IMPLICATIONS OF UTERINE ARTERY EMBOLIZATION FOR UTERINE FIBROMATOSIS

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ABSTRACT*:*
THE PRESENT STUDY EXAMINES THE FAVORABLE EFFECT OF UTERINE ARTERY EMBOLIZATION IN MINIMALLY INVASIVE TREATMENT OF SYMPTOMATIC UTERINE FIBROIDS AT WOMEN AGED BETWEEN 20 AND 70 YEARS. ARE PRESENTED PATHOLOGICAL ASPECTS, TECHNIQUE AND COMPLICATIONS AND CONSEQUENCES OF THE UTERINE EMBOLIZATION.
CONCLUSION. UTERINE ARTERY EMBOLIZATION RESULTS IN A REDUCTION OF THE VOLUME OF MYOMAS AND IS NEEDED ESPECIALLY AS A PRIMARY THERAPY BUT CAN ALSO BE USED AS ADJUNCTIVE THERAPY IN THE UTERUS CONSERVATIVE INTERVENTIONS FOR REDUCING THE NUMBER OF TOTAL HYSTERECTOMIES IN FAVOR OF CONSERVATIVE MYOMECTOMY.
IN THE STUDY GROUP WE OBSERVED NORMALIZATION OF MENSTRUAL CYCLES SINCE THE FIRST TWO MENSTRUAL CYCLES IN A 70% OF PATIENTS AND THE EFFICACY WAS 88% ON REDUCTION THE MENOMETRORRHAGIA.

KEY WORDS: UTERINE ARTERY EMBOLIZATION, UTERINE FIBROID, METRORRHAGIA.

INTRODUCTION

Uterine artery embolization is a minimally invasive technique becoming more popular as a safe and effective alternative to replace hysterectomy and myomectomy.

The most frequent benign gynecological pathology is uterine fibroid, which complication is abundant menometrorrhagia that can reach up to severe iron deficiency anemia[3].

Uterine artery embolization was inspired by techniques used in neuroradiology which consists in inducing necrosis of myoma which involves cutting off blood flow to the fibroid, causing it to shrink, using inframilimetric embolic agents.

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In 1993 J. Jacques Merland and J. Ravina performed uterine artery embolization as an alternative to surgery; the tehnique was a real success[4].

Embolization procedure is a minimally invasive technique that determines ischemia of the fibroid structures and gradual resorption of the nodules in time[5].

Uterine fibroid is a benign tumor composed of myometrial and connective tissue[6,7]. Depending on the predominance of connective/muscular tissue the tumor is called fibroid, myoma (uterine leiomyoma) fibromyoma or fibroleiomyoma[8].

Uterine fibroids (leiomyoma, fibroleiomyoma) affect a large number of women of childbearing age (20% -40% of the patients)[9].

Despite the fact that their cause is still unknown, yet there is considerable evidence that estrogens and progestogens stimulate tumor growth proliferation, as the fibroids rarely appear before menarche and regress after menopause[10-13].

Uterine fibroids are the most common benign tumors in women and the leading indication for hysterectomies in the USA[14,15].

Uterine artery embolization principle consists of devascularisation (ischemia) target sites (fibromyomas, arteriovenous malformation, cervical malignancies etc) with embolic agents that obstruct the vascular lumen and determine cutting off blood flow to the fibroid, causing it to shrink[2].

Uterine fibroids benefit most from this technique and the most frequent symptom, which requires embolization, is uterine bleeding (menometrorrhagia). The only sure method until 20 years ago to cure uterine fibroids was hysterectomy, thus existence of uterine fibroids were the indication in 30-70% cases of radical hysterectomy[16-18].

Principle of the uterine embolization is induction of necrosis, fibrous organization and gradual resorption of the fibroma and succeed only when the fibroma is intensely vascularized[19].

Uterine artery embolization is contraindicated during pregnancy or renal disease with severe renal insufficiency, pelvic inflammatory disease, genital cancers (ovarian, endometrial). A relative contraindication is the severe allergy to the contrast[20].

In our study the uterine embolization and angiography were performed in the Angiography Laboratory of the Radiology Department of the Emergency University Hospital Bucharest under maximum aseptic conditions. The following materials were used:

- scalpel blade
- puncture needle 21G, 18G
- introductory set 4F (french) or 5F
- depending on the vascular anatomy catheter 4F, 5F
- Syringe 5, 10 and 20 ml
- 1% lidocaine, heparin saline.

Some authors recommend the use of microcatheter 3F in case of small diameter vessels [21]. Uterine artery embolization was performed in an angiographic laboratory using fluoroscopic guidance under local anesthesia. An access sheath and guidewire were introduced into the artery (radial or femoral). In order to select the uterine vessels for embolization, a guiding catheter was used and placed into the uterine artery under x-ray fluoroscopy guidance. At the level of the uterine artery an angiogram with contrast was performed to confirm placement of the catheter and the embolizing agent were injected. Blood flow to the fibroid started to fade significantly, causing the uterine fibroid to shrink.

Vascular arterial puncture involves a Seldinger; we used 4F or 5F arterial sheath.

We used the following embolization agents:

1. Polyvinyl PVA particles (Contour, Ivalon)
2. TachoComb, Gelaspon, Gelfoam
3. Embosfere-sized particles in suspension.

Although it is a minimal invasive procedure, the uterine artery embolization procedure does not exclude the possibility of complications. These complications can be divided into three categories:

- Immediate - directly related to endovascular intervention
- Acute - occurs in the first 30 days post procedure
- Late - installed after 30 days of the embolization.

Minor	**Immediate**	**3.5 %**	**Alergy 2.5 % Puncture site hematoma 1 %**
	Acute	**13 %**	**Endometritis Urinary infectios Variabile intensity pain**
	Late	**8.5 %**	**Fibroid expulsion Transient amenorrhea Permanent amenorrhea**
Major	**Late**	**1.5 %**	**Severe sepsis caused by uterine necrosis 2 cases (total hysterectomy) important metrorrhagia - total hysterectomy**

Table 1 – Complications in the studied group

We present the pathological findings - obtained by the two myomectomy performed after 2 and 6 months after uterine artery embolization. Macroscopic appearance after 6 months: myomas appear diminished in volume, whitish, avascular (absent peripheral circulation), cleavage easy with adjacent myometrium, which is apparently normal vascularity. Microscopic appearance at 6 months post fibroid embolization reveals hyaline sclerosis and normal appearance of the myometrium.

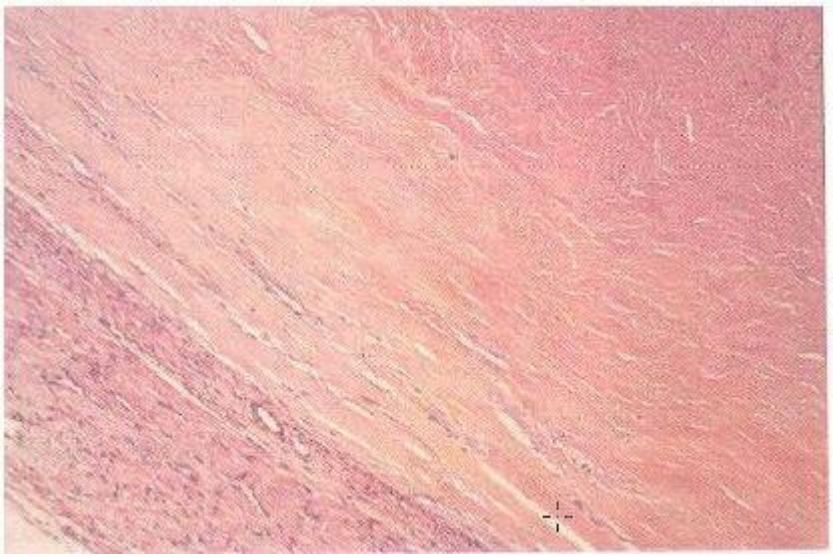

Figure 1- Histological appearance 6 months after embolization: a fibroid hyaline sclerosis, normal appearance of the myometrium

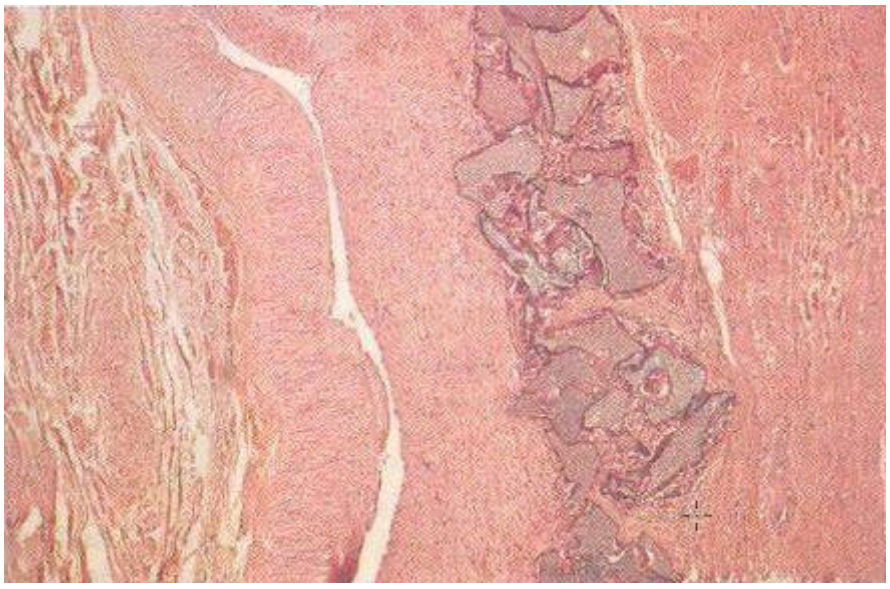

Figure 2- Polivinilformaldehid fragments in the lumen of the peripheral vessel of a myoma, absence of inflammatory reaction.

MATERIALS AND METHODS

The personal research involved a retrospective epidemiological analysis - associated with a clinical trial for a period of three years: 01.01.2010-31.12.2012. The studied group includes 200 patients hospitalized in the Department of Obstetrics and Gynecology .We used as working material data from observation sheets, clinic archive, surgical protocols, data from the statistics department of the hospital. The 200 patients in the research group were selected based on clinical diagnosis and imaging: symptomatic uterine fibroids (bleeding, pain, compression neighboring organs), infertility, cervical cancer in terminal stage (III-IV) with significant bleeding. Infertility caused by uterine fibroids was established by history (> 2

miscarriages in the first quarter and II) clinical examination and imaging diagnosis (ultrasound and nuclear magnetic resonance).

Year	**Cervical cancer stage III-IV**	**Fibroids**	**Cervical and tubal pregnancies**	Total
2010	7 (2%)	342 (97%)	4 (1%)	**353**
2011	13 (5.2%)	233 (94%)	2 (0.8%)	**248**
2012	6 (5.3%)	277 (92.4%)	7 (2.3%)	**300**
Total	**36 (4%)**	**852 (94.6%)**	**13(1.9%)**	**901**

Table 2 - Total cases of uterine embolization during 2010-2012 in Radiology Department of the Emergency University Hospital Bucharest

Of the total 200 uterine artery embolizations, 38.2% were performed as adjuvant therapy, and 61.8% as primary therapy.

Uterine artery embolization type	***No of cases***	***Percentage***
Primary therapy	124	**61.8 %**
Adjuvant therapy	76	**38.2 %**
Total	**200**	**100 %**

Table 3 - Types of uterine embolization of the study group

A total of 76 cases were operated (46 cases of myomectomia, and 30 clasic hysterectomy.

Adjuvant therapy	No of cases	Percentage
Myomectomies	**46**	**60.5 %**
Hysterectomies	**30**	**39.5 %**
Total	**76**	**100 %**

Table 4 – Total cases of uterine embolization as adjuvant therapy

Patients who received adjuvant embolization had the same symptoms as those embolized as primary intent. **In all cases p**ostoperative evolution was favorable, intraoperative bleeding was minimal. The clinical and imaging evaluations performed at 3/6 months after myomectomy found disappearance of metrorrhagia and menstruation returned to normal. The 36 patients in the study group with the diagnosis of "Advanced

cervical cancer stages III-IV" were not monitored because uterine artery embolization was an emergency method as a hemostatic therapy not therapeutic method.

In the studied group - 159 patients were aged 30-50 (79.5%); after the age of 50 years the percentage drops to 6%, while the extremely age group (20-30 years old) is 14.5%.

Age	**No of cases**	**Percentage**
20-30	**29**	14.5 %
30-40	**121**	60.5 %
40-50	**38**	19 %
50-60	**12**	6 %
60-70	**0**	0 %
Total	**200**	**100 %**

Table 5 - Incidence by age

Uterine artery embolization is recommended for younger patients (20-40 years) as primary therapy (conservative). Rank parity does not seem to significantly influence the incidence of uterine fibroids, because in our studied group 40% of patients (80 patients) were nulliparous and 47.5% (95 patients) were primiparous and secundiparous. Latest research promotes uterine embolization, even in young women who wish to preserve fertility, being communicated over 100 cases of pregnancies obtained after embolization, apparently without negative influence on pregnancy[25].

Patients we includied in the study were those who had been diagnosed with "symptomatic fibroids". In our study group, 164 patients (82%) experienced uterine bleeding . Symptoms due to compression (urinary frequency, constipation) of pelvic organ neighborhood (bladder, rectum) and the feeling of fullness, discomfort were found in 47 patients (23.5%). Severe dysmenorrhea was voiced by 10 patients (12%).

Number of patients	**200**
Median age	**40**
Symptoms:	
• **menometrorrhagia**	**164 (82 %)**
• **anemia**	**120 (60%)**
• **disorder caused by the compression of neighborhood organs**	**47 (23.5 %)**
• **infertility**	**56 (28 %)**
• **previous myomectomy (followed by relapses)**	**16 (8 %)**
• **severe dysmenorrhea**	**10 (12 %)**

Table 6 - Frequency of clinical symptoms in the study group

Menorrhagia and menometrorrhagia, are the most common symptoms which require in most cases hospitalization.

No. Crt.	Anatomoclinical classification	No. of cases	Percentage
1	Interstitial fibroids (intramural)	150	75
2	Submucosal fibroids	26	13
3	Subserosal fibroids sessile	13	6.5
4	Subserosal fibroids pedunculated	1	0.5
5	Interstitial fibroid developed in the supporting structures (round ligament, broad ligament, or uterosacral ligament)	10	5
Total		200	100

Table 7- Anatomoclinical types of uterine fibroids in the study group

The size of the myomas did not exceed 150 mm, ranging between 20-140 mm in diameter.

Diameter (mm)	**No of patients**	Percentage
20-40	**30**	15 %
40-60	**90**	45 %
60-80	**40**	20 %
80-140	40	20 %

Table 8 - Dimensions of myomas in the studied group

Patients whose fibroid diameter was between 20 and 60 mm received embolization as primary therapy. Embolization was performed as adjuvant therapy in larger tumors.

RESULTS AND DISCUSSION

In the last two decades (since 1995) endovascular techniques extended to the therapeutic possibility in the genital benign pathology (uterine fibroids, endometriosis, vascular malformations) but also in the malignant pathology (cervical cancer).

In our study conducted over a period of three years: from 2010 to 2012 we studied a group of 200 patients - aged between 20 to 60 years - with the diagnosis of uterine fibromyoma. The higher incidence of the disease was noted in the age group 30-50 - 159 cases (79.5%) from the study group. Embolization as primary therapy was performed in 124 (61.8%) cases and 76 (38.2%) patients received embolization as adjuvant therapy.

Embolization as adjuvant therapy allowed the successful of 76 surgical operations of which 46 myomectomies and 30 hysterectomies.

Also we observed normalization of menstrual cycles since the first two menstrual cycles in a 70% of patients and the efficacy was 88% on reduction the menometrorrhagia.

CONCLUSIONS

Uterine artery embolization is a technique that avoids surgery only when the cases are properly selected.

This procedure avoids myomectomy or hysterectomy morbidity in 78% of cases.

If our study group, we demonstrated that uterine artery embolization is a safe and effective method which produces permanent infarction of the fibroid tissue without subsequent relapse. In case of malignant pathology, bleeding complications that may arise in advanced stages of cervical cancer, embolization has proved the most effective method in correcting and removing uterine bleeding as adjuvant therapy.

In conclusion, endovascular therapy is the optimal solution for solving bleeding complications that can occur in gynecologic or obstetric pathology - according to reasons given above.

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