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Uterine artery embolization in the treatment of submucous myomatous nodes

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The purpose of the article was to evaluate trends of uterine submucousal myomas after the embolization of uterine arteries. Uterine fibroids are a common disease in women of reproductive age, accounting for 10 to 30 %, according to various authors. The submucous location of the myomatous node is an unfavorable type of localization of fibroids since it almost always requires surgical treatment. In this work, we would like to report on the results of endovascular x-ray occlusion of the uterine arteries in the treatment of submucous myomatous nodes. Percutaneous through catheter occlusion of uterine arteries with submucousal myomatous nodes was performed in 21 patients where 18 of them through the femoral, and 3 of them through beam access. The patients' age was under 32 up to 47 with average 36,5. Myomatous nodes' size is from 3,0 till 9,0 centimeters. There were noted self-expulsions of 10 from 21 submucousal myomatous nodes after X-ray endovascular occlusion during the 7 days and until 3 months. In the gynecological department they performed removal of partially born submucosal nodes in 3 out of 21 patients within 3 months. In the remaining 8 of 21 observations (381 %), submucosal nodes underwent myolysis in the following 12 months. After X-ray endovascular occlusion there might be expulsion or myolysis of myoma nodes in different terms during the submucosal myomatous of uterine.

Keywords: uterine artery embolisation, roentgen-endovascular occlusion, magnetic resonance tomography, uterine myoma, submucousal myomatous nodules.

Introduction

The uterine myoma is a benign tumour that grows from smooth uterine muscle cells. The uterine myoma is among the most common conditions for women of childbearing potential, with the rate form 10 to 30 % according to different authors. The rate of detection of this disease in patients at the first link stage is from 1 to 5 % of survey sample and up to 30–35 % among women with gynecological disorders. Most often we see the uterine myoma among women over the age of 35 (the average age of uterine myoma detection is 32–33 years). The highest incidence is among women of 35–45 years old. Recently, researchers have noted an increased incidence of uterine myoma among younger women (before 20–25 years old), which can be attributed to unfavorable hereditary background and improvement of diagnostic methods [1–5].

The roentgen-endovascular uterine artery occlusion for uterine myomas suggested by J. Ravina in 1994 laid the foundations for the evolution of a new organ-sparing intravascular method for treatment of this common gynecological disorder.

Clear advantages of the roentgen-endovascular uterine artery occlusion are low injury, high efficiency, low rate of complications, versatility, relapse absence [6; 7].

The roentgen-endovascular uterine artery occlusion is performed in many countries, and the number of women that underwent treatment using this method is doubling every year [8–14].

In Kazakhstan, the roentgen-endovascular uterine artery occlusion in obstetric-gynecologic pathologies is performed only in National Research Centers [15].

In our work, we would like to report the results of the roentgen-endovascular uterine artery occlusion in treatment of submucousal myomatous nodules. Submucousal location of a myomatous nodule is an unfavorable type of the myoma localization, as almost always requires surgical treatment, leaving no chance for conservative therapy. In such location of myomatous nodules, the infertility frequency reaches 30–35 %, and in case of pregnancy miscarriage and complications are possible in the gestation period, in childbirth and in the puerperal period [16–19].

Materials and methods

Percutaneous catheter-based occlusion of uterine arteries with submucousal myomatous nodules was performed in 21 patients. The age of patients is from 32 to 47 years, the average age is 36,5 years. Myomatous nodules were from 3 to 9 cm in size.

Indication for the uterine artery embolisation was clinical evidence of a disease in the form of infertility, miscarriage, hyperpolymenorrhea and/or menometrorrhagia, symptoms associated with annexa embarrassment and the pain syndrome.

For all patients a set of laboratory and instrumental studies was performed: general and biochemical blood tests, estimation of the blood clotting ability (clotting time, absolute platelet count, bleeding time), diagnostic dilation and curettage with histological analysis of the obtained material, transabdominal and intravaginal pelvic ultrasound and MRI.

Initial imaging and subsequent observation over changes in size and structure of myomatous nodules, and also over the germination of submucous myomatous nodules were performed via an ultrasound examination and magnetic resonance imaging.

Intravascular interventions were executed in the X-ray operating room equipped with an angiography unit AXIOM Artis MP. Diagnostic angiographic studies and endovascular interventions were performed for all patients via percutaneous catheteri zation.

Standard preparation of patients for an endovascular intervention included estimation of the physical status, study of the hemostatic system and state of the excretory function of the kidneys. The night before and on the day of examination, patients were given a cleansing enema, and an hour before the procedure and urinary catheter installed. 30 minutes before the procedure, women were given a preanesthetic medication.

Diagnostic angiographic studies and transcatheter occlusion of both uterine arteries were performed for all patients under local anesthesia 20 ml of 0,5 % novocaine solution. The procedure was performed using a standard Seldinger method through a right femoral artery. During the embolization of myoma arteries general anesthesia were not used.

Manipulation and position of a catheter in a blood stream were controlled using fluoroscopy (10 frames per second). We documented the process using a subtraction angiography program in the Abdomen mode 2–3 frames per second. For contrast enhancement of arteries, non-ionic contrast media were used. The velocity and quantity of the radiographic contrast medium depended on the Investigated vessel gauge.

For uterine artery occlusion, microspheres of 350–1000 μm were used.

Results and discussion

Before the roentgen-endovascular occlusion of uterine arteries, pelvic ultrasound and MRI were performed for all patients in hospital environment. During an ultrasound investigation, a myomatous nodule was located in the uterine cavity and in most cases was round, sharp and smooth, deforming the uterine cavity (Fig. 1). The ultrasound investigation is the most commonly used and rather informative method of the uterine myoma diacrisis. Pathognomonic ultrasound symptoms of the uterine myoma is increase in the uterine size, deformation of external boundaries and appearance of round or oval formations in uterine walls with lower waveforming resistance, than for myometrium. The subserous uterine myoma is visualized as a round-shaped formation with an increased sound conductivity, pedunculated or tightly united with the uterine. Ultrasound diagnostic of submucous myomatous nodules is based on detection of signs for endometrium deformation, appearance of a round or oval formation with sharp contours and medium echogenicity in the endometrium of an exaggerated uterine cavity [6; 19].

Pelvic MRI has shown submucous nodules with sharp contours and inhomogeneous structure in the uterine cavity. On T1-weighted images, a myomatous nodule became apparent as isointense, and on T2-weighted images, a myomatous nodule was visualized in most observations as hypo- and hyperintense (Fig. 2). On standard MR-images, a uterine myoma is visualized as additional round sharply defined formations with significant variability of the MR signal intensity and uniformity on T2-weighted images. Different types of uterine myomas are not only characterized with varied intensity of the MR signal on T2-weighted images, but also show distinctions in accumulation of a contrast media, which is attributed to different types of intravascular blood current. So, a simple uterine

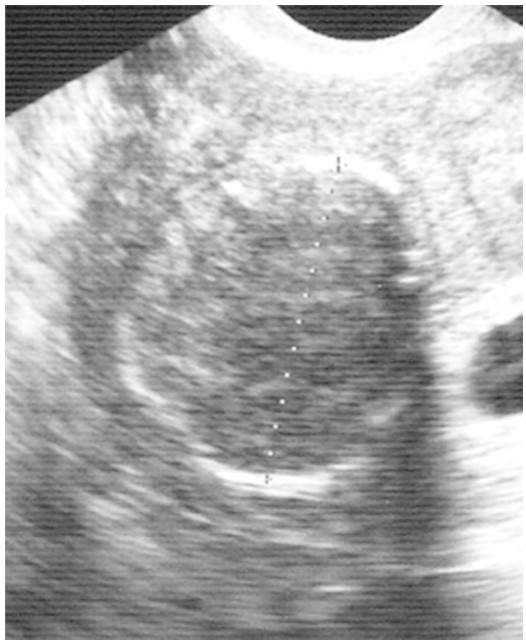

Fig. 1. Ultrasound investigation. Submucousal myomatous nodule

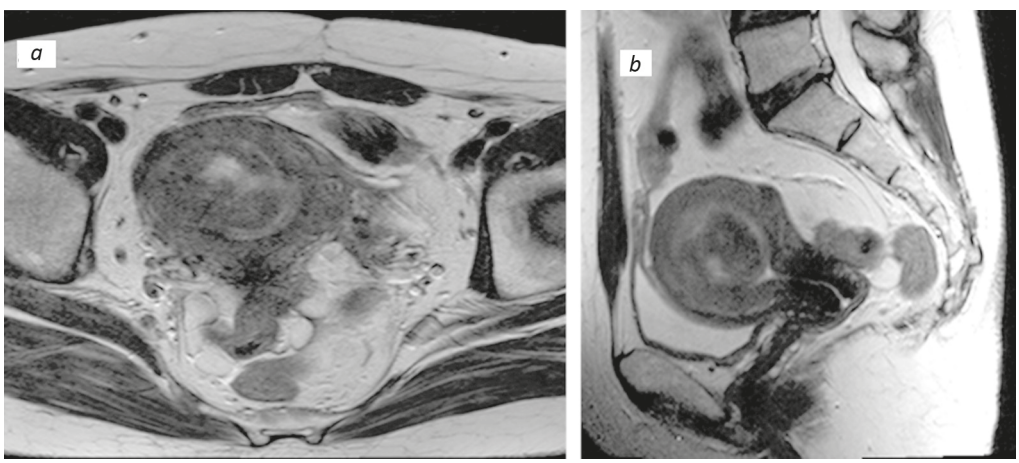

Fig. 2. MRI of the woman's pelvis (*a*) axial projection, (*b*) sagittal projection. Submucous myomatous nodule

myoma is characterized with a gradual accumulation and emission of a contrast media. A proliferative myoma is characterized with a fast accumulation and plateau setup. For uterine myomas with marked destructive changes, nodules scarcely accumulate a contrast media [20].

For all observations, roentgen-endovascular intervention was executed via a right femoral access. At present, the most frequently used vascular access to perform the uterine artery embolisation is a right common femoral puncture. As a rule, such vascular access

allows to perform selective catheterization of both uterine arteries. Nonetheless, in about 1,5 % of cases, it fails to perform a selective catheterization of one uterine artery, due to what we have to rely on a contralateral femoral artery puncture. Two-sided puncture of common femoral arteries with a subsequent one-shot selective catheterization of both uterine arteries is hardly used in current times. Main advantages of this approach are absence of necessity for ipsilateral uterine artery catheterization, and the possibility for simultaneous contrast enhancement of both uterine arteries, which provides a lower radiation exposure for a patient. Among limitations of such method, we should name a twofold increase in number of complications on the side of the vascular access. Moreover, bilateral installation of introducers and simultaneous application of two catheters, crossing in a distal aorta segment scale up a risk for development of thromboembolic complications and increase the intervention costs. The second and the third stages of the uterine artery embolization are a consecutive selective catheterization and embolization of contralateral and ipsilateral uterine arteries [21].

According to data embolization of myoma arteries in all cases were done via right femoral artery. During the diagnostic subtraction angiography there were seen pathological network of multiple vessels feeding submucous myomatous node. Uterine artery embolization was done after the diagnostic angiography. The was noted the symptoms of 'stop contrast' during the final subtraction angiography. Further diagnostic subtraction angiographies of contralateral of the uterine artery and subsequent embolization with final angiography were done. This article presents data of 21 patients that during diagnostic angiography had not any anastomoses between the branches of the uterine and ovarian arteries.

After the roentgen-endovascular occlusion of uterine arteries, all patients were observed in hospital during 3–5 days. They were recommended to keep strict bed confinement for the first 24 hours to prevent issue of blood from the puncture point. Immediately after the uterine artery embolisation and during the first day after the endovascular intervention, in all observations a post-embolisation syndrome was marked in the form of pains and sicchasia. The above syndrome was relieved by antiemetic agents and non-opioid analgesics. Also there were used broad specters of antibiotics in all post-embolization periods. According to a number of authors, the main undesirable effect of the roentgen-endovascular occlusion of uterine arteries is a post-embolisation syndrome, which is observed almost for all women after the occlusion and is accompanied by pains in a small pelvis and sickness. However, its marked symptoms can be seen only in the first hours after embolization with the subsequent regression of symptomatology on the second day [22; 23].

After roentgen-endovascular intervention, during seven days and within three months, spontaneous germination was observed for 10 of 21 (47.6 %) submucousal myomatous nodules. Clinically, spasmodic pain syndrome was observed. During check-up MRI examinations, signs of submucousal myomatous nodule germination were seen (Fig. 3).

For 3 of 21 women (9,5 %) within three months, partially germinating submucousal nodules were removed in the gynecology department of the National Research Center of Maternity and Child "University Medical Center". Clinical presentations of a germinating submucousal nodule were spasmodic pain, rheuma and bloody issue from the uterine cavity (Fig. 4).

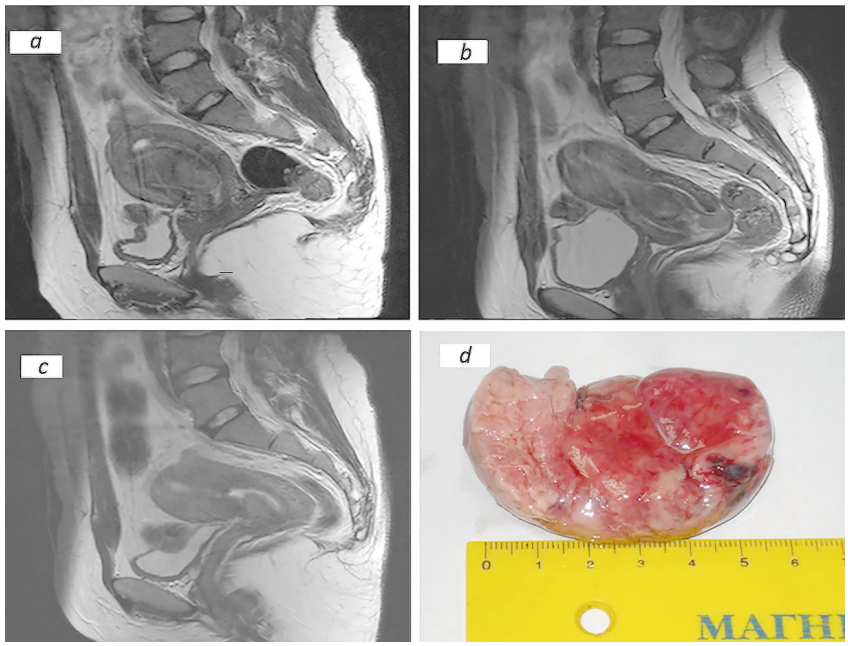

Fig. 3. MRI of the woman's pelvis sagittal projection (*a–c*) and macro specimen (*d*)

On the sagittal T2-weighted image (*a*), an oval myomatous nodule is visualized in the uterine cavity. On the sagittal T2-weighted image 7 days after the roentgen-endovascular occlusion (*b*), we can observe migration of a myomatous nodule, the cervical channel is dilated. On the sagittal T2-weighted image, after germination of a submucousa; myomatous nodule (*c*), the uterine cavity architectonics is recovered. Macro specimen (*d*).

In other 8 of 21 of observations (38,1 %), submucous nodules were discharged within the next 12 months. Histologically, hemadostenosis zone, perivascular sclerosis, and aseptic necrosis of a myomatous nodule were observed. According to a number of authors, after the roentgen-endovascular uterine artery occlusion in the treatment of submucous myomatous nodules, 24–46 % are discharged, transcervical myomectomy is performed in 11–15 % of observations, spontaneous germination is seen in 29–45 % of observations [7; 23; 24].

Clinical signs of discharge were cluster-like bloody issue from the uterine cavity. In the postoperative period and during the dynamic observation there were not registered any complications associated with embolization of the uterine arteries, followed by the expansion and myolysis of submucous nodes.

Conclusions

Thus, co-operative expulsion of submucous myomatous nodes happens in the period from 7 days to 3 months in 47.6 % of cases after embolization of the uterine arteries. In 14.3 % of cases, according to our data, partially born submucous nodes were removed. In 38.1 % of cases, myolysis of submucous myomatous nodes was noted.

Our experience has shown that the roentgen-endovascular uterine artery occlusion for submucousal myomatous nodules is a minimally invasive organ-preserving method and can be considered as an alternative to operative therapy. Submucousal myomatous

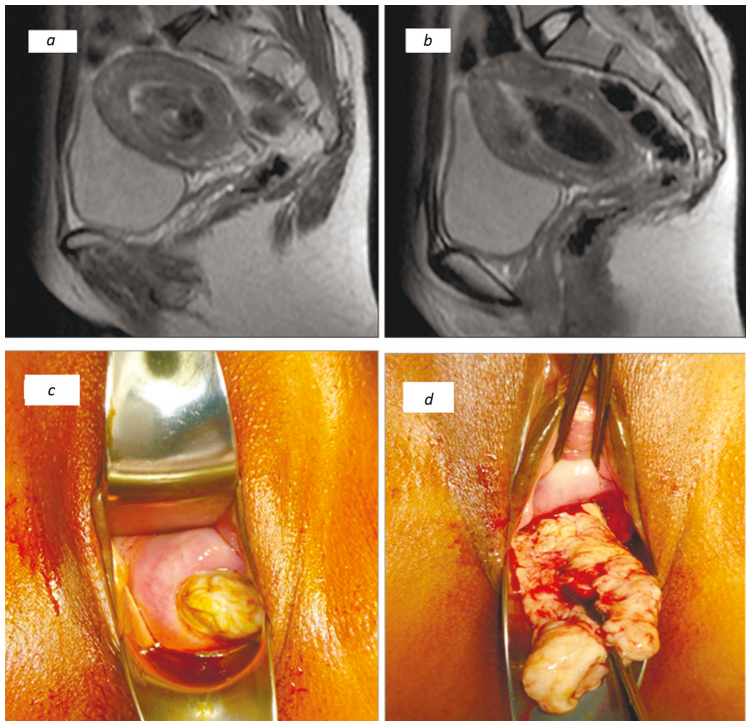

Fig. 4. MRI of the woman's pelvis sagittal projection (*a*, *b*) and operation photo (*c*, *d*)

On the sagittal T2-weighted image (*a*) before the roentgen-endovascular uterine artery occlusion, a round-shaped myomatous nodule can be seen in the uterine cavity. On the sagittal T2-weighted image (*b*) three months after the uterine artery embolisation, we can observe migration of a submucousal myomatous nodule. Partially germinating submucousal nodule (*c*). Removal of a partially germinating submucousal nodule (*d*).

nodules can spontaneously germinate within the first three months or discharge within 12 months. When identifying partially germinating submucousal myomatous nodules, it is recommended to remove them surgically with a view to preventing pyometra.

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