ORIGINAL ARTICLE: FERTILITY PRESERVATION

Uterine transposition: technique and a case report

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Objective: To report the first uterine transposition for fertility preservation in a patient with rectal cancer.
Design: Case report.
Setting: Community hospital.
Patient(s): A 26-year-old patient with stage cT3N1M0 rectal adenocarcinoma located 5 cm from the anal margin.
Intervention(s): Laparoscopic transposition of the uterus to the upper abdomen, outside of the scope of radiation, was performed to preserve fertility. After the end of radiotherapy, rectosigmoidectomy was performed and the uterus was repositioned into the pelvis.
Main Outcome Measure(s): Uterine and ovarian function preservation.
Result(s): The patient had two menstrual periods and exhibited normal variation in ovarian hormones throughout the course of neoadjuvant therapy. Menstruation began 2 weeks after reimplantation into the pelvis, and the cervix exhibited a normal appearance on clinical examination after 6 weeks. Eighteen months after the surgery, the uterus was normal and there was no sign of disease.
Conclusion(s): Uterine transposition might represent a valid option for fertility preservation in women who require pelvic radiotherapy and want to bear children. However, studies that assess its viability, effectiveness, and safety are required. (Fertil Steril® 2017;■:■–■. ©2017 by American Society for Reproductive Medicine.)
Key Words: Uterine transposition, rectal cancer, pelvic radiotherapy, fertility preservation, laparoscopy

Patients with pelvic cancer frequently require radiotherapy, which causes infertility even at low doses. Oocytes are highly sensitive to radiation: A dose of 2 Gy can destroy up to 50% of the oocyte population (1). The dose needed to cause immediate and irreversible ovarian failure is 20.3 Gy at birth, 18.4 Gy at age 10, 16.5 Gy at age 20, and 14.3 Gy at age 30 years (1). These doses are significantly lower than those employed in everyday clinical practice. In addition, radiotherapy is associated with reduced uterine volume, impaired uterine distensibility owing to myometrial fibrosis, uterine vascular damage, and endometrial injury (2).

Pelvic radiotherapy with fertility preservation is not yet available for women with pelvic tumors, not even intensity-modulated radiation therapy or other techniques. In such cases, the only options are oocyte and/or embryo freezing and ovarian transposition (OT), which might preserve reproductive and hormonal function, respectively. Although ovarian tissue cryopreservation and transplantation are possible, they are still experimental (3, 4). None of these techniques allow for pregnancy, which makes surrogacy necessary; however, surrogacy is not always a feasible option. The only possible solution is uterus transplantation (5), which is experimental and marked by all of the disadvantages of transplants in general, such as rejection, immunosuppressive therapy, and surgical complications in the living donors, as well as the need for a second surgical procedure to remove the uterus once the patient has had her intended number of children.

Uterine and adnexal transposition (UT) to the upper abdomen before radiotherapy might protect these organs, and subsequent repositioning of the uterus into the pelvis might allow the patients to experience a normal pregnancy.

PATIENT AND METHODS

A 26-year-old nulligravida patient presented with rectal bleeding and tenesmus and was diagnosed with moderately differentiated rectal adenocarcinoma located 5 cm from the anal margin. Magnetic resonance imaging (MRI) and transrectal ultrasound showed a tumor 5 cm in diameter extending toward the mesorectal tissue as well as a single perirectal lymph node 8 mm in diameter. No other disease foci were detected by positron-emission tomography/computerized tomography.

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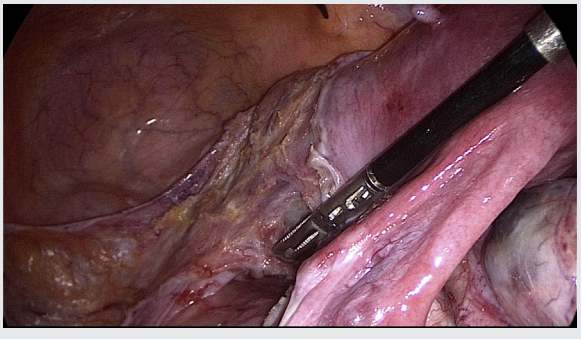
The suggested treatment consisted of oocyte vitrification before OT and neoadjuvant chemoradiotherapy. However, the patient rejected the latter option because of its association with infertility, and for this reason, UT was thoroughly discussed and agreed on by the patient. In addition, to maintain the possibility of conventional fertility preservation in case of UT failure, some of the patient's oocytes were vitrified, and fertilized embryos were frozen, after which UT was performed at the end of 2015.

The patient was placed in a dorsal modified lithotomy position with arms placed alongside the body. A urinary catheter was placed and a uterine manipulator inserted. Given a pneumoperitoneum, the standard trocar placement (also known as French positioning) is as follows. After achieving pneumoperitoneum, an 11-mm umbilical port was placed. Two 5-mm ports were placed ~2 cm medial and cranial to the anterior superior sciatic spine. A third 5-mm port was inserted 8–10 cm below the umbilical port on the midline. A 10-mm suprapubic trocar was used as a camera port to facilitate the retroperitoneal dissection and uterine manipulate in the upper abdomen in accordance with previously described methods (6). For the pelvic part of the first procedure, the surgeon was on the patient's left side, the first assistant on the right, the second assistant between the patient's legs, and the scrub nurse lateral to the patient's left leg.

After the patient was placed in a Trendelenburg position, the surgery started with the transection of the round ligament at the pelvic sidewall. The anterior leaf of the broad ligament was opened until it reached the uterus. The "gray" area of the posterior leaf of the broad ligament was opened and the posterior leaf of the broad ligament medially sectioned up to the uterosacral ligament. Vesicouterine space was dissected approximately 1 cm distal to the cervicovaginal junction to allow vaginal section. The uterine vessels were coagulated along their junction to the cervix with bipolar energy and then cut. The pericervical vessels and the insertion of the uterosacral ligaments were coagulated and sectioned until the full vaginal circumference was accessible for cutting (Fig. 1). Most of these steps were performed with the use of ultrasonic energy, which speeds up the procedure and causes less bleeding. A colpotomy ring was inserted and the uterus was amputated from the vagina with the use of monopolar energy in the cut mode. The vaginal cuff was closed by means of separate stitches of absorbable sutures (Polyglactin 0). The infundibulopelvic (IP) ligaments were dissected up to their intersection with the iliac vessels with the use of ultrasonic energy. Care was taken to avoid grasping tubes or the IP or utero-ovarian ligament to avoid damage to the vascular supply to the uterus or damaging the tubes and potentially contributing to worse success in future fertility.

FIGURE 1



The uterine vessels are ready to be coagulated with the use of bipolar energy. The vesicovaginal space is dissected and the broad ligaments opened. The left adnexa with its normal vascularization can be seen. The right ovaries are enlarged owing to the recent stimulation for oocyte harvest.

Ribeiro. Uterine transposition. Fertil Steril 2017.

At this point, the uterus was completely mobilized along with the adnexas and the pelvic portion of the IP ligament. The team was then repositioned for the retroperitoneal dissection of the ovarian vessels and positioning of the uterus in the upper abdomen. The surgeon moved to the patient's right side, the first assistant to between the patient's legs, the second assistant to the left side, and the scrub nurse lateral to the patient's left leg as reported for a previously published regular transperitoneal paraortic lymphadenectomy (6). The camera was placed in the suprapubic trocar and the patient was kept in Trendelenburg position.

The omentum and bowel were placed on the upper abdomen. The dissection of the left gonadal vessels starts with the mobilization of the sigmoid and left colon by means of lateral-to-medial dissection with the use of ultrasonic energy. It is important to mobilize the left colon up to the inferior mesenteric artery medially and to the level of the kidney hilum cranially along the Gerota fascia. Subsequently, the left gonadal vessels were gently dissected up to their origin with the use of ultrasonic energy. The same step was repeated on the right side after lateral-to-medial mobilization of the right colon and cecum. On the right side, the colon was mobilized long the Gerota fascia up to the level of the duodenum cranially and to the level of the vena cava medially. The right gonadal vessels were dissected, completing the full mobilization of the uterus and adnexas.

The uterus was then transposed to the upper abdomen. As the uterus was positioned to the upper abdomen, the patient was placed flat and the bowel was returned to the inferior abdomen through the arch formed by the uterus, adnexas, and uterine vessels.

The round ligaments were sutured to the anterior abdominal wall with the use of transabdominal nonabsorbable (nylon 3-0) sutures. The same transabdominal suture was used to attach the peritoneum overlying the gonadal vessels to the anterior abdominal wall, to avoid displacement of the uterus or IP ligament, which could cause internal herniation (Fig. 2). These sutures were tightened as the pneumoperitoneum was deflated to avoid traction of the gonadal vessels causing rupture or spasm. Before tightening the sutures, the cavity was inspected for abnormal secretion or bleeding, followed by irrigation for cleaning any remaining fluid.

Once the pneumoperitoneum was deflated and the transabdominal sutures tightened, the umbilical incision was enlarged and the cervix anastomosed to the fascia by means of six separate polypropylene 3-0 sutures (Fig. 3), ending the first procedure. For better understanding of the procedure, see Video (available online).