UTERINE FIBROIDS
PERCUTANEOUS ARTERIAL
EMBOLIZATION

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1 - Uterine Fibroids

Benign estrogen dependent tumors that regress with menopause
more frequent:
- in black women than caucasian
- in nullipara than multipara
- with age

most often asymptomatic
meno-metrorragia+/anemia, pelvic pain
mass effect, urinary and/or GI symptoms
infertility, miscarriages
1- Symptomatic UF: Conventional treatment

First step medical treatment:
- progestatives if bleeding
- LH-RH analogues
- iron supplement if anemia

Surgery in case of failure:
- myomectomy (sometimes under celioscopy) when possible, in young women
- hysterectomy (majority via abdominal route) in other cases (UF: 25-35% of hysterectomies)
2- UFE : Interventional angiography suite, local anesthesia, uni or bifemoral access, presence of anesthesiologist
Rich network of pelvic arterial collaterals:
  anastomoses between R and L uterine arteries
  uterine and ovarian arteries

No vascular pedicle dedicated to the fibroid,
but rather peri-myomatous plexus
2- UFE : Technique

Bilateral catheterisation of anterior branch of internal iliac artery, and eventually supraselective cath. of uterine artery
UFE: Technique

Analgesia before, during and after collaboration with anesthesiologists+++

Unifemoral approach (5F) or bifemoral (4F)

AP aortography: large ovarian artery?

Oblique views: hypogastric way of division cross-over if contralateral site of puncture

Selective catheterisation of both uterine arteries:
hydrophilic catheter, microcatheter +/- vasodilator
Dilated right ovarian artery
UFE : Technique

Look for utero-ovarian anastomosis before and after embolisation
UFE - Technique: materials

- calibrated microspheres 700-900 µm non resorbable type (Embospheres*) for exclusive embolisations (+/- NSAI drug load)

- resorbable particles (Curaspon *): before surgery till stagnation of contrast medium in the horizontal portion of the uterine artery
Embolisation materials

Resorbable particles: Curaspon*

Non resorbable particles: Embospheres*
Look for the « end point » (Pelage):

- UF related hypervascularisation disappear
- No more flow downstream
- Slowing in upstream segment
- Uterine art trunk, cervico vaginal run off
  and patent ut-ov anastomoses
  at the end of the procedure
Thank you Corvasal!
Homolateral cath
UFE: post-procedure management

Continuation of sedation with PCA pump autoregulated with morphine

brief hospital stay: 2 to 4 days

discharge treatment:
  – analgesics such as paracetamol (6/day) or derivatives (dextropropoxyphene 6/day)
  – NSAIDS such as ketoprofenic acid (3/day) for 8 to 10 days
3- UFE : Results(1)

31 female patients
embolisation seems profitable
- in case of voluminous UL with hemorrhagic risk
- or in patients who had multiple myomectomies

Arterial embolisation to treat uterine myomata
- 16 patients (34 to 48 years)
- technical success, stay at hospital<36 hours; no complication
- US 3 months: 20 to 80% of decrease in volume
- After 20 months: 11 asymptomatic patients
  3 partial improvements; 2 failures=>surgery,
  1 pregnancy

- 92 patients
- Technical success: 97%
- No major complication
- One full term pregnancy
- One case of amenorrhea with menopause
- Expulsion of necrotic fragments in 5 cases
- After 3 months: 40 to 75% of UL volume decrease on MRI
Worthington-Kirsch et al.,
53 patients (35 to 58 years); Ivalon+-/- coils
technical success 52/53 (98%)
 improvement of metrorragias at 3 months: 88%
 improvement of mass effect at 3 months: 94%
 mean uterine volume decrease on ultrasound at 3 months: 46%
if a new treatment was found necessary:
  79% would have chosen again the embolisation
  15% would have perhaps chosen embolisation
  6% would have chosen another therapeutic option
Uterine artery embolisation for leiomyomata,

- 200 patients
- Technical success: 99%
- One case of pulmonary embolus within 36 hours
- One case of endometritis => hysterectomy
- Improvement of symptoms: 90%
- Satisfaction rate: 93%
- MRI at 3 months and 1 year:
  - Reduction of uterine volume: 27 and 38%
  - Decrease of the size of the dominant UL: 44% and 58%
3- UFE Results: synthesis

TECHNICAL SUCCESS: > 97%

COMPLICATIONS: 1 – 2%
- AMENORRHEA (UT – OV ANASTOMOSIS)
- ENDOMETRITIS (VOLUMINOUS OR PEDICULATED UF)

CLINICAL RESULTS:
BLEEDING AND MASS SYNDROM IMPROVEMENT ~ 90%

MORPHOLOGICAL R:
> 60% UF VOLUME DECREASE 1 YEAR AFTER

IF A NEW TREATMENT IS NECESSARY:
79% OF THE WOMEN CHOOSE AGAIN EMBOLIZATION
(WORTHINGTON et al.)
MRI before embolisation

4 months later: asymptomatic
Intramural fibroid 4cm diameter before embolisation

... 3 months later, the fibroid measures less than 2 cm
Before embolisation: 4 cm fibroid

3 months later: Asymptomatic 2 cm fibroid

1 year later: asymptomatic

41 years, menometrorragia
UF + endometriosis
4 - UFE : Indications (1)

PREOPERATIVE EMBOLISATION interesting in:
- voluminous hemorrhagic fibroid
- uterus with multiple leiomyomas

EXCLUSIVE EMBOLISATION:
- rejection of surgery
- risky surgery
- incidental discovery upon a work-up for infertility
- symptomatic UF after 40 years if no pregnancy desire,
or younger, if hysterectomy is the only surgical option
Criteria to consider embolisation:

context: age
  fertility, parity, pregnancy desire,
  surgical risk
UF : size and location

BE CAREFUL IF
  - huge UF
  - large subserous pediculated UF
  - voluminous submucosal UF
  - desire of pregnancy

→ Clinical work-up + ultrasound and MRI
**UFE - Indications (3) : Why MRI?**

**Before embolisation:**
- to eliminate a pelvic tumor or an associated pathology
- to confirm presence of fibroids
- to determine size, location and enhancement of the fibroid(s)

**After embolisation:**
To evaluate size and devascularisation of the fibroid(s)

**How?**
- T2W sequences in the 3 orthogonal planes
- sagittal and axial T1W with and without fat sat, before and after Gd injection
UF: DIAGNOSIS
44 year old,
Mass in the Douglas pouch
Every prolapsed mass in the Douglas pouch is not necessarily a pediculated UF!

Here: recurrence of stromal tumor
UF: DIAGNOSIS

60 year old, right lateral uterine mass
Every lateral uterine mass is not necessarily a pediculated UF!

Here: ovarian fibroma
NCUF: DIAGNOSIS

22 year old, increase of uterine volume
Every intramural mass is not necessarily a UF!

Here: sarcoma or highly cellular UF? 
==> biopsy
UFE: INDICATIONS
41 year old,
intramural 13 cm fibroid:
LHRH analogues before UFE?
UFE; INDICATIONS
38 years old, huge subserous pediculated leiomyoma: contra-indication to UFE
UFE: INDICATIONS

41 year old, submucous leiomyoma:

==> hysteroscopic resection
symptomatic UF: UFE vs surgery

- Patient’s surgery refusal

- Instead of hysterectomy

- Instead of multiple myomectomies:
  - Patients ever myomectomised
  - At risk myomectomy (multiples UF, anemia, surgical history...)
    except young women looking for pregnancy

- Instead of solitary myomectomy:
  most of the authors: NO UFE
UFE, pregnancy and fertility

- Pregnancy after UFE:
  - more miscarriages, prematurity and caesarians
  - but signification to discuss (selected population)
  - To our knowledge:
    - no reported case of pregnant uterine rupture

- UFE to treat infertility: marginal indications

- Young women looking for pregnancy: BE CAREFUL!
  - Solitary myomectomy: NO UFE
  - Multiples myomectomies are usually prefered
  - UFE: instead of hysterectomy
5 - UNANSWERED QUESTIONS

Choice of size, shape and nature of particles: to validate with large series

**fertility** and progression of **pregnancies** effects have to be evaluated before extending the indications

**size** of embolized UF, evolution of necrosis and sepsis thresholds

exclusive embolisation/myomectomy
and exclusive embolisation/myomectomy + emb.
have to be compared

evaluation of embolisation **combined** with medical treatment
5bis- UF Interventional Radiology: Works in Progress

Therapeutic Ultrasounds under MRI guidance:
High frequency focused US
Real time MR evaluation of UFE internal necrosis
Advantage: very limited pain
Drawback: no previous anterior pelvic scar
  only 1 or 2 UF, of anterior location
  duration (2 hours or more)
  access to the technique/cost

Lasers
Cryotherapy
UFE : « TAKE HOME » MESSAGES

RELIABLE AND SURE TO TREAT SOME SYMPTOMATIC UF :

- ≈ No technical failure
- Almost bloodless surgery in case of preop embolisation
- Exclusive UFE: good clinical results:
  > 80% bleeding and mass syndrome improvement
- Fertility effects remain uncertain:
  **Beware** if desire of pregnancy still possible but alternative to keep the uterus