“Diagnostic and operative hysteroscopy in reproductive medicine”

SPECIAL INTEREST GROUP
REPRODUCTIVE SURGERY

28 June 2009
Amsterdam
The Netherlands
# PRE-CONGRESS COURSE 9

Organised by the Special Interest Group Reproductive Surgery

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Diagnostic and operative hysteroscopy in reproductive medicine

Organised by the Special Interest Group Reproductive Surgery

**Course co-ordinators:** Marco Gergolet (Italy) and Stephan Gordts (Belgium)

**Course description:** The course concentrates upon the importance and possibilities of diagnostic and operative hysteroscopy in reproductive medicine and the impact of a careful exploration of the uterine cavity on implantation and pregnancy outcome. Instrumentation, technique, indications and complications of the different procedures will be discussed in detail.

**Target audience:** All gynaecologists involved with reproductive medicine

**09:00 - 09:30**  Hysteroscopy: instrumentation, technique, complications and their management - *Stefano Bettocchi (Italy)*

**09:30 - 09:45**  Discussion

**09:45 - 10:15**  Office hysteroscopy: prospective randomized controlled trial - *Rudi Campo (Belgium)*

**10:15 - 10:30**  Discussion

**10:30 - 11:00**  Coffee break

**11:00 - 11:30**  Hysteroscopy in the infertile patient - *Stephan Gordts (Belgium)*

**11:30 - 11:45**  Discussion

**11:45 - 12:15**  Embryoscopy: anatomy and diagnostic value - *Vasilios Tanos (Cyprus)*

**12:15 - 12:30**  Discussion
12:30 - 13:30     Lunch

13:30 - 14:00    Lysis of intrauterine adhesions: failures, fertility outcome and obstetric risks - *Vasilios Tanos (Cyprus)*

14:00 - 14:15    Discussion

14:15 - 14:45    Hysteroscopic treatment of uterine congenital malformations and fertility outcome - *Marco Gergolet (Italy)*

14:45 - 15:00    Discussion

15:00 - 15:30    Coffee break

15:30 - 16:00    Hysteroscopic myomectomy: indications, technique and reproductive outcome - *Stefano Bettocchi (Italy)*

16:00 - 16:15    Discussion

16:15 - 16:45    HOME: Hysteroscopic Operative Myometrial Exploration in the infertile patient - *Rudi Campo (Belgium)*

16:45 - 17:00    Discussion
Office hysteroscopy: prospective randomized controlled trial

Rudi Campo, MD
Leuven Institute for Fertility and Embryology
LIFE
Leuven - Belgium

Diagnostic Hysteroscopy

Prospective multi-centre randomised clinical trial

1. Technique and Feasibility of diagnostic Hysteroscopy?

2. Hysteroscopic findings?

"Abnormal uterine bleeding versus the infertile patient"

Conventional hysteroscopy vs. Mini-hysteroscopy

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conventional hysteroscopy</th>
<th>Mini-hysteroscopy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total diameter</td>
<td>5.0 mm</td>
<td>2.4/3.5 mm</td>
</tr>
<tr>
<td>Speculum</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Cervical clamping</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Cervical dilatation</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Distention medium</td>
<td>CO₂/Saline</td>
<td>Saline</td>
</tr>
</tbody>
</table>
Prospective, Multicentre, Randomised Controlled Trial

To score objectively
- Pain
- Visualisation quality

Stratified for
- Total instrument diameter
- Vaginal delivery (0 versus >=1)
- Surgeons skills

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Patients randomization

Patient with indications for hysteroscopy (n=490)

Group I: Conventional hysteroscopy 5.0 mm instruments (n=244)
  - Group I-A: Patients with vaginal deliveries (n=139)
  - Group I-B: Patients without vaginal deliveries (n=105)

Group II: Mini-hysteroscopy 3.5/2.4 mm instruments (n=246)
  - Group II-A: Patients with vaginal deliveries (n=139)
  - Group II-B: Patients without vaginal deliveries (n=107)

Feasibility of Diagnostic Hysteroscopy

4 important study requirements
- Ambulatory or office endoscopic unit
- Watery distension medium (Saline)
- 30° Rigid optic with high optical quality
- Atraumatic technique

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## Mini-hysteroscopy Technique

- No speculum
- No tenaculum
- No cervical dilatation
- No anaesthesia, no analgesia
- Atraumatic and sight controlled insertion of the hysteroscope

## Atraumatic insertion technique
Outcome variables

Acceptability and feasibility were evaluated by scoring

- Pain
- Quality of visualization
- Complication rate
- Success rate

Age

Indications
Pain

- By patients
- At the end of the procedure
- Visual Analogue Scale (VAS)

Visual Analogue Scale (VAS)

0  4  8  12
Acceptable Unacceptable

Pain Scores

Conventional Hysteroscopy  Mini-hysteroscopy

5.0 vs. 3.5: ***P<0.001

Para 0 vs. Para >1: **P<0.05, ***P<0.001

Pain Scores

Conventional Hysteroscopy  Mini-hysteroscopy

5.0 vs. 3.5: **P<0.01

Para 0 vs. Para >1: **P<0.01, ***P<0.001
Pain Scores

Campo R, Molinas CR et al, Hum Reprod 2005

Conventional hysteroscopy
Mini-hysteroscopy
With vaginal deliveries
Without vaginal deliveries

Visualization of uterine cavity

- By surgeons
- During the procedure

Score
- 0: No
- 1: Insufficient
- 2: Sufficient
- 3: Excellent
<table>
<thead>
<tr>
<th>Instrument diameter and visualisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,5 mm</td>
</tr>
<tr>
<td>5,0 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Visualization Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional hysteroscopy</td>
</tr>
<tr>
<td>5.0 vs. 3.5: ***P&lt;0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Visualization Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional hysteroscopy</td>
</tr>
<tr>
<td>Parity 0 vs. Parity &gt;1: **P&lt;0.05</td>
</tr>
<tr>
<td>Parity 0 vs. Parity &gt;1: ***P&lt;0.001</td>
</tr>
</tbody>
</table>
Visualization Scores

Campo R, Molinas CR et al, Hum Reprod 2005

Visualization Scores

- Experienced surgeons
- Inexperienced surgeons

Complications rate

- By surgeons
- During the procedure
  - Vasovagal reaction
  - Uterine perforation
  - Haemorrhage
  - Cervical laceration
Complication rate

With vaginal deliveries

Success rate

- Calculated:
  - Pain <4
  - Visualization >1
  - No complications
Conclusions

- Mini-hysteroscopy:
  - Easy to perform
  - Excellent patient compliance
  - Excellent quality of visualisation
  - Real mini-invasive diagnostic procedure

- Mini-hysteroscopy, rather than conventional hysteroscopy, should be systematically used, especially when difficult access to the uterine cavity can be anticipated
Findings

Prospective multi-centre randomized clinical trial

Different pathology in infertile versus AUB patients

Findings

Normal

Abnormal

Congenital malformations
Polyp - Myoma
Adhesions

Subtle lesions
Lesions of unknown pathological significance

No Diagnosis

Demographics, indications & findings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Group I</th>
<th>Group II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>34 (20-79)</td>
<td>35 (19-70)</td>
</tr>
<tr>
<td>Indications (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infertility</td>
<td>45</td>
<td>44</td>
</tr>
<tr>
<td>Bleeding</td>
<td>44</td>
<td>46</td>
</tr>
<tr>
<td>Others</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Findings (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>54</td>
<td>55</td>
</tr>
<tr>
<td>Abnormal</td>
<td>39</td>
<td>43</td>
</tr>
<tr>
<td>No diagnosis</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>
Demographics, indications & findings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Group I</th>
<th>Group II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Para &gt;1</td>
<td>Para 0</td>
</tr>
<tr>
<td></td>
<td>39 (23-79)</td>
<td>31 (20-78)</td>
</tr>
</tbody>
</table>

Indications (%)

- Infertility: 28 / 69 / 26 / 67
- Bleeding: 59 / 23 / 63 / 25
- Others: 13 / 8 / 11 / 8

Findings (%)

- Normal: 51 / 57 / 51 / 62
- Abnormal: 42 / 35 / 48 / 36
- No diagnosis: 7 / 9 / 1 / 2

Abnormal findings in patients with infertility

- Subtle lesions
- Cong. Malf.
- Adhesions
- Myoma
- Necrotic tissue
- Polyp

Abnormal findings in patients with AUB

- Subtle lesions
- Cong. Malf.
- Adhesions
- Myoma
- Polyp

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Abnormal findings

- AUB
- Subtle lesions
- Polyp
- Myoma
- Cong. Malf.
- Necrotic tissue
- Adhesions
- Infertility

Subtle lesions

- Elevation
- Hypervascularisation & Strawberry pattern
- Diffuse polyposis
- Necrotic tissue
- Exophytic
- Synechia

Diagnostic hysteroscopy in the infertile patient

Fertile environment? Infertile environment?

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### Subtle lesions

**Lesions of unknown pathological significance**

- Diffuse polyposis
- Strawberry pattern
- Hypervascularization
- Mucosal elevation
- Endometrial defects
- Others

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### Subtle lesions ??

**effect of magnifying and hydroflotation**

- These subtle or incipient lesions: significance unclear but could be associated with infertility.

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### Diffuse polyposis
Strawberry pattern

Hypervascularisation

Localised mucosal elevation
**Subtle lesions**

**Effect of magnifying and hydroflotation**

- By reducing the diameter of the hysteroscope, the effects of patient parity and also surgeon's experience are no longer important.

- Diagnostic mini Hysteroscopy is Simple and Safe with high patient compliance. Only when a mini-hysteroscope, watery distension medium and an atraumatic insertion technique is used.

---

**Conclusions 1**

GRADE A EVIDENCE

By reducing the diameter of the hysteroscope, the effects of patient parity and also surgeon's experience are no longer important.

Diagnostic mini Hysteroscopy is Simple and Safe with high patient compliance. Only when a mini-hysteroscope, watery distension medium, and an atraumatic insertion technique is used.

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**Conclusions 2**

Fluid mini hysteroscopy is mandatory in the first line exploration of every infertile patient with significant higher incidence of uterine congenital malformations, adhesions, and presence of necrotic tissue.

Diagnostic mini-hysteroscopy has a high visualisation capacity for subtle lesions. There is lack of evidence to identify the importance of those changes for implantation disorders but further exploration of those lesions in the infertile patient seems advisable.
Hysteroscopy in the infertile patient
S. Gordts

ESHRE
Pre-congress course SIG reproductive surgery
Amsterdam, 2009

Transvaginal Endoscopy
Complete endoscopic investigation of the female reproductive tract.
Hysteroscopy
Transvaginal Laparoscopy (TvL)
Salpingoscopy
Patency test

Investigation
uterine pathology   congenital
acquired

tubal pathology
endometriosis

Optimization offers the potential for spontaneous conception
Diagnostic hysteroscopy

Diagnostic hysteroscopy in the infertile patient

Looking into the incubator

Hysteroscopy in Infertility

Questions

- Feasibility of office Hysteroscopy in the infertile patient?
- Importance of Findings for reproductive performance?
First line diagnostic procedures

Trans vaginal Ultrasound  Fluid Mini Hysteroscopy  Kontrast Sonography

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HSG To invasive To expensive MRI

Mini endoscopes for minimal invasive approach

Hopkins, 30º, 2.9 mm
**Watery distension medium**

*For minimal invasive approach*

- Hydro floatation shows subtle lesions,
- Rinsing effect in case of bleeding
- Less discomfort than CO2 gas.
- Scientific evidence that ringer lactate is to be preferred
- Only for unipolar surgery Purisole is indicated

---

**Ambulatory Endoscopic Unit**

*For minimal invasive approach*

- No conventional OR
- No general anaesthesia

---

**Specific characteristics for minimal invasive approach**

- Ambulatory endoscopic unit
- Watery distension medium
- Small diameter instrumentation with high optical quality
- Atraumatic technique
Minihysteroscopy: Technique

Atraumatic technique

- No speculum
- No tenaculum
- No cervical dilatation
- No anaesthesia, no analgesia
- Atraumatic and sight controlled insertion of the hysteroscope.
VAGINO-CERVICO-HYSTEROBOPY

Hysteroscopy Specific Problems

Virtual uterine cavity
Endometrium is very fragile
Distension medium resorting - loss
Instrument diameter and optical quality
Documentation
Slow learning curve
Cost benefit for the surgeon is generally poor

Mean pain score
“HSC versus HSG”

*Campo, et al. Prospective randomised trial (474 pat.) p<0.0001
Minihysteroscopy: Findings

Congenital pathologies

Acquired pathologies:

Large lesions:
- Myoma, polyp, adhesions

Subtle lesions:
- Mucosal elevation, hypervascularisation, strawberry pattern, diffuse polyposis, exofitic or necrotic lesions,
Minihysteroscopy in the infertile patient
Subtle changes can impair fertility?

Fertile environment?  Infertile environment?

Localised mucosal elevation

Diffuse mucosal elevation
Diffuse polyposis

Hypervascularisation

Subtle lesions

Lesions of unknown pathological significance

- Diffuse polyposis
- Strawberry pattern
- Hypervascularization
- Mucosal elevation
- Endometrial defects
- Others
Subtle lesions

Increased vascular pattern DD

- Endometritis
- Prolonged Hypo oestrogenic environment
- Adenomyosis
- Intramural myoma
- Others?

Increased vascular pattern

Current LIFE strategy

- Microbiology
- Histology
- Sequential hormone therapy
- Doxycycline 200 mg/day 10 days
- Control HSC after 2 months
- In case of remaining problem MRI

Strawberry pattern
Subtle lesions

- Elevation
- Hypervascularisation & Strawberry pattern
- Diffuse polyposis
- Necrotic tissue
- Exophytic
- Synechia

In infertility:
- 62% abnormal bleeding
- 22%

In necrotic tissue:
- Exophytic

Adenomyosis - Incidence

No real clinical diagnosis

Common histological diagnosis

Incidence:
5-70% retrospective studies
Adenomyosis - Incidence

- Fertility
- Dysmenorrhea
- Menorrhagia

Incidence: 28/56 (50%)

Brosens J et al. 1995 Lancet, 346

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2.4 mm 3.5 mm 5.0 mm

Prospective, multicentre, randomised controlled trial

To score objectively Pain score

Visualisation quality

Stratified for Total instrument diameter

Vaginal delivery (0 versus >1)
CONCLUSIONS

Diagnostic hysteroscopy is a first line ambulatory office procedure.

Our data shows that the best results are obtained with the mini-hysteroscopes of 3.4 mm

Diagnostic Procedure congenital malformation

UTERINE SEPTUM  T-SHAPED UTERUS
Diagnostic Procedure congenital malformation

Trans vaginal Ultrasound  Fluid Mini Hysteroscopy  Kontrast Sonography

Hysteroscopic metroplasty in infertility

Indication for hysteroscopic ambulatory repair

No GRADE A evidence for surgical intervention.
High compliance and low complication rate of hysteroscopic metroplasty
Current classifications are insufficient for scientific approach.
Strategy?
Incidence of congenital anomalies in the infertile patient

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uterus septus</td>
<td>44</td>
<td>63</td>
</tr>
<tr>
<td>T-Shaped</td>
<td>23</td>
<td>33</td>
</tr>
<tr>
<td>Uterus unicornis</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

One Stop Therapeutic Potential
Dissection of uterine septum

Septated Uterus and Implantation after IVF

<table>
<thead>
<tr>
<th></th>
<th>uteroplasty</th>
<th>control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregn. rate</td>
<td>20%</td>
<td>12.5%</td>
</tr>
<tr>
<td>Impl. Rate</td>
<td>10.5%</td>
<td>4.6%</td>
</tr>
</tbody>
</table>
UTERINE SEPTUM
Pre- and Post-operative Pregnancy Outcome

<table>
<thead>
<tr>
<th>No.</th>
<th>Pre-operative</th>
<th>Post-operative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>43</td>
<td>31</td>
</tr>
<tr>
<td>Pregnancies</td>
<td>117</td>
<td>37</td>
</tr>
<tr>
<td>• abortions</td>
<td>*104 (88.9%)</td>
<td>*5 (13.5%)</td>
</tr>
<tr>
<td>• premature</td>
<td>6 (5.1%)</td>
<td>5 (13.5%)</td>
</tr>
<tr>
<td>• at term</td>
<td>7 (6.0%)</td>
<td>27 (73%)</td>
</tr>
<tr>
<td>• children alive</td>
<td>*12 (10.2%)</td>
<td>*32 (86.5%)</td>
</tr>
</tbody>
</table>

Septated uterus
Gargiulo et al, subm. Fertil Steril

<table>
<thead>
<tr>
<th>Small n= 125</th>
<th>Large n= 54</th>
</tr>
</thead>
<tbody>
<tr>
<td>before</td>
<td>after</td>
</tr>
<tr>
<td>Time</td>
<td>22.44</td>
</tr>
<tr>
<td>Preg</td>
<td>109</td>
</tr>
<tr>
<td>Deliv</td>
<td>16.5%</td>
</tr>
<tr>
<td>Abort.</td>
<td>78%</td>
</tr>
<tr>
<td>Ectop.</td>
<td>5.5%</td>
</tr>
</tbody>
</table>

Proper diagnosis of fibroids

Ultrasound
Contrast sonography
Hysteroscopy
One Stop Therapeutic Potential

Submucosal Myoma

Effect of Submucosal Fibroids on IVF Outcome

- Fahri 1995 decreased
- Elder-Garcia 1998 decreased
- Healy 2000 decreased

Delayed childbearing USA

Women having their first baby
≥ 35 y increased 50 % between 1981 and 1999
40 – 45 y increased 75% between 1981 and 1995
Use of assisted reproduction USA

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 35 Y</td>
<td>40.9%</td>
</tr>
<tr>
<td>35 - 37 Y</td>
<td>21.3%</td>
</tr>
<tr>
<td>38 - 40 Y</td>
<td>19.3%</td>
</tr>
<tr>
<td>41 - 42 Y</td>
<td>9.3%</td>
</tr>
<tr>
<td>&gt; 42 Y</td>
<td>9.2%</td>
</tr>
</tbody>
</table>

Conclusions

- easy to perform
- visualization quality is excellent
- excellent patient compliance
- safe procedure
- cost benefit for the surgeon is generally poor
- first-line diagnostic procedure

Although frequently detected at hysteroscopy in infertile patients, the impact of subtle lesions on implantation is still unclear.

Operative hysteroscopic procedures can be performed in a day hospital setting.
Terminology

Embryoscopy – direct visualization of an embryo usually 5-10 weeks previous to fusion of the chorion and amnion

Fetoscopy – usually 14-25 weeks. Phenotypic evaluation added to the karyotype analysis

Should be restricted to families at high risk for recurrence of genetic conditions associated with external fetal anomalies not detectable by ultrasound

Entry and Inspection

Embryoscopy can be performed

Trans abdominally
Trans cervically
Usually before 11 weeks the telescope reaches the extracoelomic space
The amniotic cavity is formed after 11 weeks of gestation
The Development of Embryoscopy

- Dr Bjorn Westin in 1954, performed hystero-embryoscopy in 3 embryos before TOP during early 2nd trimester
- He used the McCarthy’s 10 mm telescope
- Two cases were performed under GA and one with local anaesthesia
- He reported active embryo extremities movements and he counted over 30 swallowing movements per minute

The development of Embryoscopy

Scrimgeour JB and Valenti C, 1970’s
- Direct endoscopic examinations of embryos by laparotomy and a small opening of the myometrium

The development of Embryoscopy and the first direct fetal biopsies

- Rodeck 1980 and Elias 1983
- Perform the first “Fetoscopies”
- Transabdominal insertion of the endoscope under real-time US guidance for direct fetal observation, fetal blood sampling and fetal skin biopsies
Embryoscopy was considered as an obsolete option during 1980 while the abortion rate was 4 - 8%.

The US was then well developed and helped a lot in early fetal anomaly diagnosis.

Daffos F performs an US guided direct fetal blood sampling.

The Development of Embryoscopy

Technological advances...

The recent optic and instrument technological advances offer better visualization with smaller diameter telescopes enabling better and more accurate diagnostic capabilities.

Also enable minimal operative procedures to the fetus with less complications for the fetus and the mother.

Embryoscopy and recent molecular achievements

First trials presented minor benefits and limited diagnostic potentials due to poor technical facilities.

Recent molecular biology achievements and technical advances as well as social needs and demands will accelerate the clinical application of embryoscopy for early diagnosis and probably embryo treatment...
The value of Embryoscopy

- Diagnostic
  - Etiology of missed and recurrent abortions
  - Reevaluate normal embryo status / anatomy, physiology
  - Phenotype of embryos with suspected US abnormalities

- Therapeutic
  - Cervical ectopic pregnancy
  - Stem cell therapy
  - Gene therapy

In Vivo Evaluation of early embryo development and its surrounding environment

The following can be clearly visualized

- Cervical canal
- Intrauterine cavity
- Pregnancy sac
- Chorion and amnion
- Embryo
- Umbilical cord
- Alantois

Cervical Ectopic Pregnancy

- US evaluation at 5+4 weeks.
- Mild bleeding
- Pregnancy G4 after 3 TOPs
- Embryoscopy in order to inject methotrexate. Successful hysteroscopic clearance of the cervical ectopic pregnancy (video)
Definition and Abortion Risk Rate

- Recurrent spontaneous abortions (RSA) refer to three or more consecutive spontaneous abortions (Hannes 1992)
- Risk for SA after 1st Abortion 20-25%
- Risk for SA after 2nd Abortion 40-50%
- Risk for SA after > 3rd Abortion 60% and levels of
- Most couples have at least a 60% chance of delivering a live-born infant with three or more spontaneous abortions (Poland et al. 1977)

The frequency of factors affecting RSA

(Dhont M. 2003, Kuttech WH 1999)

1. Genetic abnormalities 3-5%
2. Uterine anatom. abnor. (hereditary & acquired 15-20%)
3. Immunologic (Antiphosphol. & Anticardiolipin 15-25%)
4. Endocrine / metabolic disorders 5-8% (DM, PCOD etc)
5. Environmental factors 5-10% (occupation, smoking etc)
6. Unexplained 40% can not identify the etiology (Stephenson MD 1996)
Patients and Methods

- 38 patients with history of RSA
- All patients underwent history, general body and gynecological examinations and laboratory investigations and hysteroscopy during their last abortion

Patients

Our study - RSA patients with

- unexplained etiology 15
- uterine cavity abnormalities corrected 7
- anticardiolipin syndrome 2
- endocrinological factor 5
- suspected thrombophilia, treated w LMH 8
- treated with husband WBC 1

The technique of Embryoscopy

- Visualization of dead human embryos up to the age of 12 weeks
- TransCervical
- Instruments: Telescope 3.5mm, 5mm, 30°, single flow
- Metal Halide light source 270 Watts
- Distention medium: Normal saline
- No use of anesthesia or sedation
**Targets of the Study**

- Standardization of the technique.
- Evaluation of the potentials of the technique.
- Evaluation of the characteristics of the pregnancy sac and its contents.
- Correlation of the embryo external characteristics and its genetic analysis.

**Results**

- The total of 35 embryos were evaluated.
- In 35/38 cases embryoscopy was successful and complete evaluation of the embryo and pregnancy sac was performed.
- The beta-hCG serum level was zero in three weeks after the D&C.

**Correlation of the embryo morphology and embryo karyotype**

<table>
<thead>
<tr>
<th>Variety of possibilities</th>
<th>Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Normal phenotype and normal karyotype</td>
<td>5/35</td>
<td>14</td>
</tr>
<tr>
<td>B Normal phenotype and abnormal karyotype</td>
<td>2/35</td>
<td>6</td>
</tr>
<tr>
<td>C Abnormal phenotype and normal karyotype</td>
<td>5/35</td>
<td>14</td>
</tr>
<tr>
<td>D Abnormal phenotype and abnormal karyotype</td>
<td>23/35</td>
<td>66</td>
</tr>
</tbody>
</table>
ZT
- 29 y old, M+1
- G1-G3 Recurrent Abortions
- Complete Workup for RA – normal results
- G4 – Crystal Heparine (CH) and LMH – term pregnancy healthy baby
- G5 – CH + LMH at 6 weeks missed abortion
  - Embryoscopy revealed anencephaly and abdominal malformations

HAA
- 40y old, 2yM+0,
- Subserous & Intramural fibroids
- Uterus enlarged 17w,
- G5, Ab(2)3
- Recurrent Abortions
- Embryo missing right Eye
Embryoscopy of Missed Abortion

- 233 cases by Philipp T et al in 2003 found
- 75% with abnormal karyotype,
- 18% - abnormal phenotype and normal karyotype compared to [14% our results SRA]
- 7% - normal phenotype and karyotype compared to [14% our results SRA]

Investigation of RSA etiology

- Rubio Carmen et al. 2004 (MSRM)
- RSA couples undergoing PGD compared to those cases that did not have RSA
- Numerical chromosomal abnormalities in human preimplantation embryos of women with RSA was 66% as compared to 33% found in non RSA patients.

Conclusions

- Embryoscopy seems to be a valuable method for accurate diagnosis of the cause of spontaneous recurrent and missed abortions. This can be especially useful for future treatment purposes.
- The embryo external characteristics differ in cases of the same genetic abnormalities.
- Both Alantois and Chorion seem to be also affected from the genetic abnormality expressed in the embryo
- Cervical ectopic pregnancy can be treated by embryoscopy
Lysis of Intrauterine adhesions
Failures, Fertility outcome and Obstetric Risks

Presentation
Objectives
Etiology – Causes - Mechanism
Frequency
Clinical Symptoms
Diagnosis
Treatment options
Treatment success rate
Treatment complications, failure rate
Pregnancy complications
Review of the literature

ESHRE 2009
Amsterdam, The Netherlands
28 June to 1st July 2009
Pre-congress course 9
Diagnostic and operative hysteroscopy in reproductive medicine

Tanos Vasilios, MD, PhD.
Prof in Obstetrics & Gynaecology

Intrauterine adhesions
Asherman's Syndrome

Joseph Asherman first described IUA in 1948

- destruction of the endometrium
- formation of adhesions / synechiae
- anterior and posterior uterine walls are adhered

Intrauterine adhesions (IUA)

may be thin, filmy, dense, calcified and
Obliterate
- the endometrial cavity partially or completely
- internal cervical os and /or
- cervical canal
Why hematometra does not occur despite stenosis or atresia of the Cx internal os

Theory A
• The endometrium perhaps in response to a build-up of pressure, becomes refractory, and simple cervical dilation cures the problem

Theory B
• The process of adhesions formation is very slow and symptoms pass uneventfully

US measurement of Endometrial thickness in patients with uterine outlet obstruction
Lo ST et al 2008 Hum Reprod
• 16/26 pts with only outlet cervical adhesions
• Compared with 50 normal menses patients
• Endometrium was 3.9mm (+/- 0.4mm)
• No haematometra

Aetiology of Asherman’s Sy - IUA
• Generally after overzealous postpartum curettage
• Very severe adhesions have been noted following severe postpartum haemorrhage / curettage and postpartum hypogonadism (Sheehan’s Sy)
• After abortion / incomplete / repeated abortions – neglected / sharp curettage
• Following uterine surgery extensive endometrial trauma
  (cesarean section, myomectomy, metroplasty, hysteroscopic surgery)
• Post severe endometritis and / or PID
• As a complication of uterine artery embolization for the treatment of uterine fibroids (as an ischemic response following this procedure)
Incidence of IUA after abortion

- After 1 abortion the incidence is 16.3%
- After 3 or more abortions the incidence rises to 32% (Friedler S et al 1986)
- The severity of adhesions also rises increasing the number of abortions (Yu D et al Fertil Steril 2008)

Prevalence of IUA after placental remnants or incomplete abortion

In 50 patients undergoing
- secondary removal of placental remnants or
- repeat curettage for incomplete abortions
  Ambulatory hysteroscopy 3months after intervention
  *Intra uterine adhesions found in 40%
      - 5 with Asherman's Sy
      - 6 had grade II
      - 6 had grade III
      - 3 had grade IV

Rare causes of IUA formation

- Tuberculosis (Dg is made by culture of the menstrual discharge or by endometrial biopsy)
- Uterine Schistosomiasis (check eggs of the parasite in urine, faeces, rectal scrapings. menstrual discharge or endometrium.
  (Speroff L 2005)
Clinical Symptoms

- Hypomenorrhea or amenorrhea or dysmenorrhea
- Menstruation can be even normal
- Miscarriages / Recurrent miscarriages
- Infertility can be present even with mild adhesions

Diagnosis of IUA

- Hysteroscopy is the gold standard method accurate detecting even minimal adhesions that are not apparent on a hysterogram
- Typical pattern of multiple adhesions seen in Hysterosalpingogram (filling defect)
- HSG is an insufficient diagnostic method because the filling defects of the endometrial cavity or obliteration of the tubes are not conclusive for the exact condition of the endometrial cavity

Ultrasound diagnosis and correct grading of IUA

- Knopman J & Copperman AB in J Reprod Med 2007 evaluated the 3D US in the management of suspected Asherman’s Syndrome
- 54 infertility patients
- 3Dimensional Sonography sensitivity was 100%
- HSG sensitivity was 66.7%
Treatment

- In the past IUA were treated with curettage (D&C) to break up the synechiae. Of course this is an obsolete and wrong way of today's standard care of treatment.

- Hysteroscopy is the best tool for accurate diagnosis and simultaneous treatment / lysis of adhesions.

- Offers direct visualization, evaluation of the severity of the case and excision.

Diagnostic hysteroscopy for IUA

Evaluate the

- Degree of adhesion formation
- Deformity of the uterine cavity
- Pay attention to small adhesion openings and possible flow of tiny fragments and tissue debris might lead you to anatomic landmarks (ostia, myometrium) (Van Belle Y et al textbook 2004)

Ways to avoid false route and uterine perforation during resection of IUA

- Hysteroscopic resection of IUA is a very high risk of creating false routes and uterine perforation:
  - US is of great help especially to identify the distance to the fundus serosa.
  - Laparoscopy is of great help especially in the area of the ostia whereas hysteroscopic transillumination can be detected and guided accordingly.
  - Laparoscopically injecting the uterus with methylene blue dye may help to identify the junction at which the anterior and posterior walls are adhered.
Hysteroscopic technique
Strategy for cutting IUA adhesions

- First cut filmy and central adhesions
- Follow the fluid flow
- Marginal and dense adhesions cut last
- Maintain the hysteroscope in mid-channel axis relative to the uterine walls
- Bleeding usually occurs when you operate between adhesions and myometrium

Tools to be used for IUA lysis

- Use the smallest diameter operative hysteroscope available
- Continuous flow
- Do not try to break the adhesions with the scope
- For adhesion lysis can be used
  - Cold Scissors
  - HF electrical energy – Bipolar / Versapoint etc
  - Nd:YAG laser

Most important tips

- Select the patient / according to your experience and set up
- Operate with patience
- Use cold scissors, it is the best option (tactile feeling, more precise, dissection is possible)
- Except in cases with very hard adhesions/ calcifications
- Simultaneous use of US / Laparoscopy
- Try to identify and reach the endometrium / myometrium cleavage
- Try to keep the correct orientation – identify the ostia if possible
Preventive measures for recurrent adhesions following hysteroscopic adhesiolysis

- Application of intrauterine device (IUD) *
- A pediatric Foley catheter (3ml balloon dilatation for 7 days) *
- Usage of anti-adhesive agents as a distending medium (Adept) during hysteroscopic surgery or as a hyalobarrier gel at the end of the operation (under research)

* Nowadays are abandoned proved to be inefficient

Pre & Post operative care

- A broad spectrum antibiotic is started preoperatively and maintained for 10 days
- An inhibitor of prostaglandin synthesis can be used if uterine cramping is a problem
- The patient is treated for 2 months with high doses of estrogen (conjugated estrogens 2-6 mg daily for 3-4 weeks with progesterone added during the third week

Operation success

- Regain of menstruation cycle (43-67%)
- To achieve a pregnancy / delivery of a baby (28-43%)
- When an initial attempt fails to re-establish menstrual flow, repeated attempts ARE WORTHWHILE even upto x 5 (Fernandez H 2008)
- Persistent treatment with repeated procedures may be necessary to regain reproductive potential
- Approximately 70-80% of patients with regaining menses can achieve a successful pregnancy (Speroff)
Review of the literature

<table>
<thead>
<tr>
<th>Study</th>
<th>Method Used</th>
<th>Preg Rate</th>
<th>Live Birth %</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robinson et al 2008</td>
<td>Scant</td>
<td>46</td>
<td>80</td>
<td>Uterine Perforation 0.6%</td>
</tr>
<tr>
<td>Yu et al 2008</td>
<td>HF Energy</td>
<td>38</td>
<td>80</td>
<td>Uterine Rupture 0.8% Uterine Regener 1%</td>
</tr>
<tr>
<td>Fernandez et al 2006</td>
<td>Monopolar 25</td>
<td>44</td>
<td>33</td>
<td>Adhesion Regener 45% Placenta acreta 3 pts</td>
</tr>
<tr>
<td>Zikopoulos et al 2004</td>
<td>Resectosc 25</td>
<td>26</td>
<td>33</td>
<td>Uterine Rupture 3 pts</td>
</tr>
</tbody>
</table>

Technological improvements, increasing knowledge and experiences in the last 10 years seems that raised the treatment efficacy of IUA, increasing the chances for menes restoration and pregnancy as well as live birth deliveries

The efficacy of IUA Resection is corelated to patient’s age

- Among 71 patients studied
- 31 patients needed only 1 operation
- 20 needed 2 operations
- 15 needed 3 operations
- 5 needed 4 operations
- Patients with age < 35 Pregnancy rate was 67%
- Patients with age > 35 Pregnancy rate was 24%


Pregnancy after IUA treatment is frequently complicated

- Spontaneous abortion
- IUGR
- By premature labor
- Placenta acreta
- Placenta praevia
- Uterine rupture (Shiau CS et al CDMJ 2005)
- Postpartum haemorrhage (Vu et al Fertil Steril 2008)
😊 Thank U!!!
Hysteroscopic treatment of uterine congenital malformations and fertility outcome

Marco Gergolet, MD, MSc
PCC 9
25* ESHRE ANNUAL MEETING
AMSTERDAM

Congenital uterine anomalies
Prevalence

A critical analysis of studies from 1950 to 2007, done with different diagnostic tools:

- Most accurate diagnostic procedures:
  - Hysteroscopy + laparoscopy
  - Sonohysterography (SHG)
  - 3D ultrasound

- Less accurate tools:
  - 2D US, and HSG

The study found a 6.7% prevalence of congenital uterine anomalies in the general population, 7.8% in the infertile population and 16.7% in the RM population.

The arcuate uterus was the commonest anomaly found in the general and RM population.

Septate uterus was the commonest anomaly found in the infertile population.

[Saravelos Hum Rep Update 2008]
Before: 3 spontaneous miscarriages, 46 XX
After: conceived in 2 months, 2 pregnancies at term.

Prevalence of congenital uterine malformations
General population

<table>
<thead>
<tr>
<th>Author</th>
<th>Method</th>
<th>Anomalies (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raga 1997</td>
<td>HSG, HSC</td>
<td>3.8</td>
</tr>
<tr>
<td>Acién 1997</td>
<td>Vag. US, HSG</td>
<td>4.6*, 7.8**, 16.7***</td>
</tr>
<tr>
<td>Jurković 1997</td>
<td>3D US</td>
<td>5.4</td>
</tr>
<tr>
<td>Maneschi 1995</td>
<td>HSG</td>
<td>10</td>
</tr>
<tr>
<td>Nasri 1990</td>
<td>US</td>
<td>2.7</td>
</tr>
</tbody>
</table>

*: Previous term pregnancies, **: previous pregnancies and some miscarriage, ***: nulligravidae

Prevalence of congenital uterine malformations
Infertile population

<table>
<thead>
<tr>
<th>Author</th>
<th>Method</th>
<th>Incidence %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tulandi 1980</td>
<td>HSG</td>
<td>1.0</td>
</tr>
<tr>
<td>Sørensen 1981</td>
<td>HSG</td>
<td>2.9</td>
</tr>
<tr>
<td>Raga 1996</td>
<td>HSG, Vag. US, 3D US</td>
<td>26.2</td>
</tr>
<tr>
<td>Acién 1997</td>
<td>HSG, Vag. US</td>
<td>16.0</td>
</tr>
</tbody>
</table>
Prevalence of congenital uterine malformations

RM population

<table>
<thead>
<tr>
<th>Author</th>
<th>Method</th>
<th>Incidence %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clifford 1994</td>
<td>HSG, Vag US</td>
<td>1.8</td>
</tr>
<tr>
<td>Raga 1997</td>
<td>HSG, HSC, LEP</td>
<td>6.3</td>
</tr>
<tr>
<td>Acién 1997</td>
<td>HSG, Vag, US</td>
<td>25.4</td>
</tr>
</tbody>
</table>

Prevalence of different types of uterine malformations

<table>
<thead>
<tr>
<th>Author</th>
<th>Method</th>
<th>Arcuate %</th>
<th>Septate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exalto 1978</td>
<td>US, Lap</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>Acién 1996</td>
<td>Vag US, HSG</td>
<td>27.1</td>
<td>17.1</td>
</tr>
<tr>
<td>Raga 1997</td>
<td>HSG, HSC</td>
<td>53.8</td>
<td>25.6</td>
</tr>
<tr>
<td>Vercellini 1999</td>
<td>HSC</td>
<td>8.1</td>
<td>54.2</td>
</tr>
</tbody>
</table>

AFS Classification

Class I: segmental agenesis and variable degrees of uterovaginal hypoplasia

Class II: unicameral uterus (partial or complete unilateral hypoplasia)

Class III: double uterus (duplication of the uterovaginal canal results from incomplete fusion of the müllerian ducts.)

Class IV: bicornuate uterus (incomplete fusion of the uterovaginal canal)

Class V: septate uterus (the external shape of the uterus is a single unit. [distinct from the bicornuate uterus which can be seen branching into two distinct horns when viewed from the outside])

Class VI: arcuate uterus (the uterus is essentially normal in shape with a small, midline indentation in the fundus which results from failure to completely dissolve the median septum.)
This classification consider only complete septum or partial. The term “arcuate uterus” has been abandoned, considered to be a radiologic diagnosis.

Class I: Dysgenesis of Muellerian Ducts: Includes agenesis of uterus and vagina (Mayer – Rokitansky – Kuster – Hauser syndrome)
Class II: Disorders of the Vertical Fusion of the Muellerian Ducts: transverse vaginal septum, cervical agenesis or stenosis
Three asymmetric obstructions: Unicornuate uterus, unilateral obstruction of a cavity of double uterus, unilateral vaginal obstruction
Five symmetric unobstructed disorders: Didelphic ut., Septate ut., Bicornuate ut., T shaped and unicornuate with rudimentary horn
Class IV: Unusual Configuration of Vertical – Lateral Fusion Defects: unusual configuration of abnormalities

Which is the best diagnostic tool?
HSG: Characterization of uterine anomalies can be difficult, however, especially regarding the differentiation of a septate from a bicornuate uterus (Pellerito 1992).

Vaginal US: reported accuracy of approximately 90%–92% (Pellerito 1992).

### Diagnostic “office” hysteroscopy

- Visual confirmation of US findings
- Elective in case of uncertain ultrasound
- High compliance of patients. No need of anesthesia or analgesia.

### 3D US

3D ultrasound is a reproducible method for the diagnosis of congenital uterine anomalies and for the measurement of uterine cavity dimensions. (Salim et al. 2003)

In experienced hands, a sensitivity of 93% and a specificity of 100% have been achieved. (Kupelvić and Kurjak 2000)
MRI
Magnetic resonance imaging (MRI) has a reported accuracy of up to 100% in the evaluation of muellerian duct anomalies (Fedele et al. 1989)

Complex anomalies and secondary diagnoses such as endometriosis can often be optimally characterized noninvasively. (Troiano and McCarty 2004)

WHEN IN NECESSARY TO TREAT?

When in necessary to treat?

<table>
<thead>
<tr>
<th>Author</th>
<th>Miscarriage</th>
<th>Preterm d.</th>
<th>Author</th>
<th>Miscarriage</th>
<th>Preterm d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fayez 1986</td>
<td>80.5%</td>
<td>9.5%</td>
<td>Fedele 1987</td>
<td>9.1%</td>
<td>5%</td>
</tr>
<tr>
<td>Perino 1987</td>
<td>88.8%</td>
<td>11.1%</td>
<td>Daly 1989</td>
<td>20.2%</td>
<td>70.8%</td>
</tr>
<tr>
<td>Daly 1989</td>
<td>88.7%</td>
<td>11.7%</td>
<td>Fedele 1993</td>
<td>33.2%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Gribova 1996</td>
<td>32.7%</td>
<td>44.5%</td>
<td>Gribova 1998</td>
<td>25.0%</td>
<td>4.4%</td>
</tr>
</tbody>
</table>
### Uterine anomalies – rationale for treatment

The distortion of uterine anatomy is more severe in congenital anomalies, which are found in women with a history of recurrent first trimester miscarriage.

The degree of distortion of uterine architecture was quantified by the ratio \( \frac{F}{F+C} \), where \( F \) was the length of the uterine septum or depth of the fundal indentation and \( C \) was the length of the remaining uterine cavity.

(Salim et al 2003)

\[
\frac{F}{F+C}, \text{ where } F \text{ was the length of the uterine septum or depth of the fundal indentation and } C \text{ was the length of the remaining uterine cavity}
\]

### AIM OF THE STUDY

Aim of the study was to verify whether hysteroscopic metroplasty could be advantageous in treatment of primary and secondary infertility in term of shortening of pregnancy seeking time and reduction of spontaneous miscarriage rate.
Mean duration of infertility before (red) and after (blue) hysteroscopic metroplasty

Median time for achieving a spontaneous pregnancy was 18.0 months (range 2-120) before metroplasty and 4.0 months (range 0-39) after metroplasty (p<0.001)

Pregnancy seeking before and after metroplasty - nulligravidae

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Large septum (Group 1)</th>
<th>Medioder nobr (Group 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before metroplasty</td>
<td>After metroplasty</td>
</tr>
<tr>
<td>Pregnancies</td>
<td>157</td>
<td>159 (137 women)</td>
</tr>
<tr>
<td>Deliveries</td>
<td>135 (10.8%)</td>
<td>143 (11.6%)</td>
</tr>
<tr>
<td>Abortions</td>
<td>3 (2.7%)</td>
<td>23 (18.9%)</td>
</tr>
<tr>
<td>Ectopic pregnancies</td>
<td>4 (4.5%)</td>
<td>4 (2.7%)</td>
</tr>
</tbody>
</table>

Statistics

<table>
<thead>
<tr>
<th></th>
<th>Group 1, before vs. after metroplasty</th>
<th>Group 2, before vs. after metroplasty</th>
<th>Before vs. Group 1</th>
<th>Before vs. Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy seeking duration (Mann Whitney test)</td>
<td>4.0/0.001</td>
<td>4.0/0.001</td>
<td>p&lt;0.001</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Pregnancy failure rate (χ² test)</td>
<td>3.0/0.03</td>
<td>3.0/0.03</td>
<td>3.0/0.03</td>
<td>3.0/0.03</td>
</tr>
</tbody>
</table>
WHY SEEMS TO BE INDEPENDENT FROM THE SIZE?

MRI ULTRASTRUCTURE

- MRI intensity similar to the myometrium (Carrington et al. 1990)

ENDOMETRIUM COVERING SEPTUM

- Fedele described a morphological alteration of mucosa covering the septum (Fedele et al. 1996).
**VASCULARIZATION**

- Increased miscarriage rate could be consequence of a disrupted vascular architecture within septa (Fayez et al. 1986)

**ROLLING AND TETHERING**

The mechanism of the trophoblast invasion has analogies with the rolling and tethering of leucocytes on blood vessels (Red-Horse et al. 2004). Could be that septum covering endometrium cannot express ligands such MECA 79 recognized antibodies that recognize L selectin expressed on blastocyst surface (Red-Horse et al. 2004)

**INVASION OF UTERUS**
CONCLUSION

Uterine congenital anomalies seem to be an important factor of pregnancy failure and metroplasty seems to improve dramatically the outcome of pregnancies. In front of the benefit of favourable pregnancy outcome after metroplasty, at least vaginal ultrasound should be performed in all cases with history of spontaneous abortion. In case of positive US, office diagnostic hysteroscopy should be performed even after first abortion.

CONCLUSION

The long duration of infertility before surgery, absence of other factors to explain their not conceiving, and short time interval subsequent to surgery in which conception occurs, suggests metroplasty has value in treatment of patients with septa and otherwise unexplained infertility.

CONCLUSION

No differences have been found between women with large septa and those with arcuate uterus either in the obstetric anamnesis before metroplasty or in the outcome after metroplasty. Further studies are needed to assess why the mechanisms that lead to miscarriage seem to be independent from the size of septum.
HOME
Hysteroscopic Operative Myometrial Exploration in the infertile patient?

Rudi Campo, MD
Leuven Institute for Fertility and Embryology
LIFE
Leuven - Belgium

ESHSRE, 25th annual meeting
Amsterdam, June 28–July 1, 2009

Is the myometrium a homogeneous smooth muscle mass?

Normal myometrium is seen as a homogenous structure in ultrasound

NMR divides the normal myometrium in 2 different entities
Myometrium 2 structural entities

- Small central zone of increased density
- Larger outer hypodenser zone

THE JUNCTIONAL ZONE

Different structure and function

- High nuclear/cytopl. ratio
- Decreased extracellular matrix
- Low water content

Junctional Zone Myometrium

Functional important entity in reproduction
- Ontogenetically related to endometrium
- Cyclic changes in SSH receptors
- Role in gamete transport and implantation
- Early changes from time of implantation
**Junctional Zone Myometrium**

**Important role in Reproduction**

- Functional important entity in reproduction
- Early changes from time of implantation
- Decidualisation and trophoblast invasion
- Defective transformation of JZ spiral arteries in spectrum of pregnancy complications

**THE OUTER MYOMETRIUM**

**Less important role in reproduction**

- Muscle contractions during delivery

**Junctional Zone Pathology**

- **Myoma**

  - Normal JZ
  - JZ lesion
  - Outer myometrium lesion
Adenomyosis uteri

Junctional Zone Pathology

Normal JZ  Focal lesion  Diffuse enlargement of Junctional zone

First line - ONE STEP – procedure

Ultrasound  Fluid Mini – Hysteroscopy  Kontrast sonography

HOME  Exploration of sub endometrial myometrium

low risk – low cost – high compliance
Proper Uterine diagnosis?

Ultrasound
Distortion of homogenous myometrium?
Myometrial thickness?

Hysteroscopy
Cavity form?
Subtle lesions?

Contrast sonography
Cavity form?
Measure Intracavitary lesions.

Proper uterine diagnosis?

Fluid mini-Hysteroscopy
Subtle lesions??

effect of magnifying and hydroflotation
Subtle lesions

clinical significance unclear but could be associated with infertility.

- Diffuse polyposis
- Strawberry pattern
- Hypervascularization
- Mucosal elevation
- Endometrial defects
- Others

Diffuse polyposis

Strawberry pattern
Mucosal elevation

marked localised vascular pattern

Endometrial defects
Subtle lesions a sign for Junctional Zone Pathology?

When do we have to enlarge the diagnosis

Ultrasound
Distortion of homogenous myometrium
Increased myometrial thickness >15mm

Hysteroscopy
Endometrial defect
Reddish endometrium of unknown origin
Subtle cystic lesions
Localised vascular pattern

Proper Uterine diagnosis?

How to enlarge diagnosis?

NMR
Diffuse enlargement of uterine wall
Subtle endometrial lesions with normal ultrasound

HOME
“Hysteroscopic Operative myometrium exploration”
Subtle endometrial lesions.
Focal subendometrial lesion seen in ultrasound or MRI.
Hysteroscopic Operative Myometrial Exploration

- 4 important conditions
- Ambulatory or office endoscopic unit
- Watery (Saline) distension medium
- Small diameter instrumentation with high optical quality
- Atraumatic technique

Ambulatory Endoscopic Unit

See and threat

Separate surgical room, Only sedation

Watery distension medium

- Grade A evidence
- Less painful!!
- Hydro-flotation subtle lesions!!
- Saline for bipolar surgery
**HOME**

**Instrumentation**

<table>
<thead>
<tr>
<th></th>
<th>2.0 mm</th>
<th>2.9 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° rod lens optic:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operative 5 Fr. single flow sheath:</td>
<td>3.6 mm</td>
<td>4.3 mm</td>
</tr>
<tr>
<td>Operative continuous flow sheath:</td>
<td>4.2 mm</td>
<td>5.0 mm</td>
</tr>
</tbody>
</table>

**HOME**

**5 French Mechanical probes**

**HOME**

**5 French Bipolar probes**
HOME
5 French Bipolar coagulation probe.

HOME
Bipolar Resectoscope

HOME
Hysteroscopic Operative Myometrial Exploration
23-year-old patient of Indo-African origin with a primary infertility of 20 months. A cystic lesion is seen at HSC.

Pathology of subtle lesion seen at HSC revealed adenomyosis. Spontaneous pregnancy occurred within 3 months after hysteroscopic removal of subtle lesion.
HOME
Subtle lesions and adenomyosis?

HOME
Exploration of subtle lesions

HOME
Resection of subtle lesions
DD adenomyoma - myoma

Focal subendometrial myometrial pathology seen at MRI

Subtle lesions

Exploration with scissors

Removal of 2 other myomas
Exploration of JZ myometrium for differential diagnosis

Conclusions 1

Diagnostic fluid mini-hysteroscopy is an accurate tool with high visualisation capacity for subtle lesions.

See and treat can be done in an ambulatory environment under conscious sedation.
Conclusions 2

MRI divides the myometrium in two structural and functional different zones.

Especially in the field of reproductive medicine the exploration of the junctional zone myometrium seems an interesting idea.

Conclusions 3

Mini Hysteroscopy in combination with ultrasound provides the possibility to enlarge the diagnostic procedure with a minimal invasive surgical act aiming an endoscopic inspection of the sub endometrial myometrium with resection of suspicious myometrial areas for histological examination.

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