ENDOVASCULAR TREATMENT IN UTERINE FIBROMIOMATOSIS

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INTRODUCTION

Uterine fibromiomi (FMU) is the most common human benign tumour and the most frequently found in woman’s reproductive system; uterine fibroms appear at 20 – 25% of the women and approximately 40% among women over 50 who still have menstruation.

Uterine fibrom affects millions of women and can justify 60% from the 600000 hysterectomies realized in the United States every year, while in Europa it varies from 73000 in Great Britain to 200.000 in Germany [34,56,74,107].

Endovascular treatment through embolothe rapy represents a new method, least invasive, with satisfactory results for a long time, which presents various advantages in comparison with the classic treatment methods.

There are enough proofs in literature that suggest the fact that EAU is a very effective alternative, least invasive at the chirurgical treatment.

The aim of the present study is presenting the embolothe rapy technique we apply in the Universitary Center of Craiova and the advantages this type of treatment presents in comparison with the other classic therapeutic methods for the patients diagnosticated with uterine fibromiomi.

GERENAL CONSIDERATIONS

CHAPTER I

Anatomic references

I.1. Uterus

The uterus is a cavitary muscular organ situated in the pelvis with the shape of an anteroposterior flattened cone with the bottom oriented up; it presents body, isthmus and cervix. The isthmus is a channel on the antero-posterior side.

Dimensions: for the adult woman the uterus is 6 cm long, 4 cm wide and 2 cm thick.

I.2. Pelvine vascularisation

Terminal branches of aorta

- A. iliaca communis, right and left, is formed by the bifurcation of the aorta at the level of L4-L5 intervertebral disc and ends through its dividing in the two terminal: iliac extreme and iliac intern.

Intern iliac artery (hipogastic) (A. iliaca interna), branch of the common artery, begins at the level of L5/S1vertebras right anterior the sacroiliac articulations and has a trajectory of approximately 4 cm posterior to the superior margin of the big sciatic whole.

Uterine artery

It is an artery with aspect and dimentions that vary with the physiologic of the woman.[1] It comes from the anterior side of the interne artery and presents in its tract three segments. It is the most voluminous visceral branch of the hipogastic artery with a diameter of 2-3 mm without pregnancy. It starts from the anterior body of the hipogastic artery, the most frequent as a branch of the inferior artery of the buttock.
The brachnes for the uterine body (Rr. helicini) are short and penetrate directly the plexiform blanket of the miometer, divide in a posterior and anterior branch, each of them going on the correspondent side of the uterus – arcuate arteries.

Arcuate arteries: ramify in peripheral branches which continue their tract serving the external terce of the miometer and radial branches, centripetal, with the tract perpendicular on that of the arteries from which they emerge and go towards the endometrial surface.

Alternative origins of the uterine arteries

The origin of the uterine artery is variable and its correct estimation is important for preventing catheterisation breakdown.

CHAPTER II

UTERINE FOBRIMIOM PATHOLOGY

Uterine fibromiom (FMU) is the most common human benign tumour and the most frequent uterine tumour which develops in the flat muscularity of the uterine wall (miom) but also presents a conjunctive component, from where the designation of fibromiom. In the morphopathologic studies the leiomiom term is preferred.

II.2. Incidence.

It is estimated that 20% of the women over 35 have a known uterine fibromiom, but this figure is inferior to the real one. Practically it can be considered that every uterus contains at least one fibromiomatos, even if it is minor or microscopic visible (Thomson).

FMU is detected three times more frequently at the Negroid race probably because of a genetic predisposition or certain particular socio-economic conditions.

II.3. ETIOPATOGENY

The determinant factor has not been determined yet. Although, there are many theories: Conheim’s congenital hereditary theory, Klebs-Pillot’s vascular theory, Wirchoff’s cankerous theory, the hormonal theory. The hormonal theory proves to be the most valid, the uterine fibrom being detected exceptionally before the first menses and involuting at the menopause - Heger, Scitz, Faure incriminating the role of the estrogens in the genesis of this tumour.

GENERAL, HORMONAL FACTORS

At present, there are taken into consideration at least three hormonal factors which may influence the proliferation of uterine leiomiom: the oestrogens, STH and progesteron.

The leiomiom presents cyclic proliferation periods and ceases growing at the menopause when the level of sexual hormones decreases.

The complex process of FMU histogenesis presents a couple of evolutive phases:

a. Proliferation focus formation
b. Initiation of tumoral microscopic modifications
c. Tumour development

Leiomioms are vascular tumours and the angiogenesis is vital for their growth. They have proved to have more veins and arteries and more vessels with a bigger caliber than the normal miometer [29, 32].

II.4. MORFOPATHOLOGY

The uterine fibromiom is a unique or multiple tumoral formation, of variable dimensions, that distinguishes from the surrounding miometer and creates anomalous hipertrophy areas of the uter.

The histological types of fibromiom are represented by:

a. TYPICAL LEIOMIOM
b. CELLULAR LEIOMIOM
c. HISTOLOGICAL RARE TYPES OF LEIOMIOM

CHAPTER III

SIMPTOMATHOLOGY

The uterine fibromiom manifests very different depending on the number, the size and the localization of the fibromiomatic nodules.

III.1. THE ASIMPTOMATIC FIBROMIOM

The most usual FMU is highlighted by a gynecological exam and sometimes it is discovered along chirurgical exploring of the pelvis.

III.2. UTERINE HEMORRHAGES

Uterine bleedings represent the most frequent symptom in women with FMU. The menorrhy is the most common and characteristic form of bleeding in women with fibriom.

In the evolution of a fibriomm the hemoragy is frequent and can be considered as a complication

III.3 HIDROREEA, PIOREEA

Hidroreea barely appears (1,8% of the cases, after Ducuing).

Pioreea or the purulent losses can sometimes reveal a fibriiform polyp close to mortification.

III.4. SORE FIBROMIOMS

The uterine fibromiom itself is not sore. The appearance of pain warns about consecutive injury or complications.

Intense pain, with colicative character, reflects uterine contractions which incline to exclude a submucous nodule or fibrous polip from the uterine cavity. Sometimes the pain has the aspect of a particular dismenhorea.

III.5. ASTRICTION ON THE ADIACENT

Depending on its size and location, FMU can affect the organs in the neighbourhood. Polakiuria is the most frequent sign.

CHAPTER IV

DIAGNOSTIC

This includes the case of uterine fibroms:

- The certitude of the diagnostic through an imagistic and gynecologic exam
- Assignation of the number, location and size of the fibroms
- Exclusion of malignity
CHAPTER V
TREATMENT

V.1. CHIRURGICAL TREATMENT

Chirurgical removal of the tumour or of the uterus represented not much time ago the election treatment of FMU; it includes the myomectomy, hysterectomy, miolise, criomiolise, HIFU technique (high intensity focused ultrasound).

V.2. MEDICAL TREATMENT

Medicamentary treatment of the fibrous uterus is a tranzitory therapeutic measure which aims reaching the spontaneous menopause or the optim moment for the chirurgical intervention.

TREATMENT WITH PROGRESIVITY SYNTHESIS

TREATMENT WITH AGONISTS OF Gn RH

V.4. Endovascular treatment through uterine artery embolization

EAU is now a well known alternative to the traditional therapies for fibromatos uterus treatment.

Uterine artery embolization

The principle method is selective catheterization of uterine arteries and the introduction of particles emboligen aimed to block the arterial lumen.

PART II
PERSONAL RESEARCH
CHAPTER I

PURPOSE, OBJECTIVES AND WORK MOTIVATION

- The purpose of this paper is to present the stages of treatment by uterine artery embolization, the costs of the type of patients whom they are addressed and the advantages compared with other classical surgical and nonsurgical treatment.
- Application of uterine artery embolization therapy in type fibromatos uterine pathology with symptoms manifested.
- Detect particular aspects of the myometrium and tumor tissue vascularization during angiography guidance to patients in the study group, compararea tehnicii de abord brahial aplicată în studiul de față, versus literature data using femoral approach control of postembolization syndrome, especially postinterventional pain.
- Imaging evaluation of patients progress within 6 months postembolization.

CHAPTER II
MATERIAL AND METHOD

The study group comprises 107 patients aged 19-47 years who were highlight one or more fibroid nodules. The study was conducted during April 2005 - March 2011 Department of Interventional Radiology Emergency Hospital Craiova, in collaboration with the Department of Gynecology Department of Interventional Radiology Craiova and University of Bucharest Emergency Hospital.
II.3. Embolization technique used
The principle method is selective catheterization of uterine arteries and the introduction of particles emboligen aimed at blocking the arterial lumen.

II.3.2. Stages of embolization:
A. Vascular abord
The Seldinger technique consists in mounting a pressure sheath. We used 4F or 5F arterial sheath.

B. Selective arterial catheterization
It is executed by entering the desired arterial lumen catheters used after the above mentioned technique.

C. Checking the correct catheterisation
It is done for each uterine artery by injecting a contrast substance through the catheter and track dynamic images. Quantity and size depend on arterial flow and injection volume of fibroids.

D. Injection of emboligen particles
To achieve the therapeutic embolization of uterine arteries it is necessary to introduce particulate embolization transcatheter.

E. Embolization control
The injection of a contrast substance test checks the embolization is.

F. Postinterventional haemostasis
After correct retirement of the catheter embolization, and arterial sheath, and after prolonged manual compression hemostasis (5-10 min) we applied a pressure dressing indicating the patient resting in bed 3-4 hours.

II.4. postinterventional tracking
After angiographic maneuvers is necessary to monitor closely developments in the general condition of the patient for early detection of possible complications that may occur.

We considered it appropriate delineation of two distinct periods of evolution postintervenţională with different tracking parameters and can appreciate the woman and postembolizare steps.

Protocol postembolizare tracking the patient assumes in our two-stage design:
- Early stage (72 hours) which is usually achieved during hospital admission,
- up to six months late stage by regular checks (may be extended by agreement of the patient and subsequent years).

CHAPTER III

RESULTS

III.1 Characteristics of the studied lot
In the present study there were carried out 107 interventions for fibromiomasys uterine embolization in patients aged between 19 and 47 years.

III.2. Characteristics of uterine lesions
Another classification of patients in the study group can be done to highlight the number of nodules fibromiomas imaging examinations, ultrasound and MRI.
Distribution of lesions in the group of patients studied fibromioma tosee: 1 to 1 lesion, 2 to 2 lesions, 3 - more than two lesions

An important role in selecting patients for this type of minimally invasive treatment had fibromioamelor location, most of them having their intramural or subendometrial so:

Fibromiomas myometrial nodule mass distribution: 1 - 2 subendometrial - intramural, 3 - subserous, 4 - multiple locations

The data from these imaging examinations can conclude the following: regression tracking dimensional nodules can be classified as the examinations at 6 months:
- between 0-25% volume regression was seen in 78 cases.
- in 32 cases of volume reduction ranged between 25-50%
- nine of the patients at 6 months showed regression over 50%
- nodular in 3 patients could not be separated from imaging examinations.

Volumetric regression of lesions 6 months fibromiomas postembolizare: 1 - up to 25%, 2-25 - 50% 3 - over 50% 4 - expulsion nodules

III.3. VERSIONS OF EMERGING UTERINE ARTERY - PRACTICAL IMPORTANCE
Uterine artery origin varies from one patient to another and has practical importance in application emboloterapiei, its correct assessment catheterisation may prevent failure and radiation dose reduction and shortening of the intervention.

III.4. Case presentations
Next, I will present some significant cases in the study group patients. The first case is a patient of 27 years who presented to the gynecological examination for heavy menorrhagia, and prolonged (over 7 days), blood clots, uterine essentially.

The appearance is suggestive fibromyoma and continues Doppler ultrasound with spectrum analysis showing multiple blood vessels at the periphery of the party input, low flow resistance.

Approach artery was performed in the left brachial artery using a set of angiography with a 4F arterial sheath fitted with three-way valve and valve. After passage of 4F Cobra catheter through the brachial artery, descending aorta, common iliac artery using the guide, the uterine arteries are selectively catheterised.
Checking correct artery catheterisation uterineprin iodine contrast injection

Emboline material is inserted permanently (Embosphere 500 - 700μ) as saline solution and iodinated contrast media, slow, under fluoroscopic control.

Verification of uterine artery embolization correct contrast injection through the catheter

After that I started taking Perflagan embolization iv slow infusion. Antibiotic treatment started two hours before embolization by iv administration of 500 mg Ampiclin slowly. In about four hours postembolization patients complain of nausea and vomiting episodes appear to control which we received a vial intramuscular metoclopramide.

Postembolization symptoms resolved almost completely within 48 hours except for a discrete intervention leak light brown and persistence of a sensation of pelvic distension.

3 months postembolization ultrasound shows a nodule hipoechoic, approximately 28/23 mm homogeneous appearance of tiny calcifications and the absence of Doppler signal inside.

The patient also states the presence of normal menstrual bleeding in appearance, amount and duration.

Examination at 6 months and the patient shows a similar issue during says no other symptoms.

For different patients 45 years of age is significant for bulky fibromyoma types which can be treated by this method.

Clinical and ultasonographic showed anterior wall of the uterus in a bulky fibroid nodule approximately 82/78 mm heterogeneous structure and moderate vascularisation.
Voluminous fibromyoma node - endovaginal ultrasonographic examination

At the control angiography there were bulky uterine arteries showed a rich vascularity of the fibroid nodule. The sheer volume of fibroid node required the use of large quantities of particles emboligen approximately 3.5 ml were mixed with the substance being phased in contrast, for better control of the embolisation.

They also used a larger amount of particles that were introduced Gelaspon also controlled embolization fluoroscopic until a proper and appearance of reflux of the contrast injection.

Compared with patients above this patient presented a febrile syndrome more evident with temperatures up to 38.4 °C that lasted about 36 hours. This syndrome was controlled with antipyretics usual.

We believe that a prolonged febrile syndrome was mainly due to increased volume of the node and hence a larger amount of resorption of degradation products.

The patient was discharged after 72 hours with good general condition.

In about a month postembolization patient presented with good mental state and ultrasound examination showed regression endovaginală sonadă dimensional node to approximately 75/70 mm and also the absence of intratumoral vasculature.

Three months posembolization dimensional reduction of fibroid was moderate about 70/65 mm.

CHAPTER IV
DISCUSSIONS

IV.1. Features of the embolization technique applied in this study
Method of treatment for the group of patients included in this paper is based on the steps presented in the works of foreign authors more 600 601, 602, to which I contributed an
arterial approach method is less used by them, instead a method which ensures handling Easier arterial catheter and a patient's comfort, especially during the early postembolization.

**Irradiation time**

Regarding selective catheterization of uterine arteries during the arterial puncture flouroscopic of making up to the agent for both arteries emoligeni had values between 3.8 minutes and 28 minutes.

**Radiation Dose Assessment**

One of the main disadvantages of this type of therapy is the radiation dose that a patient receives during embolization.

Although the process is only used for several years, was quickly adopted by more and more centers, however, there is still no published results of randomized studies on larger groups of patients.

**Table 2**

Average X-ray doses received by patients in different radiological procedures

<table>
<thead>
<tr>
<th></th>
<th>Pulmonary X-ray</th>
<th>Barium</th>
<th>Abdominal CT</th>
<th>EAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean dose</td>
<td>68µGy</td>
<td>215mGy</td>
<td>78mGy</td>
<td>897mGy</td>
</tr>
</tbody>
</table>

**IV.3 Optimal control of postembolization syndrome**

Postembolization syndrome generally occurs in all patients undergoing this treatment with different manifestations. The primary symptom is forever but pain is represented by different intensities. (305). Pain intensity according to claims patients can have the ”tolerable” by colicky pain, lancinante Therapy which requires a vigorous and sustained.

It is necessary to start therapy to combat postembolization syndrome even before the commencement of the procedure.

**Hospitalization period**

One of the important factors that states the value in the treatment of uterine artery embolization uterine fibromyoma is the reduced length of stay and overall recovery and social reintegration of the patient.

Foreign authors in several papers presented statistical data that has duration of patient hospitalization from 0.81 to 2.2 days after which the prosecution is ambulatory (418, 419).

Compared with the literature (87.41) in our study group during hospitalization was between 48 and 72 hours with an average of 2.8 days, largely due to a desire to prevent early complications and extending surveillance patients.

![Bar chart depicting hospital stay comparison](image)
IV.4. Postembolization clinical monitoring and imaging

Tracking the development is conveniently postinterventional by ultrasound examination.

It is preferable to track compliance with a protocol of clinical course and imaging of the uterus and in my opinion fibromioamelor comprising the following steps:
- gynecological exam at 10 - 15 days postinterventional to check for possible late complications of embolization maneuver,
- endovaginal ultrasound probe, filled with pulsed Doppler examination and Power mode for the analysis of blood flow within fibromyoma miometru and at 1, 3, 6 months postembolization.

IV.5. The importance of therapeutic method

What is the uterine embolization in patients who want to preserve the integrity uterine and possible pregnancy?

Patients who have symptoms caused by fibroids (metrorrhagia) and Myomectomy or mimetrectomia which is not an option, the UAE should be tested before further treatment by hysterectomy because this method could also resolve the previous symptoms.

The importance of this method in psychological

There are studies that have examined patients on long-term satisfaction postembolization.

Comparative analysis of current treatment methods in uterine fibromiomatosis

The table below summarizes the comparison will present various methods of treatment applied in the uterine fibromiomatosis.

Table 3

<table>
<thead>
<tr>
<th>Method of treatment</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Costs</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histerectomy</td>
<td>Radical curative method</td>
<td>requires general anesthesia, bleeding moderate permanent amenorrhea occurs, possible mental changes</td>
<td>High transmission costs, psychological effect</td>
<td>Slow</td>
</tr>
<tr>
<td>Miomectomy</td>
<td>Effective curative method</td>
<td>uterus general anesthesia, the uterus scar, reduced reproductive function, does not apply to multiple fibroids</td>
<td>High transmission costs,</td>
<td>Slow</td>
</tr>
<tr>
<td>Hysteroscopic resection</td>
<td>Local anesthesia, bleeding is reduced</td>
<td>Applied to intracavitary submucosal fibroids, reduced fertility</td>
<td>Medium</td>
<td>Quick</td>
</tr>
<tr>
<td>Medications (agonisti Gn RH)</td>
<td>Reduces fibroid size and bleeding</td>
<td>Early menopause, osteoporosis, rehabilitation fibroid after stopping treatment</td>
<td>High</td>
<td></td>
</tr>
</tbody>
</table>
### IV.6. Assessing the costs of this technique

An important thing to remember is the first direct costs of surgery compared emboloteraphy class and second overall costs difficult to assess because there have included the cost of reintegration into the family and workplace, and and costs "side" represented by the psychological implications.

**CONCLUSIONS**

1. Endovascular treatment is an effective treatment option in female genital pathology and especially in fibroid therapy.
2. Uterine artery embolization is a minimally invasive treatment method that removes discoforul caused by the presence of uterine fibroids.
3. Uterine artery embolization for uterine fibromyoma is now seen as a method of choice proved to be a safe and effective method which produces permanent infarction of fibroid tissue without its subsequent relapse.
4. Postembolization syndrome in good condition can be controlled with appropriate treatment to ensure patient comfort.
5. Postinterventional imaging and clinical monitoring showed the disappearance of symptoms in 21 cases (87.5%) and significant improvement in 3 cases (12.5%).
6. Monitoring imaging is done conveniently and inexpensively yet with good accuracy by ultrasound endovaginal probe preferred, and necessarily associated with Doppler examination for monitoring blood and lymph fibromiomatos myometrium.
7. The costs of intervention are smaller and faster recovery from hysterectomy or Myomectomy fever, patients being able to quickly rejoin the family and workplace.

**Selective Bibliography**


