the nearby organs and tissues.

In the Gynecology department of the NCRC of the Uzbekistan MoH, 204 modified fertility-sparing ARTs have been performed for CC women of reproductive age (27 to 37 years) at the early stage of the disease (T1A, T1B). The research was conducted in 2012-2015.

The eligible patients were examined clinically and instrumentally. The carefully collected history of the patients included the information on their genital and extragenital diseases and conditions. The objective gynecological examination determined the tumor type, spread of cervical tumor to loco-regional lymph nodes, condition of vaginal walls and parametral tissue. Histological investigation of the tissue samples taken from the affected area showed that most of 207 women involved in the study had squamous cell cervical cancer: 89 of them had non-keratinizing squamous cancer; 189 patients had keratinizing squamous cell cancer, and 7 ones had adenocarcinoma.

Abdominal radical trachelectomy includes partial or total hysterectomy, resection of the upper third of the vagina, pelvic tissue around the cervix and vagina, the vesico-uterine, sacro-uterine and cardinal ligaments, and the common, internal and external iliac vessels. ART is known to differ from radical hysterectomy with resection of the appendages; it not only preserves the uterus, ovaries and fallopian tubes, but the patient's reproductive function as well.

Ethical approval

The written informed consent was obtained from each patient involved in the research. The review board and ethics committee of National Center for Cancer Research under the MoH Tashkent, Uzbekistan.approved the study protocol.

Selection of patients.

The criteria of patient selected for the modified fertility-sparing ART were as follows:

- Fertility age
- Desire to preserve reproduction function
- The size of the tumor is < 2 cm
- Squamous cell tumor
- The upper third part of the uterine cervix is not affected
- No signs of metastases into the regional lymphatic nodes
- Stage T1aN0-1M0 (IA1 with invasion to the vascular space, stages IA-IB)

Criteria of patient's exclusion from the study group:

- Signs of infertility
- Malignization of the lymph nodes and margins revealed by urgent biopsy
- no opportunities for dynamic observation

Description of the technique

The modified ART was performed under general combined anesthesia and started with midline laparotomy followed by setting several wound dilators to improve the operative field view. A thorough revision of the abdomen and pelvic organs was made to explore the abdominal and pelvic cavities. The presence of adhesion signs developed after various previous interventions in this area is of particular importance, since it may be accompanied by functional or organic changes of different character.

A thorough examination of the topographic-anatomic structure of the uterus with the appendages and assessment of the vessels condition, surrounding organs and tissues, retroperitoneal space and ureters were made visually and by palpation. If there was some free liquid in the small pelvis or side channels, it was aspirated to perform urgent cytological tests. The condition of the ovaries was examined to reveal the presence of cysts or solid cystic formations. If necessary, the cysts were resected after an urgent histological examination performed within the surgery. We examined the condition of the parietal and visceral peritoneum to reveal tumor dissemination or any other morphological changes. On completion of the abdominal revision in Trendelenburg position, the intestinal loops were placed to the upper part of the abdomen and isolated from the small pelvis. The uterine fundus was stitched with Z-shaped silk suture and fixed with forceps to ensure free movement of the uterus during the operation, if needed. This procedure was performed to avoid any injury of the ovaries, fallopian tubes and uterine vessels.

The first stage of the surgery was dissection of pelvic lymph nodes that made possible to follow the principles of radical surgical treatment for CC in order to avoid the loco-regional spread of the malignant process.

The round ligaments on both sides were dissected alternately to obtain the access to the iliac region. Lymphodissection was performed around the common, external and internal iliac vessels up to the obturator fossa, around the obturator nerve, uterine cervix and the upper third of the vagina. During dissection particular attention was paid to careful coagulation and ligation of the lymph vessels in order to reduce postoperative lymphorrhea. After lymphadenectomy, the obturator area on both sides was gradually filled with gauze drapes soaked with 96% ethanol. After dissection of the lymph nodes with no signs of metastases, the second stage of the surgery began. It meant complete or partial removal of the cervix (depending on the location and size of the initial lesion) and included resection of the upper third of the vagina, paracervical and paravaginal tissue, cardinal, sacro-uterine and vesico-uterine ligaments. At this stage, the main task was not only to preserve the uterine corpus, ovaries and fallopian tubes, but also to retain vessels that adequately supply these organs. Thereby, special attention was paid to careful assessment of the uterine and ovarian vessels.

After sharp and blunt dissection of the peritoneum and the vesico-uterine folds the posterior wall of the bladder was separated from the anterior wall of the uterine cervix to the beginning of the middle third of the vagina. Carefully controlling the ureters on the both sides, the back leaf of the peritoneum covering the back leaf of the cervix was resected. The lateral leaves of the broad ligament were cautiously excised avoiding any injury of the ureters taken by tourniquets. The uterine vessels were carefully exposed. At the level of the uterine isthmus, the ascending and descending branches of the uterine vessels were carefully separated; the latter ones were cut and ligated on both sides.

The ureters were exposed sharply, starting from the area above the pelvis inlet to the place of decussation with the uterine vessels. The uterine cervix was moved proximally; the uterine vessels were moved laterally, while the bladder was moved down. Under strict visual control of the ureters' position, the vesico-uterine ligaments were cut anteriorly and the recto-uterine ligaments were cut posteriorly, ligated and fixed by forceps.

The back leaf of the peritoneum was separated from the posterior wall of the vagina by blunt dissection, thus, moving back the anterior wall of the rectum at a safe distance. The cardinal ligaments were cut and ligated on both sides and fixed by forceps. The uterine cervix was resected clipping the paravaginal tissue and vaginal tube on the line of the upper and middle thirds of the vagina with excision of all sections. The soft tissues, held by forceps, were stitched and ligated. The vaginal walls were fixed by six ligatures on forceps.

After these manipulations the uterus with the upper third of the dissected vaginal wall was carefully hold in hands and the cervix resection started. The level of cervical resection in each case was determined individually. It was performed perpendicularly to the uterus axis depending on the tumor parameters. The adequacy of the cervix removal was assessed by urgent histological examination of the margins. Thereafter, the residue of the uterus corpus was gradually sutured with eyeless needles and Vicryl threads, and then it was fixed to the middle third of the vaginal tube. If necessary, in order to reduce the vaginal lumen after an adequate juxtaposition with the uterus corpus, the vaginal walls were stitched using side sutures. Blood supply of the remaining part of the uterus and appendages was monitored. On completion of the reconstructive stage and revision, the restoration of the round ligaments integrity began after removal of gauze material from the obturator fossae. When the integrity of anterior and posterior leaves of the peritoneum had been restored, the abdominal cavity was separated from the small pelvis anatomically.

At the final stage of the surgery, a Z-shaped suture was ligated. The adequacy of blood supply to the uterus and appendages was re-assessed; the iliac-obturator area remained nonperitonized to provide lymph outflow and prevent lymph cyst formation. The Douglas' pouch was drained by silicone drains. The anterior abdominal wall was sutured in layers after revision and sanitation.

RESULTS AND DISCUSSION

Abdominal radical trachelectomy in CC women of reproductive age presupposes urgent histological examination of the margins and excision of the lymph nodes. If tumor cells were revealed, the surgery was performed by the standard method, i.e. by extended hysterectomy without appendages and transposition of the ovaries.

On average, the surgery lasted 140 ± 28.7 min with 420 ± 50 ml. blood losses. Epithelization of the uterine stump after surgery lasted 5 - 8 weeks. Application of tampons with ointment in the granulating area and periodic gentle bougienage of the cervical canal are necessary procedures at this stage.

Gynecological outcome

The menstrual cycle in the patients recovered 1 - 3 months after the surgery; one patient complained of amenorrhea at the 5th month after the surgery that is probably due to insufficiency of supplying vessels. Lymphatic cysts developed in two patients in the post-operative period. The pathological focus was eliminated in one patient after the conservative therapy and in the second patient after the puncture and extraction of the cyst content.

The dynamic monitoring of the patients has shown that their subjective state is adequate, no pathological changes in their gynecological and general status were revealed by cytological examination of the smears taken from the uterine stump and vaginal walls. Ultrasound examination of the abdomen and pelvis, X-ray examination of the lungs were performed; the levels of sex hormones and CA 125 as well as blood phosphorus and calcium were determined when it was necessary.

Oncological outcomes

No patient had CC recurrence and metastasis (till 42 months after the first surgery).

Obstetric outcomes

Postoperatively, the patients expected restoration of their reproductive function, but it has not occurred yet because of a short period of time after the surgery.

Hereby, we have presented the results of our experience of the ART modification. We are going to conduct further the research to evaluate both subjective and the objective statuses of young patients, study their reproductive behavior and quality of life, as well as late results.

CONCLUSION

Modified abdominal radical trachelectomy provides better management of the surgical field and help avoid injuring the nearby organs. ART in women of reproductive age with early-stage cervical cancer requires urgent histological examination within the surgery. ART provides a chance for young CC patients to improve their quality of life and preserve (possible) fertility.

DECLARATIONS

Authors' Contributions

All authors contributed equally to this work.

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Competing interests

The authors declare that they have no competing interests.

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