Congenital Uterine Anomalies

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Congenital Uterine Anomalies - Overview

- Introduction
- Normal Findings
- Pathologic Findings
- Embryology
- Prevalence
- Anatomy
- Nomenclature
- Classification
- 3D Diagnosis
- Measuring System
- Fundus Thickness
- Therapy Measure Based
Introduction
Everything is possible, nothing is impossible ...

Functional endometrium **without** outside communication:
• Symptoms occur with menarche, mostly pain
• Typically pediatric patient
• Often misinterpreted as endometriosis
• Often surgery needed

_____________________________________________________

Functional endometrium **with** outside communication:
• Symptoms (if ever) will occur clearly after menarche, often related to in-/fertility and bleeding disorders
• Typically in adult patients
• Indication for surgery under hot debate ...
CUA?

Case
28y Women, Wish for Child, 14th Day

sagittal

transversal
28y Women, Wish for Child, 14th Day

ESGE/ESHRE: U0, normal uterus
AFS/ASRM: VI, arcuate uterus
Normal Findings
Transversal: fundal to cervical
Sagittal: right to left
transversal: fundal to cervical

sagittal: right to left
ESHRE/ESGE: normal uterus, U0
ASF: -, ASRM: normal uterus
Pathologic Findings
Pathologic Findings

Case 1
Transversal: up > down
Sagittal: right > left
CUA? – 2D TVS

Transversal: up > down

Sagittal: left > right
CUA – 2D TVS

2D sagittal median

3D transversal virtual

ESGE / ESHRE  Partial septate uterus U2a
AFS / ASRM  Partial septate uterus Vb
CUA - 3D TVS

3D transversal virtual

virtual 3D layers & 3D volume

virtual 3D volume

ESGE / ESHRE  Partial septate uterus U2a
AFS / ASRM  Partial septate uterus Vb
25mm  Individual total fundus thickness
13mm  Part of the septum to be resected
12mm  Remaining anatomical fundus thickness = goal of anatomical septum resection

Bajka M, Badir S.
Fundus thickness assessment by 3D transvaginal ultrasound allows metrics-based diagnosis and treatment of congenital uterine anomalies.
Uterus Septum Treatment - Before and After

Bevor ...

After ...
2012, 2nd pregnancy, last before septum resection, 6+5

2014, 3rd pregnancy, 1st after septum resection, 6+3
Uterus Septum Treatment - Follow Up

Pre-treatment...

Post-treatment, at 3m...

After 2y...

After 5y...
Pathologic Findings

Case 2
Case 2

38y pat, 1 child born at 33w, reg MPA injections, amenorrhea
Case 2

ESGE/ESHRE: U4b, hemi uterus with no rudimentary cavity
ASF/ASRM: IIId, unicornuate, no horn
Pathologic Findings

Case 3
Case 3

35y pat, after prim C-section at 38+1, **CUA?**

Transversal fundal

Transversal cervical
Case 3

35y pat, CUA, after prim C-section at 38+1, 2nd pregnancy 6+1

ESGE/ESHRE: U2b C2 V1
AFS/ASRM: Va
Case 3

35y pat, CUA, 2nd pregnancy 9+3 gemini mono-di, after prim C-section at 38+1

ESGE/ESHRE: U2b C2 V1
AFS/ASRM: Va
Congenital Uterine Anomalies

Quiz
Case 1

Transverse view

Sagittal view

Coronal view

cranial

right

caudal

left

ESGE/ESHRE:
AFS: -, ASRM:

Grigoris F. Grimbizis, Rudi Campo, Basil C. Tarlatzis, Stephan Gordts, Editors.
Female Genital Tract Congenital Malformations. Classification, Diagnosis and Management.
Case 2

ESGE/ESHRE:
AFS: -, ASRM:

Grigoris F. Grimbizis, Rudi Campo, Basil C. Tarlatzis, Stephan Gordts, Editors.
Female Genital Tract Congenital Malformations. Classification, Diagnosis and Management.
Case 3

Transverse view

Sagittal view

Coronal view

cranial
right
caudal
left

ESGE/ESHRE:
AFS: -, ASRM:
Congenital Uterine Anomalies

Embryology
At 6 - 9 weeks of gestation:
Müllerian ducts appear and there is a caudal midline fusion and connection with the urogenital sinus.
So, failure of development of the Müllerian ducts during this period leads to uterine hypoplasia / aplasia.

At 10 - 13 weeks of gestation:
Upward fusion of the caudal parts of the Müllerian ducts.
Any failure of fusion during this period of time leads to uterine duplications (didelphys, bicornuate uterus).

At 14 - 18 weeks of gestation:
Resorption of the medial septum forms the utero-vaginal channel uterine cavity and superior 2/3 of the vagina).
Failure of resorption of the midline septum leads to uterine septation (septate uterus).

RELYING ON
Crosby, W.M., Hill, E.C.
Embryology of the Müllerian duct system.
“There are intermediate and incomplete forms of bicornuate and septate uteri, due to simultaneous lack of fusion and reabsorption of paramensonephric (Müllerian) ducts ...”

Prevalence
### Prevalence (new DX per 100, %)

94 studies, n = 89'861

<table>
<thead>
<tr>
<th>Category</th>
<th>Prevalence</th>
<th>Septate</th>
<th>Arcuate</th>
<th>Bicornuate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>general population and/or fertile women</strong></td>
<td>5.5%</td>
<td>2.3%</td>
<td>3.9%</td>
<td>0.2%</td>
</tr>
<tr>
<td><strong>women with infertility</strong></td>
<td>8.0%</td>
<td>3.0%</td>
<td>1.8%</td>
<td>1.1%*</td>
</tr>
<tr>
<td><strong>women with miscarriage</strong></td>
<td>13.3%</td>
<td>5.3%*</td>
<td>2.9%</td>
<td>2.1%*</td>
</tr>
<tr>
<td><strong>women with infertility &amp; miscarriage</strong></td>
<td><strong>24.5%</strong></td>
<td><strong>15.4%</strong>*</td>
<td>6.6%</td>
<td>4.7%*</td>
</tr>
</tbody>
</table>

*statistically significant

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Chan YY, Jayaprakasan K., Zamora J, Thornton JG, Raine-Fenning N, Coomarasamy A.  
The prevalence of congenital uterine anomalies in unselected and high-risk populations: a systematic review.  

➢ Strong indication for evaluation of the fundus!
Classification of uterine malformations according to the American Fertility Society 1988
relying on embryological, clinical factors, prognosis & treatment options

I Hypoplasia/agenesis
(a) Vaginal
(b) Cervical
(c) Fundal
(d) Tubal
(e) Combined

II Unicornuate
(a) Communicating
(b) Non-communicating

III Didelphys

IV Bicornuate
(a) Complete
(b) Partial

V Septate
(a) Complete
(b) Partial

VI Arcuate

VII DES drug related

Three-dimensional ultrasound in the diagnosis of Müllerian duct anomalies and concordance with magnetic resonance imaging.

The American Fertility Society classifications of adnexal adhesions, distal tubal obstruction, tubal occlusion secondary to tubal ligation, tubal pregnancies, Mullerian anomalies and intrauterine adhesions.
CUA – Prevalence of Classes

Bicornuate uteri IV 15%
(partially) septate uteri V 44%
arculate uteri VI 33%

> 90% of all CUA

Term Delivery Rates

- No CUA: Overall, ca. 80%
- Untreated CUA: Overall, ca. 50%
  - Arcuate uterus, ca. 65%
  - Unicornuate and didelphys uterus, ca. 45%
  - Untreated bicornuate and septate uterus, ca. 40%
- Septate uteri after OP HSC septum resection: Almost normal prognosis restored, ca. 75%
Congenital Uterine Anomalies

Anatomy
CUA - Anatomy

Outer uterine contour
- V indentation

Inner uterine contour
- V protrusion/septation

FTH Fundus thickness

Clinical examination

2D / 3D US
Congenital Uterine Anomalies

Nomenclature
CUA - Nomenclature

Genital Tract Anomalies (GTA)

Müller Duct Anomalies (MDA)

Congenital Uterine Anomalies (CUA)

Cave: inconsistent use of nomenclature & classification terms!
CUA - Nomenclature

Uterus duplex unicollis

Uterus duplex with double vagina

Uterus didelphys

Uterus septus with single vagina

Uterus subseptus

Uterus arcuatus

Uterus unicornis with rudimentary contralateral hemiuterus

+/− slightly different terms & imprecise definitions = inconsistent nomenclature!
Classification 1
CUA Classification – AFS

1988

Base: HSG
Classification of uterine malformations according to the American Fertility Society 1988
relying on embryological, clinical factors, prognosis & treatment options

MÜLLERIAN ANOMALIES

The reason for providing a standardized classification is its value to the practicing physician. It should be simple to use to promote compliance and flexible enough to provide the capacity to fit almost "every" possibility. A frequently used classification by Strassman26 grouped the anomalies into the symmetric double malformations (didelphys, bicornuate, septate) or the asymmetric ones (unicornuate with or without a rudimentary horn).

This resulted in a reduction in the amount of available information that reached the literature because of arbitrary groupings, particularly with regard to the bicornuate and septate uteri. Consequently, if the clinician wishes to inform, for example, a patient with a unicornuate uterus with a rudimentary functional horn of her prognosis, the sources are limited to individual case reports or a single series containing few cases. Few reports in the literature provide useful data for separate uterine malformations26-29. The conclusions reached in these individual series vary greatly because they are based on such a small number of observations.

An easy-to-use flexible system will allow the clinician to group cases with others so that in the future appropriate conclusions can be reached based on adequate numbers. This classification (Table 5) organizes the anomalies according to the major uterine anatomic types. It allows the user to indicate the malformation type as well as the associated variations involving the vagina, cervix, tubes, ovaries, and urologic system. Later, when data is compiled, a unique "computerizable" code can be generated for reporting purposes.

The classification committee had difficulty deciding how to include the arcuate uterus. Because the arcuate uterus is externally unified, it could be classified as a form of a partial septate uterus. However, since in contrast to the other malformations, the arcuate uterus appears to behave normally, it was thought that it should be classified separately for the present. Thus, data can be generated that can be used to determine if it should remain in a classification of abnormal uterine malformations or is a variant of normal anatomy.
In 1988, the ASF produced a standard form for classification of Müllerian duct defects

- It is well established and very popular among clinical & interventional studies

- Only «soft» definitions by pictures!
- The normal uterus is not defined
- Only corpus/fundus associated anomalies are included. Vagina, cervix, fallopian tubes, and renal system have to be described separately

The American Fertility Society classifications of adnexal adhesions, distal tubal obstruction, tubal occlusion secondary to tubal ligation, tubal pregnancies, Müllerian anomalies and intrauterine adhesions.
CUA – AFS Based Basic Therapy

• Recommendations for surgical interventions base on CUA classifications, mostly on the 1988 ASF Classification

• Therapy
  Very simplified ...
  - (partially) septate uteri qualify for OP HSC septum resection (metroplasty)
  - bicornuate eventually for OPEN metroplasty
  - arcuate for no surgery.

The American Fertility Society classifications of adnexal adhesions, distal tubal obstruction, tubal occlusion secondary to tubal ligation, tubal pregnancies, Mullerian anomalies and intrauterine adhesions.
2009

Base: 3D TVS
New Outpatient Subclassification System for American Fertility Society Classes V and VI Uterine Anomalies

Gianpietro Gubbini MD, Attilio Di Spie zo Sardo MD, PhD *, Daniela Nascetti MD, Elena Mar ra MD, Marialuigia Spinelli MD, Elena Greco MD, Paolo Casadio MD, and Carmine Nappi MD

From the Departments of Obstetrics and Gynecology, University of Bologna (Drs. Mar ra and Casadio), Bologna; and the Department of Obstetrics and Gynecology, University of Naples “Federico II,” (Drs. Di Spie zo Sardo, Spinelli, Greco, and Nappi), Naples, Italy.

ABSTRACT  Study Objective: To produce and validate a simple, systematic and reproducible subclassification system for uterine anomalies previously classified by the American Fertility Society as Class V and VI to achieve a precise definition of each uterine anomaly, confirm the feasibility and safety of surgical correction of the anomalies, determine the type of hysteroscopic treatment, and provide a standard by which patient selection, treatment, and reproductive outcomes can be compared between centers.

Design: Descriptive study (Canadian Task Force Classification III).

Setting: Department of obstetrics and gynecology of a private clinic (hospital).

Interventions: Eighty-nine patients undergoing office hysteroscopy to assess partial or complete “double” uterine cavity.

Measurements and Main Results: One patient with a bicorneal uterus detected at ultrasonography was excluded from the study. The remaining 88 patients were classified according to our subclassification system. Seventy-three patients categorized as having Z 2 cm or greater (septum intersecting one-third of the uterine cavity or more) and Y more than 0 cm (normal or straight uterine fundus) underwent hysteroscopic and ultrasonography to combine a geometric model comprising uterine septum length (Z variable) and fundus depth (Y variable) through which a new subclassification of the uterine anomalies was elaborated.

Conclusion: Our outpatient subclassification system may address a precise diagnosis and a thorough categorization of patients with a partial or complete double uterine cavity, enabling safe and effective hysteroscopy without use of laparoscopy.
Definitions of «X» given by Gubbini et al.:
- intercornual distance ...?
- the line joining the interstitial portions of the fallopian tubes ...?
- **outer** interostial distance/line??

CUA Diagnosis – Tubal Part Intramural

Is the intramural part of the tubes visible in 3D TVS?

Typically, they are not visible

Infrequently, they are visible as broad tubes

Sporadically, they are visible as thin tubes


"... This is crucial to preserve adequate fundus thickness $Y$ (1.5 cm(!?)) to avert intraoperative uterine perforation or uterine rupture during pregnancy or labor..."

**CUA Classification – GUBBINI 3D-TVS**

<table>
<thead>
<tr>
<th>A: $Y&gt;1.5cm$</th>
<th>OHSC</th>
<th>NHSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>OHSC</td>
<td></td>
</tr>
<tr>
<td>B: $1.5cm&gt;Y&gt;0$</td>
<td>OHSC</td>
<td>NHSC</td>
</tr>
<tr>
<td>B1</td>
<td>no surg</td>
<td></td>
</tr>
<tr>
<td>B2</td>
<td>OHSC</td>
<td>NHSC</td>
</tr>
<tr>
<td>C: $0&gt;Y&gt;1cm$</td>
<td>no surg</td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OHSC = office HSC
NHSC = narcosis HSC

Fig. 2. Graphic representation of the 12 subclasses of uterine malformations based on our novel subclassification system.

Fig. 3. Classification of 88 patients according to our subclassification system.

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…According to some authors, clinicians dealing with such uterine anomalies should attempt to describe them according to their component parts rather than categorize them into the class that most approximates the dominant feature.

Our new classification system directly focuses on the architecture of the uterine cavity, describing the uterine fundus thickness (not in absolute numbers!) and the endocavitary development of the septum...

Our subclassification system has a number of advantages in terms of diagnosis of uterine anomalies because it enables differentiation between malformations previously classified to the same class in the AFS system (i.e., A1–A3 or B1–B3 or A2, B2, and C2). Furthermore, it enables diagnosis of malformations that are not suitable for surgical correction....
Congenital Uterine Anomalies

3D Diagnosis
2010

MRI, 3D TVS
• **Transvaginal** acquisition (except for three patients with intact hymen)
• Initially 2D ultrasound in **strict mid-sagittal** view, adjusting the capture window to obtain the optimal 3D volume
• **Sweep angle of 90°** bisecting the capture plane
• Anomalies with **large transverse diameter** (didelphic uterus, wide septate, bicornuate uterus, communicating unicornuate) volume obtained from a **transverse plane** so that both uterine horns could be visualized
• **Volumes manipulated** until a **satisfactory surface rendered image** was of the fundus, uterine cavity and cervical canal
• **Luminosity** and **contrast** curves adjusted for multiplanar and rendered images, and for **threshold** and **transparency**.
• Rendering modes mixture of **surface/gradient of light** of 10/60 to 60/10.
Three-dimensional ultrasound in the diagnosis of Müllerian duct anomalies and concordance with magnetic resonance imaging.

High degree of concordance between 3D US (n=286) and MRI (n=65) in the diagnosis of uterine malformations (based on AFS) (2 differences: 1x 3D US/1x MRI correct)

Relationship between cavity and fundus is visualized equally well with 3D ultrasound and MRI

3D ultrasound was of most use when distinguishing between bicornuate (IV), septate (V), and arcuate (VI)

Few differences observed only when the lower part of the uterus was studied (cervix, vagina)

3D US should be complemented always by careful gynecological exploration in order to identify any alterations in the cervix & vagina (MRI detects cervical and vaginal septa!)

3D US is cheaper and better tolerated by patients.

Radiology | Gynecology
--- | ---
1. Fundus: | MRI | 3D (2D)
2. Corpus: | MRI | 3D (2D)
3. Portio: | MRI | clinic (& 2D/3D)
4. Vagina: | MRI | clinic

Gold Standard?

Congenital Uterine Anomalies

Classification 2
CUA Classification – ESHRE/ESGE

2013

Base: 3D TVS, MRI, HSG, HSC, LSC
**GTA Classification – CONUTA (ESHRE/ESGE)**

<table>
<thead>
<tr>
<th>Main class</th>
<th>Sub-class</th>
<th>Co-existent class</th>
</tr>
</thead>
<tbody>
<tr>
<td>U0</td>
<td>Normal uterus</td>
<td><strong>C0</strong> Normal cervix</td>
</tr>
<tr>
<td>U1</td>
<td>Dysmorphic uterus</td>
<td><strong>C1</strong> Septate cervix</td>
</tr>
<tr>
<td></td>
<td>a. T-shaped</td>
<td><strong>C2</strong> Double ‘normal’ cervix</td>
</tr>
<tr>
<td></td>
<td>b. Infantilis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. Others</td>
<td><strong>C3</strong> Unilateral cervical aplasia</td>
</tr>
<tr>
<td>U2</td>
<td>Septate uterus</td>
<td><strong>C4</strong> Cervical aplasia</td>
</tr>
<tr>
<td></td>
<td>a. Partial</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Complete</td>
<td></td>
</tr>
<tr>
<td>U3</td>
<td>Bicorporeal uterus</td>
<td><strong>V0</strong> Normal vagina</td>
</tr>
<tr>
<td></td>
<td>a. Partial</td>
<td><strong>V1</strong> Longitudinal non-obstructing vaginal septum</td>
</tr>
<tr>
<td></td>
<td>b. Complete</td>
<td><strong>V2</strong> Longitudinal obstructing vaginal septum</td>
</tr>
<tr>
<td></td>
<td>c. Bicorporeal septate</td>
<td></td>
</tr>
<tr>
<td>U4</td>
<td>Hemi-uterus</td>
<td><strong>V3</strong> Transverse vaginal septum and/or imperforate hymen</td>
</tr>
<tr>
<td></td>
<td>a. With rudimentary cavity (communicating or not horn)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Without rudimentary cavity (horn without cavity/no horn)</td>
<td></td>
</tr>
<tr>
<td>U5</td>
<td>Aplastic</td>
<td><strong>V4</strong> Vaginal aplasia</td>
</tr>
<tr>
<td></td>
<td>a. With rudimentary cavity (bi- or unilateral horn)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Without rudimentary cavity (bi- or unilateral uterine remnants/aplasia)</td>
<td></td>
</tr>
<tr>
<td>U6</td>
<td>Unclassified malformations</td>
<td></td>
</tr>
</tbody>
</table>

**Associated anomalies of non-Müllerian origin:**
The ESHRE/ESGE consensus on the classification of female genital tract congenital anomalies.

GTA Classification – CONUTA (ESHRE/ESGE)

Fig. 7.17 (continued)
Normal uterus is defined
(Personal remark: External indentation up to 50% wall thickness: U0 or U1c?)

Abolition of the “arcuate uterus”: Even very small deformities of the uterine cavity could be associated with poor pregnancy outcome; the term “arcuate” is quite confusing including patients with different degrees of uterine deformity, even partial septa, since its definition is not clear at all (AFS, ...)

Thus: septate uterus includes now patients with internal midline indentation of >50% of the uterine wall thickness
(Personal remark: anatomy is defined exactly at the location of the pathology?!)  

Thus: A new subcategory “others” was added in class U1/dysmorphic uterus (U1c), giving the opportunity to include all minor deformities of endometrial cavity including internal midline indentations (less than 50% of the uterine wall thickness); the clinical value of this variant needs further clinical research.

The ESHRE/ESGE consensus on the classification of female genital tract congenital anomalies.
Fig. 7.21 Spectrum of morphology within the same class. (a–c) ESHRE/ESGE U2a. (d–f) ESHRE/ESGE U2b. (d) Broad septum with zonal anatomy. (e) Intermediate thickness of septum with unclear zonal anatomy. (f) Narrow septum, no zonal anatomy.
Objective Assessment of the Fundus

**Fig. 7.20** Assessment of the fundal myometrial thickness. (a) <50 % of the wall thickness: ESHRE/ESGE U0 normal or U1c dysmorphic uterus. (b) >50 % of the wall thickness: ESHRE/ESGE U2 septate uterus.
CUA – Detailed Description of a Case

CUA

- ESGE/ESHRE: Complete bicorporeal uterus (U3b, C0, V0)
- AFS/ASRM: Complete bicornuate uterus (IVa)

- Deutlich in zwei fast gleichgrossen Anteilen vorliegendes Corpus-Fundus uteri (rechts etwas grösser als links, uterine Cavum-Länge re 34mm, li 33mm) mit jeweils gut ausgebildeten Endometriumstreifen, jeweils deutlich nach lateral gekippt, die Separation beginnt direkt kranial der Zervix (kein klassischer Uterus duplex!)
- Zervix: normal ausgebildet (totale Länge 43mm)
- Vagina: normal ausgebildet, keine Septen darstellbar
- Ovar links: normal ausgebildet (unter OH-Suppression)
- Ovar rechts: heute nicht gesehen, zuvor dargestellt
- Tuben: nicht abgeklärt (ein HyFoSy könnte versucht werden)
- Nierenanatomie: kursorisch unauffällig
- Kohabitationsbeschwerden: keine
- Hypermenorrhoe: ausschliesslich zu Beginn der Menstruation zwei Tage (vor OH)
- Dysmenorrhoe: keine
- Schwangerschaften: bisher keine
- Konzeptionswunsch: derzeit nicht vorhanden, OH (Valette) seit diesem Zyklus im Einsatz
Congenital Uterine Anomalies

Therapy
Infertility before 2010: After 2x “blind” HSC septum resection, finally no children ...
Congenital Uterine Anomalies

Measuring System
2015

3D TVS metrics
Measuring Cross

Assessing fundus thickness (FTH)

Surgical goal:
Anatomical reconstruction, but ...

What is normal FTH?

### Normal Fundus in Premenopausal Women

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>FTH µ +/- SD [mm]</th>
<th>p-value</th>
<th>FTH minima [mm]</th>
<th>FTH maxima [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All</strong></td>
<td>100</td>
<td>12.02 +/- 2.03</td>
<td></td>
<td>6.16</td>
<td>19.43</td>
</tr>
<tr>
<td><strong>Groups</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parous</td>
<td>55</td>
<td>12.95 +/- 1.90</td>
<td></td>
<td>8.27</td>
<td>19.43</td>
</tr>
<tr>
<td>Nulliparous</td>
<td>45</td>
<td>10.92 +/- 1.86</td>
<td>&lt; 0.0001*</td>
<td>6.16</td>
<td>18.72</td>
</tr>
<tr>
<td><strong>Sub-groups according to parity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P No-LNG-IUS</td>
<td>28</td>
<td>12.4 +/- 1.90</td>
<td></td>
<td>8.27</td>
<td>17.48</td>
</tr>
<tr>
<td>P LNG-IUS</td>
<td>35</td>
<td>10.90 +/- 2.07</td>
<td>&lt; 0.0001*</td>
<td>6.16</td>
<td>18.72</td>
</tr>
<tr>
<td>0P No-LNG-IUS</td>
<td>27</td>
<td>13.38 +/- 1.89</td>
<td></td>
<td>10.48</td>
<td>19.43</td>
</tr>
<tr>
<td>0P LNG-IUS</td>
<td>10</td>
<td>11.02 +/- 1.34</td>
<td>0.02*</td>
<td>8.04</td>
<td>13.74</td>
</tr>
</tbody>
</table>

Ø FTH 12mm

(range 6.16 – 19.43mm)
# CUA – Possible Fundus Therapy

<table>
<thead>
<tr>
<th>EHSRE/ESGE classification</th>
<th>FTH assessment</th>
<th>possible consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>U0 normal uterus</td>
<td>mean 12 mm, maxima 18 mm</td>
<td>no intervention</td>
</tr>
<tr>
<td>U2 septate uterus</td>
<td>&gt; 18 mm</td>
<td>HSR, goal: new FTH of 12 mm (septum resection is completed) or resection level has reached the inner interostial line (flat inner fundus is achieved)</td>
</tr>
<tr>
<td>U3c bicorpororeal septate uterus</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bajka M, Badir S.  
*Fundus thickness assessment by 3D transvaginal ultrasound allows metrics-based diagnosis and treatment of congenital uterine anomalies.*  
CUA - Classifications and FTH - Comparison

CUA Classification – ASRM Specification

**FIGURE 1**

**Normal / Arcuate**
Depth < 1 cm
Angle > 90°

**Septate**
Depth > 1.5 cm
Angle < 90°

**Bicornuate**
Depth indentation > 1 cm

Diagrams of the ASRM definitions of normal/arcuate, septate, and bicornuate uterus based on assessment of available literature, understanding that these anomalies reflect points on a spectrum of development. Normal/arcuate: depth from the interstitial line to the apex of the indentation < 1 cm and angle of the indentation > 90 degrees. Septate: depth from the interstitial line to the apex of the indentation > 1.5 cm and angle of the indentation < 90 degrees. Bicornuate: external fundal indentation > 1 cm. Internal endometrial cavity is similar to a partial septate uterus.

*ASRM. Uterine septum. Fertil Steril 2016.*
As a result of the numerous and varied definitions and terminology used to describe septate uteri, it is challenging to interpret the data regarding pre-treatment and post-treatment outcomes and ultimately determine optimal management.

It is important when confirming the diagnosis of septate uterus that the external uterine contour as well as the internal configuration of the endometrial cavity are assessed.

The data regarding reproductive implications of a uterine septum are limited, making firm recommendations regarding treatment difficult.

Importantly, there are no prospective randomized controlled trials (RCTs) that compare surgical treatment of a septum with no intervention.

Several observational studies indicate that hysteroscopic septum incision is associated with improved clinical pregnancy rates in women with infertility. (Grade C)

Some limited studies indicate that hysteroscopic septum incision is associated with a reduction in subsequent miscarriage rates and improvement in live-birth rates in patients with a history of recurrent pregnancy loss. (Grade C)

There is insufficient evidence to conclude that obstetric outcomes are different when comparing the size as defined by length or width of uterine septa. (Grade C)

In a patient with infertility, prior pregnancy loss, or poor obstetrical outcome it is reasonable to consider septum incision. (Grade C)

In a patient without infertility or prior pregnancy loss, it may be reasonable to consider septum incision following counseling regarding potential risks and benefits of the procedure. (Grade C)
According to ASRM 2016

ASRM

Uterine septum: a guideline.
Fertil Steril 2016
The “CUA-Classification-Fight” ...

According to ASRM 2016

According to ESHRE/ESGE 2013

1. Classification means great simplification

2. We need a detailed description of the individual malformation(s) including reliable metrics

3. 3D US seem to be GYN screening method of choice

4. The rules for individual treatment should base on RCT multicenter studies relying on pre- and postoperative metric assessment with prospective evaluation of the outcome (fertility, pain reduction, IUC placement)
CUA – Proposal: Pipeline of Classification System Development

1. Consent on measuring system in 3D TVS

2. Perform measurements before and after surgery

3. Measure the outcome
   (fertility, pain/bleeding, effectiveness of IUC)

4. Define measure and outcome dependent classification system
CUA - Summary

- Screen the genital tract for anomalies by clinical examination & 2D/3D TVUS (transversal plane!) MRI only if necessary (complex malformation, unclear findings, ...)

- Describe the anomaly found in detail (& metrics!)

- Assign any abnormality to the most appropriate class and state the classification system used

- Clear inner & outer contour of the fundus, apply the measuring cross and measure the fundus thickness

- The 2013 ESHRE/ESGE GTA Classification is under evaluation
Vielen Dank für Ihre Aufmerksamkeit!