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Unicornuate uterus with non-communicating horn

Gaurie Tilak, MS3
Gillian Lieberman, MD



Outline

- **Menu of tests**
- Anatomy and embryology
- Our patient
- Companion patients
- Clinical importance



Menu of tests

- Ultrasound
- Sonohysterography
- Hysterosalpingography
- MRI



Ultrasound

- Indications: First line for imaging the female pelvis
- Preparation: Full bladder for abdominal; empty bladder for transvaginal
- Technique:
 - Transabdominal gives widest frame of view
 - Transvaginal is better to see detail
 - 3D ultrasound lets you see endometrium and myometrium in more detail



Sonohysterography

- **Indications:** Uterine polyps, submucosal fibroids, Asherman's syndromes
- **Preparation:**
 - Done during proliferative phase of menstrual cycle (0-10 days after last menstrual period) to ensure the patient is not pregnant
 - Difficult to interpret during secretory phase because endometrium is thickened
 - Cannot be bleeding because there is a theoretical risk of causing endometriosis
- **Technique:**
 - Balloon catheter is placed in endocervical canal and used to inject saline
 - Transvaginal ultrasound is used to visualize the now distended endometrial canal



Hysterosalpingography

- **Indications:** Infertility evaluation, confirmation of tubal closure devices, visualize uterine anomalies
- **Preparation:**
 - Done between days 5-10 of menstrual cycle when flow has stopped to ensure no pregnancy and minimize risk of endometriosis
- **Technique:**
 - Catheter inserted in endocervical to inject contrast
 - Key radiographic images taken
 - Pre-injection
 - Early filling phase to see any filling defects that could be obscured by contrast
 - Later filling phase to see uterine cavity and fallopian tubes



MRI

- **Indications:** Visualization of gynecologic anatomy, surgical planning
- **Preparation:** None
- **Technique:**
 - Organ anatomy best visualized on T2 images
 - Hemorrhage or fat containing lesions best seen on T1 with fat saturation

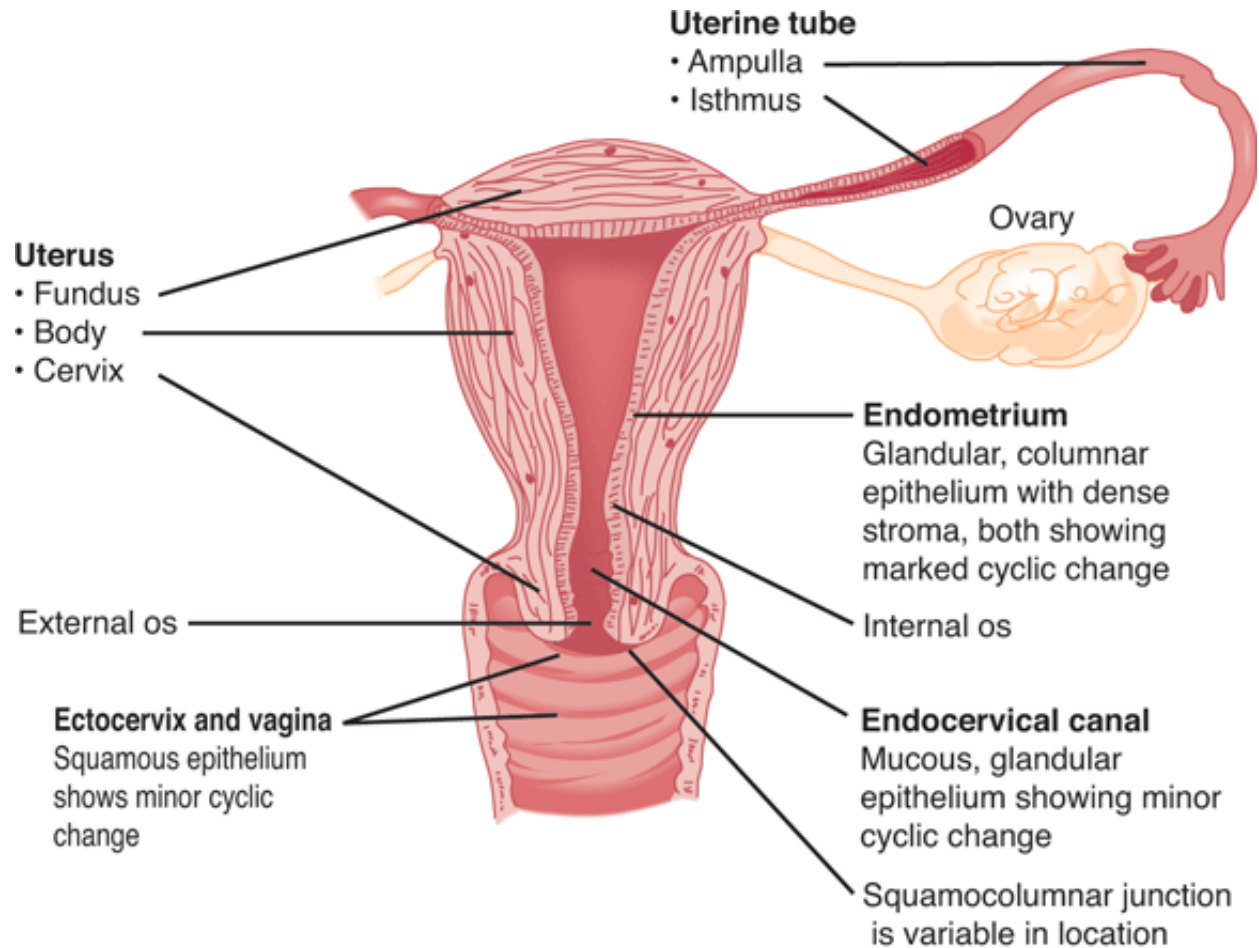


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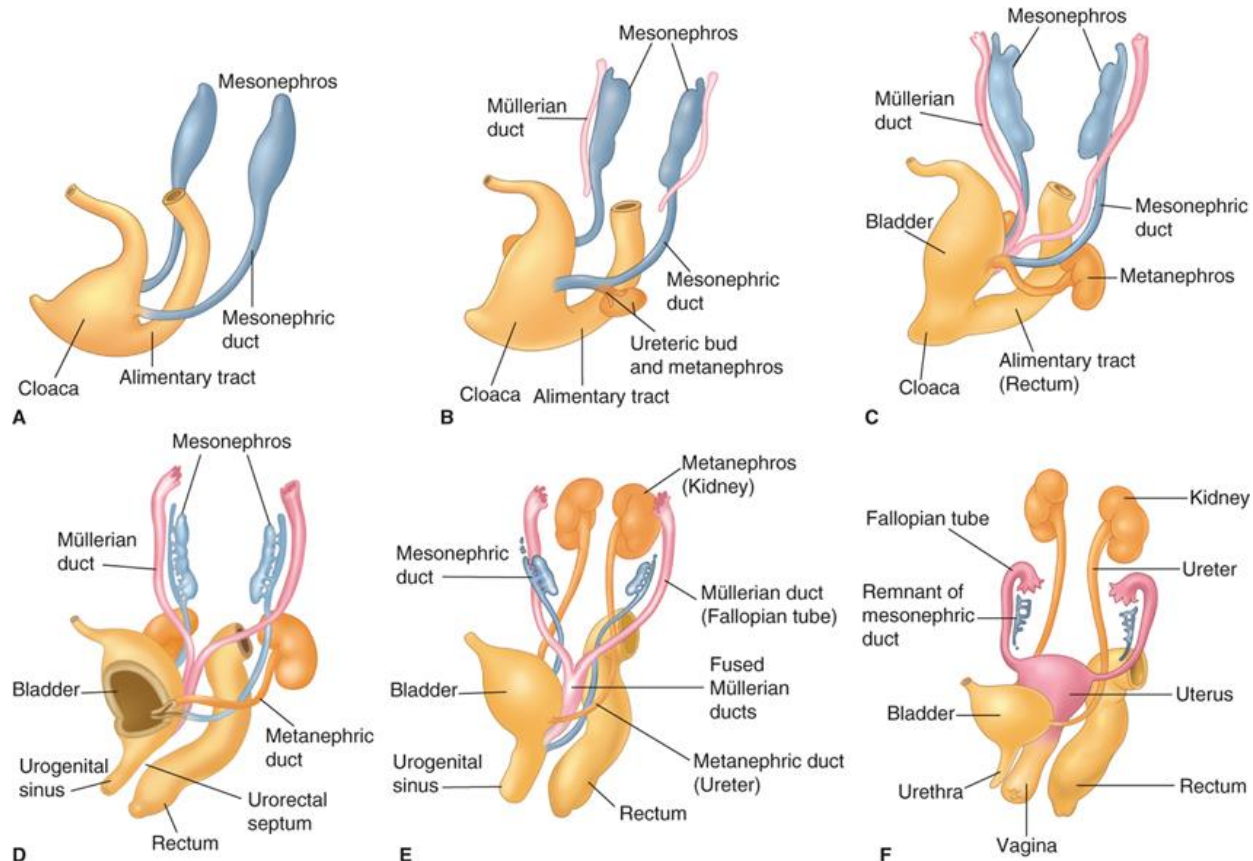
Anatomy



McPhee SJ, Hammer GD. eds. *Pathophysiology of Disease, 6e.* New York, NY: McGraw-Hill; 2010. <http://www.accessmedicine.com>



Embryology



Source: Hoffman BL, Schorge JO, Schaffer JI, Halvorson LM, Bradshaw KD, Cunningham FG: *Williams Gynecology, 2nd Edition*: www.accessmedicine.com
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From: Section 2. Reproductive Endocrinology, Infertility, and the Menopause. Williams Gynecology, 2e, 2012



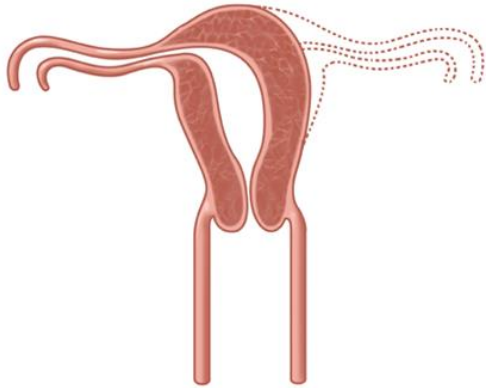
Mullerian duct anomalies

Three ways development can go wrong:

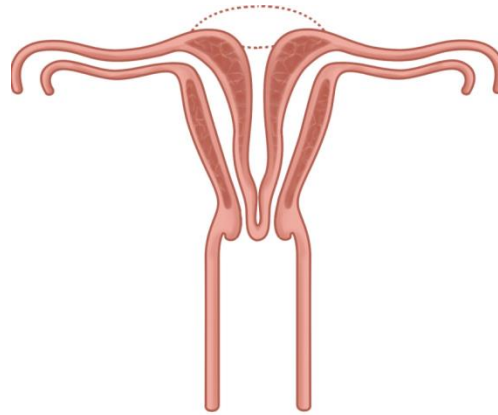
1. Mullerian ducts don't develop
2. Mullerian ducts don't fuse
3. Median septum doesn't get resorbed



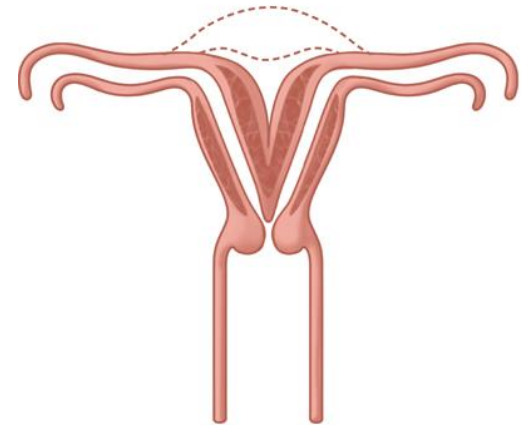
Types of anomalies



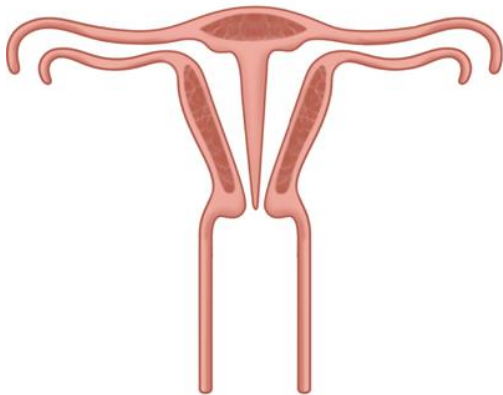
unicornuate



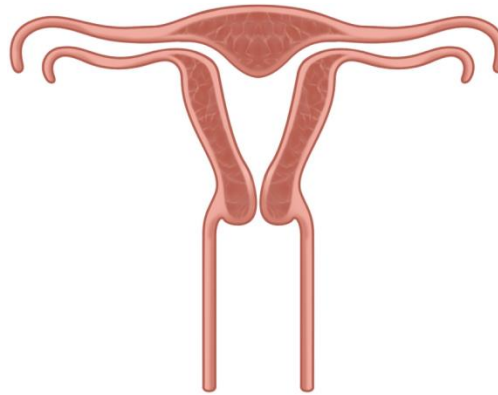
didelphys



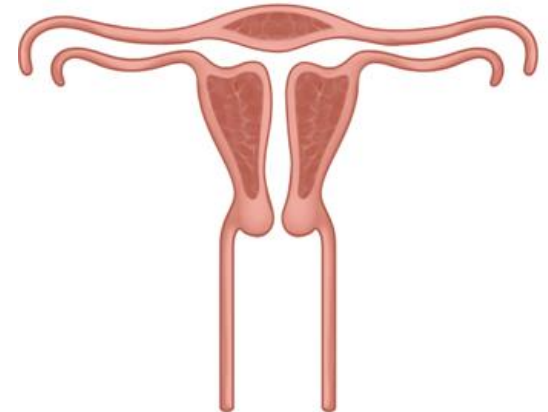
bicornuate



septate



arcuate



DES



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Our patient

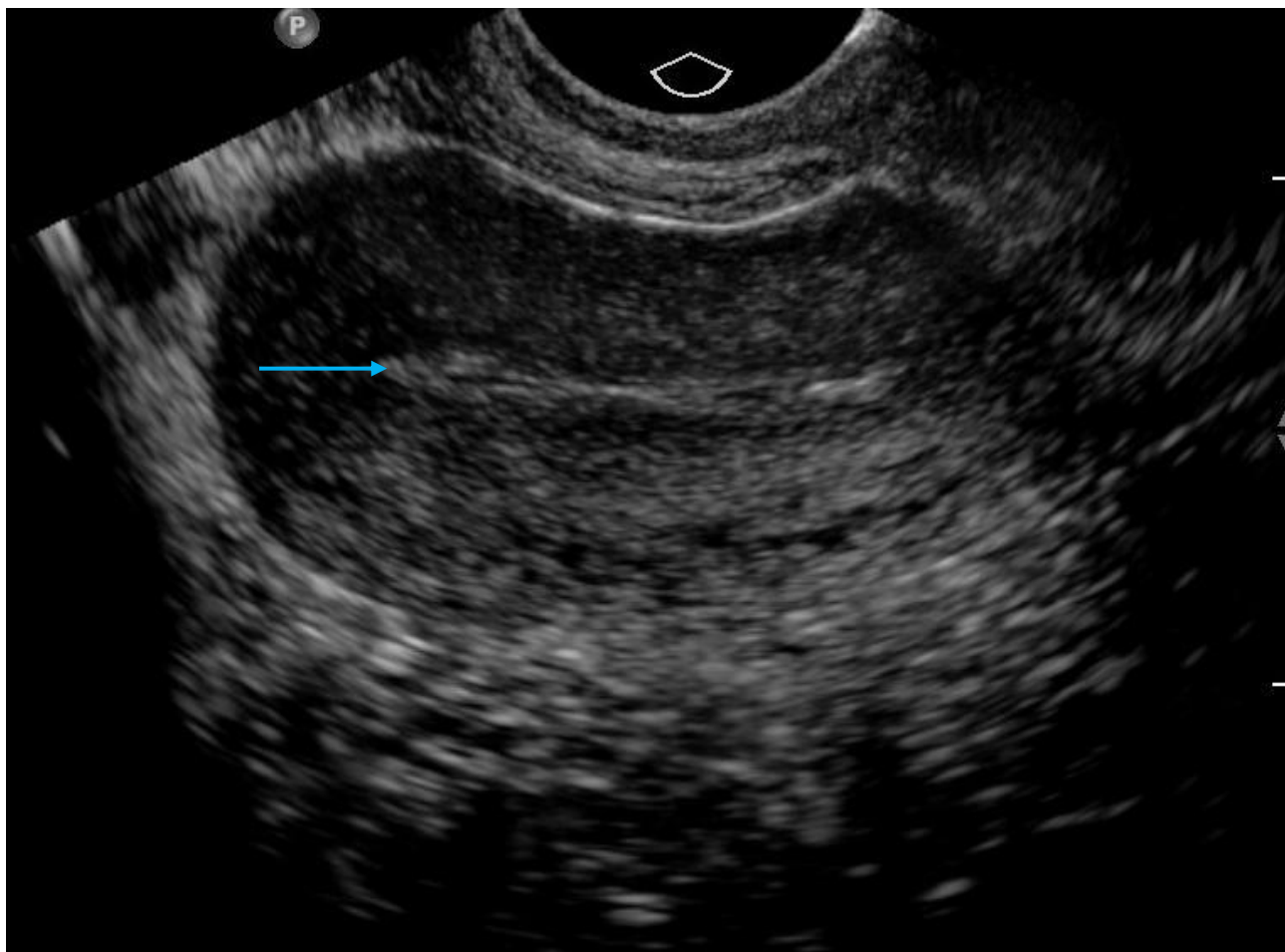
- 31 y/o female G2P1
 - Previous miscarriage
 - Required c-section at 37 weeks for 2nd pregnancy because of intrauterine growth restriction
- Anatomic anomaly noticed during c-section
 - Appeared to be unicornuate uterus with possible second, atrophic horn
 - Follow up to further characterize her anatomy
- Follow up imaging: ultrasound, sonohysterogram and hysterosalpingogram



Companion patient 1: normal ultrasound

cranial

caudal



Endometrium

Sagittal transvaginal ultrasound

From: PACS

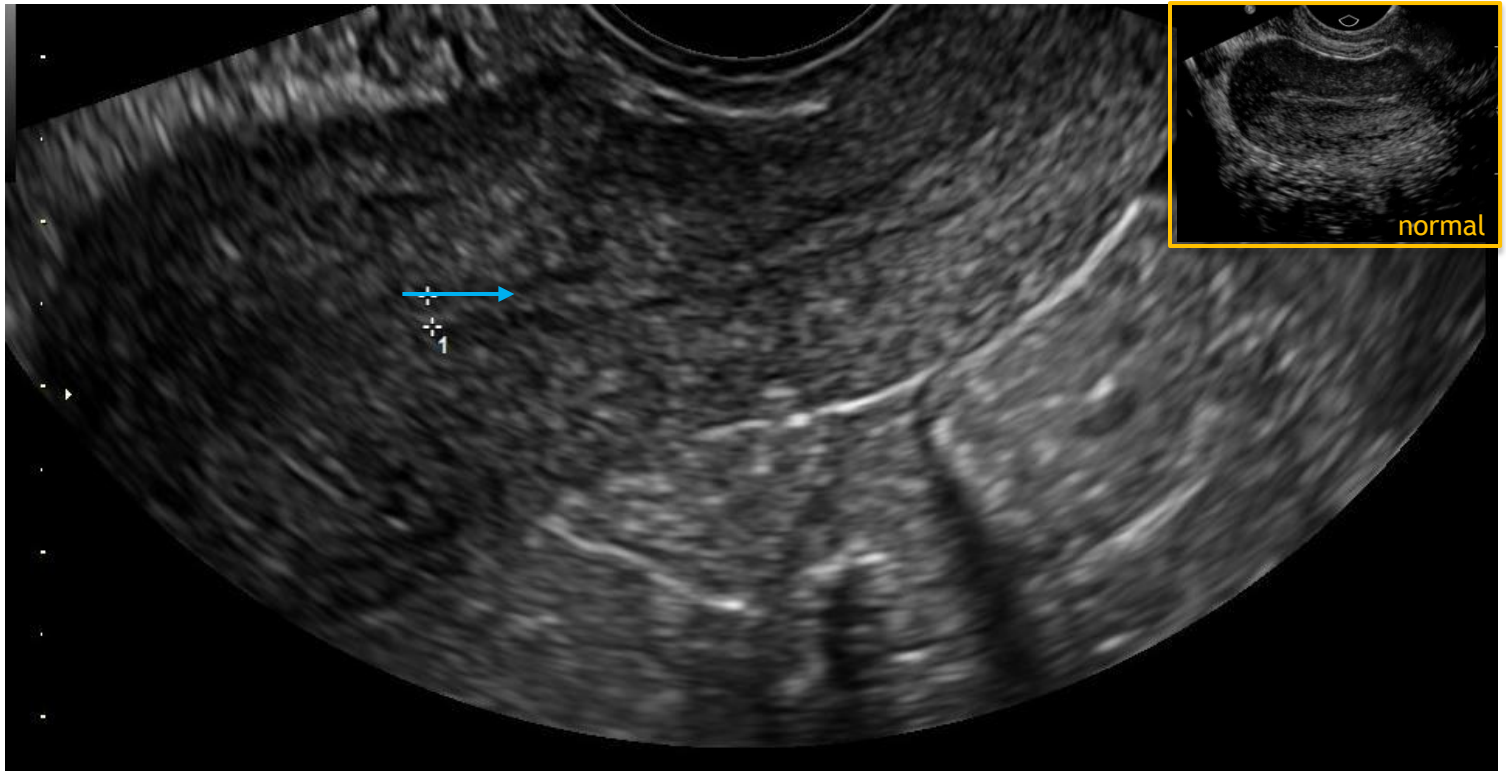


Our patient: ultrasound

cranial

caudal

Endometrium



Sagittal transvaginal ultrasound

From: PACS

The patient's ultrasound looks very similar to the normal. Her anomaly was not picked up on previous ultrasound examinations. Further imaging showed her anomaly more clearly.



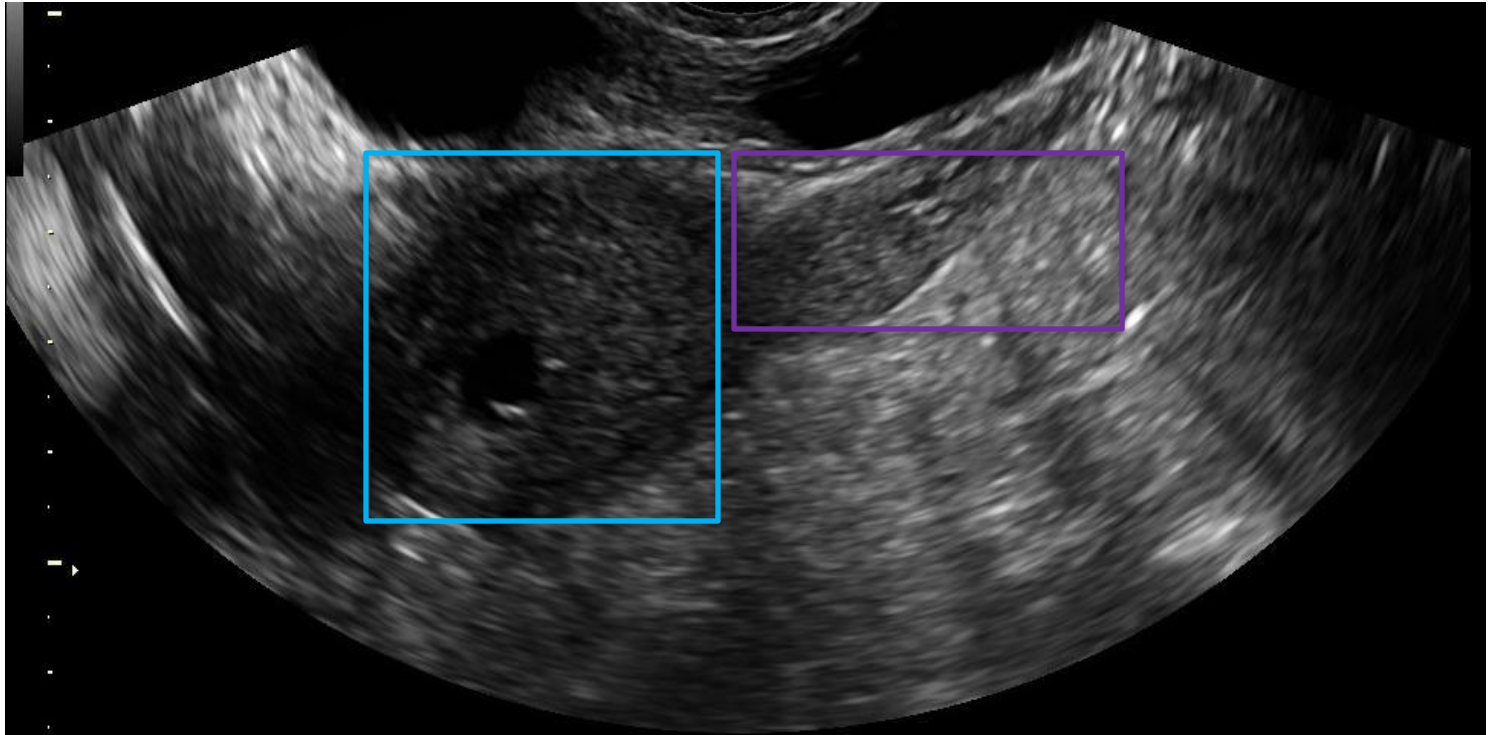
Our patient: sonohysterogram

right

left

Normal horn
with fluid
filled
endometrial
cavity

Atrophic
horn with
no visible
fluid



Transverse transvaginal ultrasound

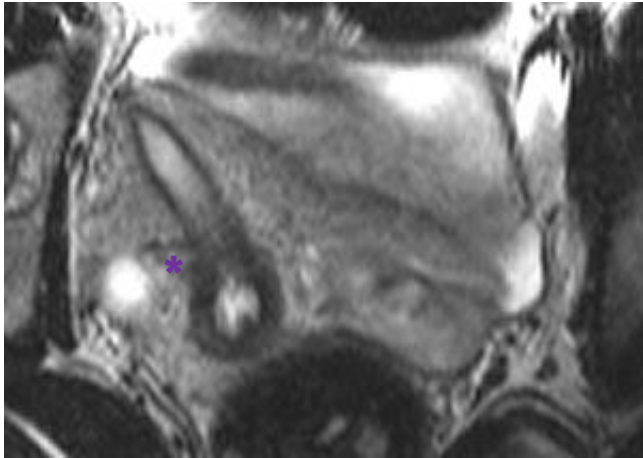
From: PACS

The sonohysterogram more clearly shows one normal uterine horn and another horn with no endometrial cavity.



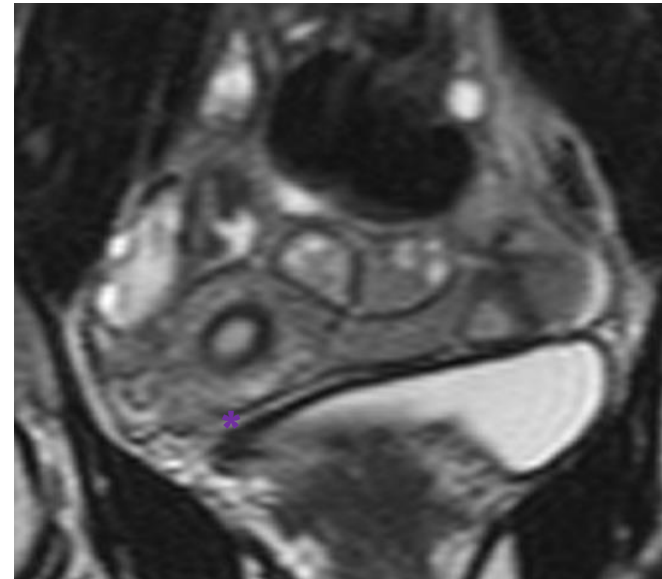
Companion patient 2: MRI

Our patient did not get an MRI. But here is what her condition would look like:



From: Deborah Levine, MD

Oblique coronal T2 MRI



From: Deborah Levine, MD

Oblique axial T2 MRI

Endometrium *

Right horn is normal with myometrium and endometrium.

Left horn has no endometrium

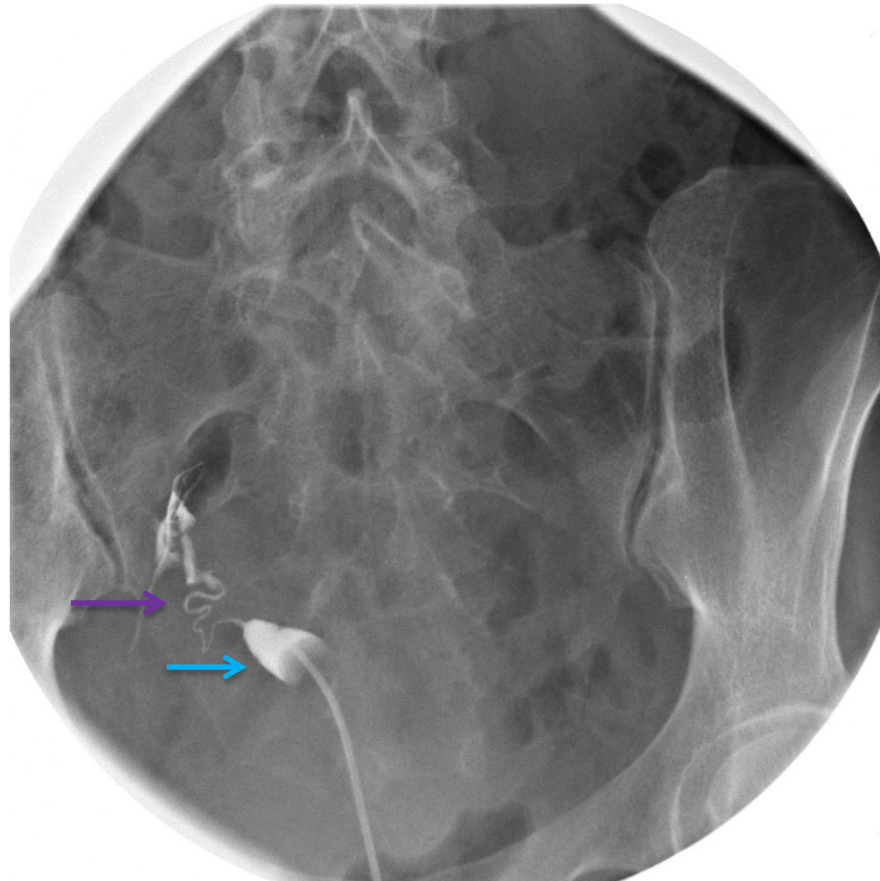


Our patient: hysterosalpingogram

No left sided endometrial cavity or fallopian tube present

Fallopian tube

Uterus



From: PACS

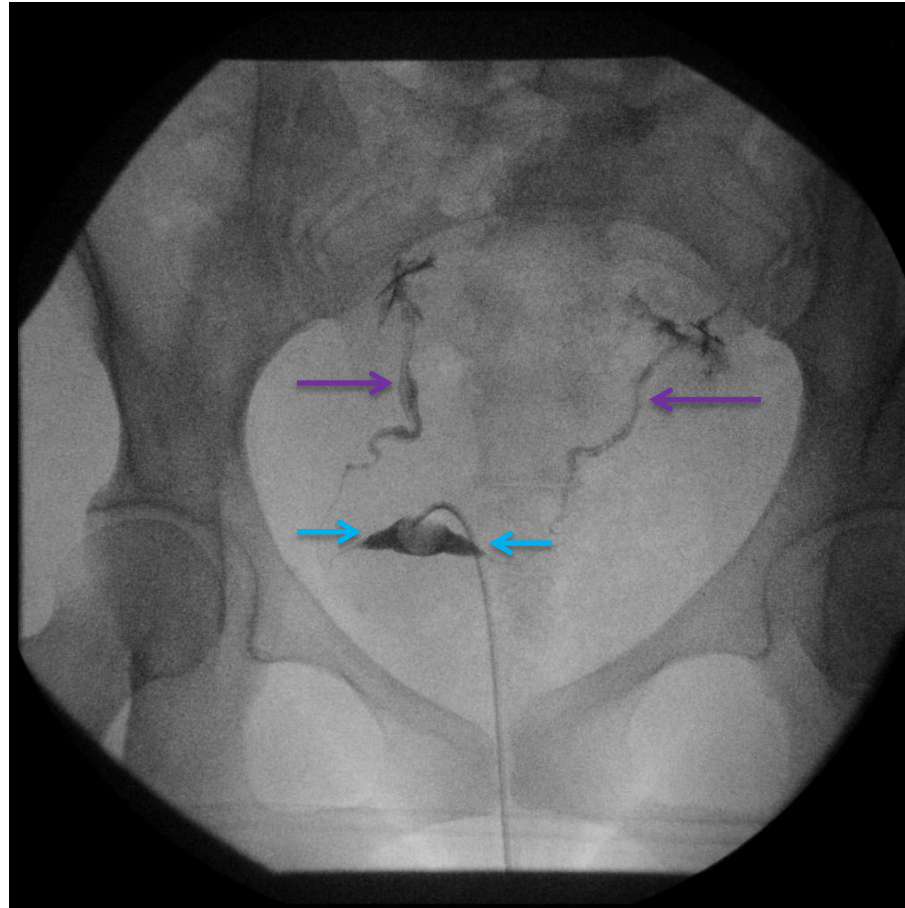


Companion patient 3: hysterosalpingogram

Endometrial cavities and
fallopian tubes present on
right and left sides

Fallopian tubes

Uterus



From: PACS



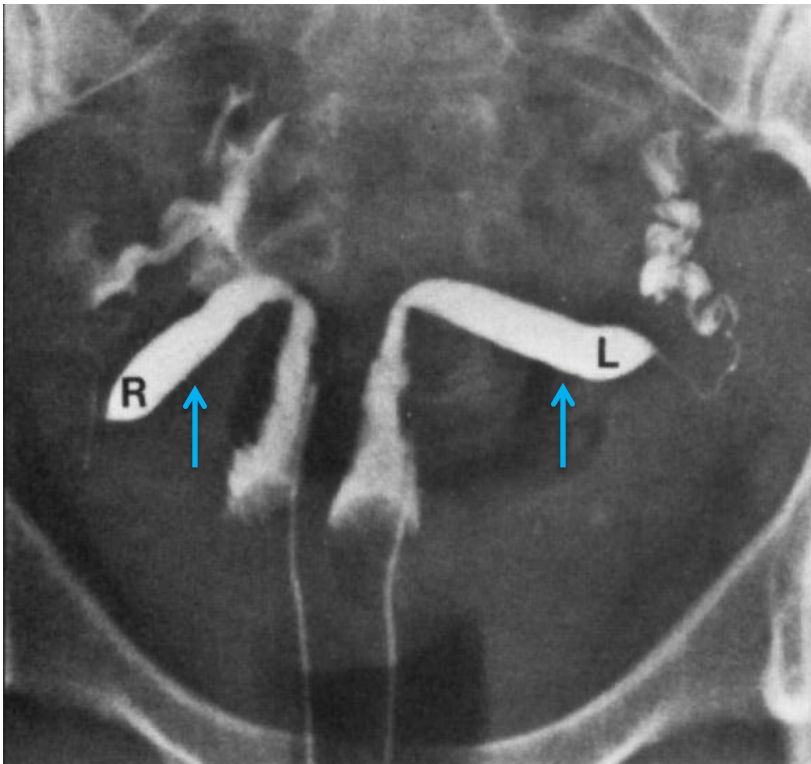
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Companion patient 4: HSG

Didelphys



From: Deborah Levine, MD

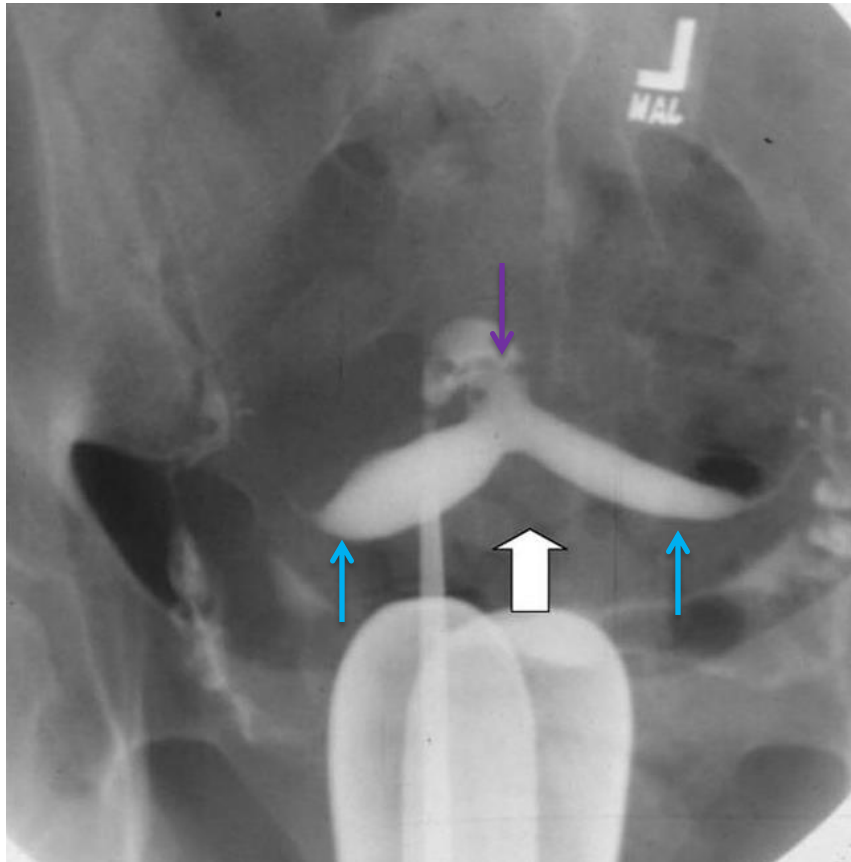
Incomplete fusion with
two cervixes and two
endometrial cavities with
no communication

Endometrial cavity



Companion patient 5: HSG

Bicornuate



Incomplete fusion with one cervix and two endometrial cavities that are fused inferiorly but not superiorly

Endometrial cavity

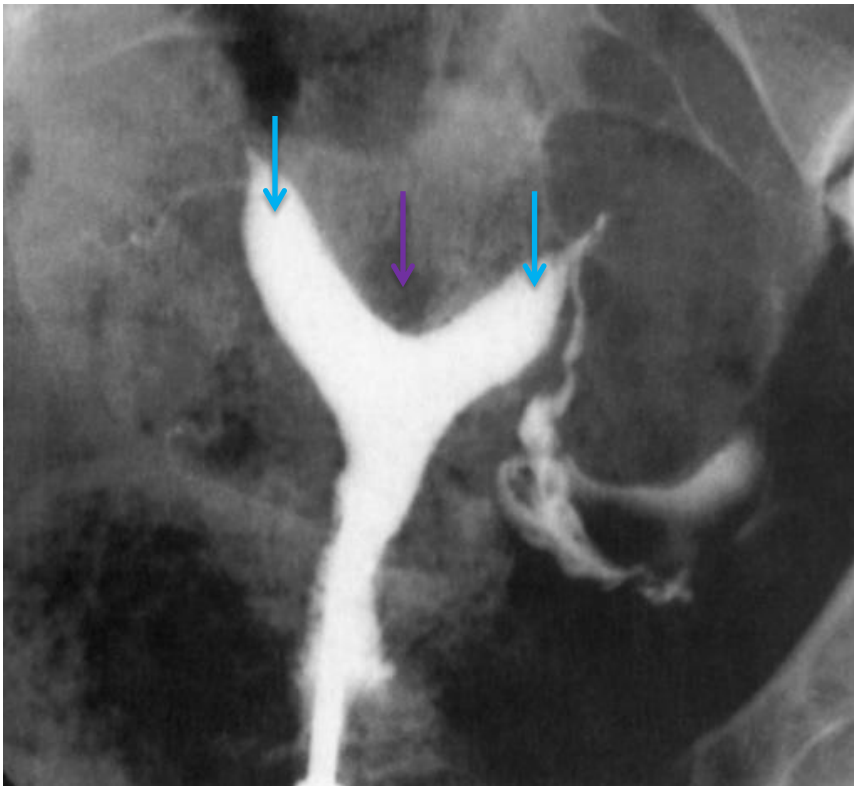
Fused portion

Trojano RN, Mccarthy SM. Mullerian duct anomalies: imaging and clinical issues. Radiology. 2004;233 (1): 19-34



Companion patient 6: HSG

Septate



Complete fusion but incomplete resorption of the median septum.

Endometrial cavity

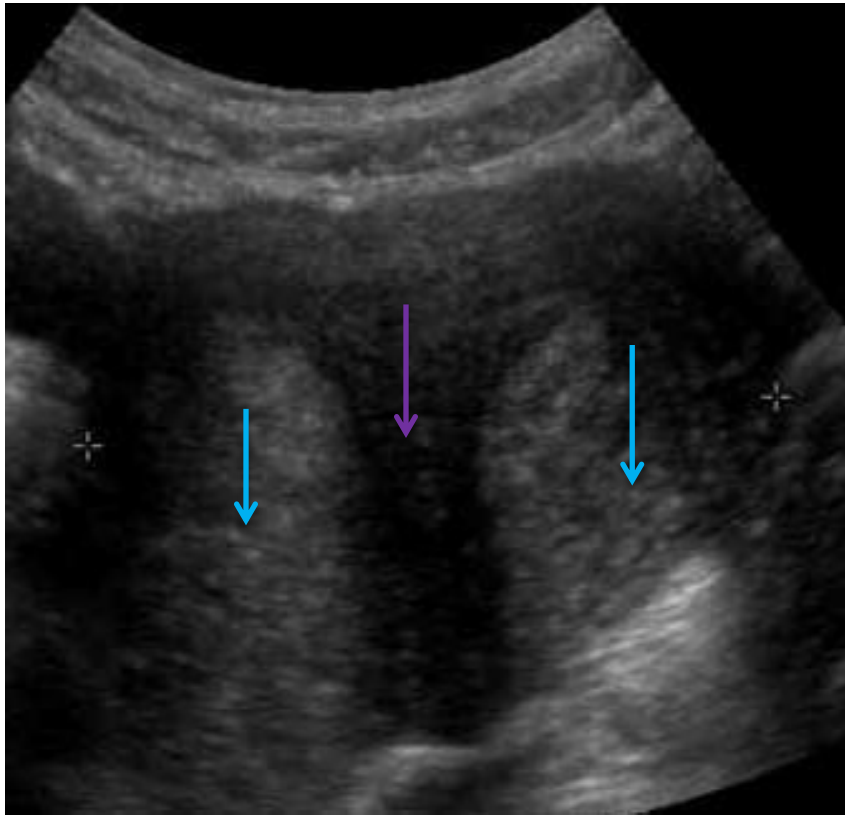
Septum

From: Deborah Levine, MD



Companion patient 7: ultrasound

Septate



Complete fusion but
incomplete resorption of the
median septum.

Endometrial cavity

Septum

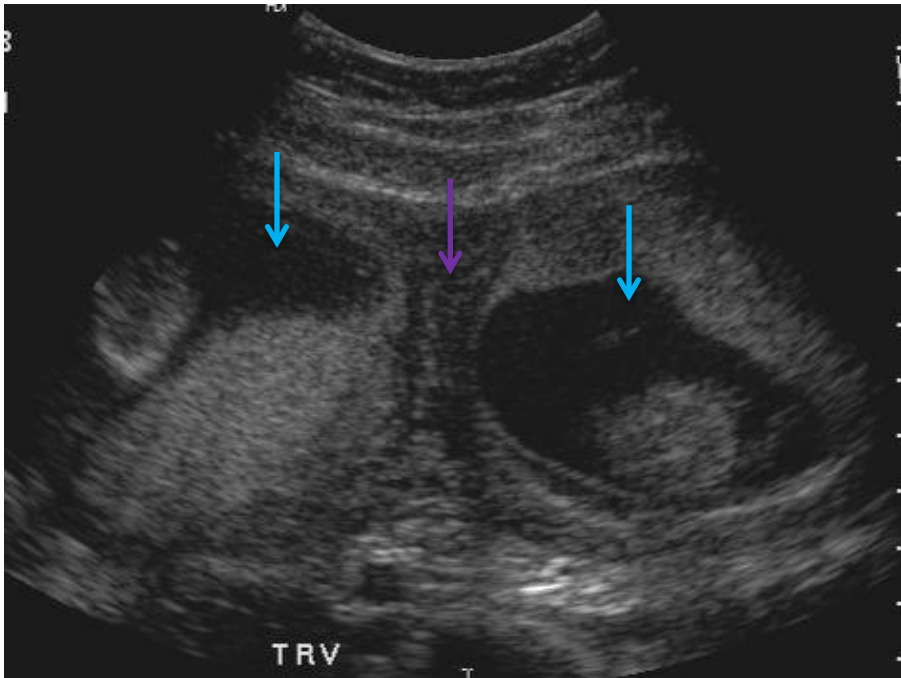
From: Deborah Levine, MD

Transverse transvaginal ultrasound



Companion patient 8: ultrasound

Septate



From: PACS

This patient is pregnant. It's hard to tell if a uterus is bicornuate or septate during gestation because the structures are not in usual proportions. However, you can tell that this patient has one of those anomalies

Endometrial cavity

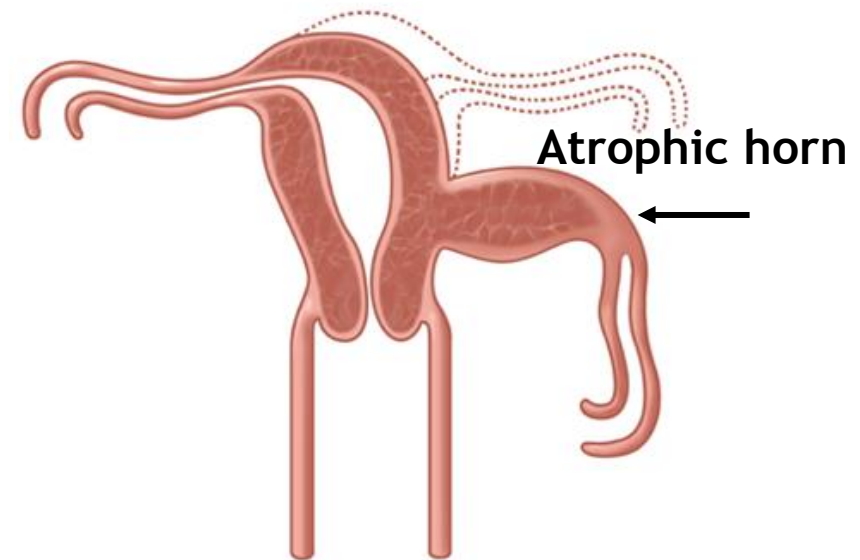
Septum

Transverse transvaginal ultrasound



Our patient: diagnosis

- Final diagnosis:
Unicornuate uterus with patent right fallopian tube and non-communicating horn
- Embryologic origin:
Agenesis of one Mullerian duct AND failure of ducts to fuse



From: Hoffman BL, et al. Chapter 18: Anatomic Disorders.
Williams Gynecology, 2e. www.accessmedicine.com



Mullerian duct anomalies: clinical importance

- Can lead to increased risk of:
 - Unicornuate: abnormal fetal position, intrauterine growth retardation
 - Didelphys: range from asymptomatic to increased risk of spontaneous abortion
 - Bicornuate: spontaneous abortion, preterm birth
 - Septate: spontaneous abortion (due to abnormal vascularity in the septum)
- All types associated with ipsilateral renal agenesis
 - Our patient had normal kidneys bilaterally as seen on an outside exam



Review

- **Menu of tests**

- Ultrasound
- Sonohysterogram
- Hysterosalpingography
- MRI

- **Anatomy and embryology**

- Uterine anatomy
- Uterine embryology
- Types of Mullerian duct anomalies

- **Our patient**

- Imaging

- Ultrasound
- Sonohysterogram
- Hysterosalpingogram

- **Diagnosis**

- Unicornuate uterus with atrophic, non-communicating horn

- **Companion patients**

- MRI
 - Unicornuate uterus
- Hysterosalpingogram
 - Didelphys
 - Bicornuate
 - Septate
- Ultrasound
 - Septate

- **Clinical importance**



Acknowledgements

- Megan Garber
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- Lexie Berwick
- Richard Li



References

- Chandler TM, Machan LS, Cooperberg PL, Harris AC, Chang SD. Müllerian duct anomalies: from diagnosis to intervention. *British Journal of Radiology*. 2009;82(984):1034-1042.
- Coleman, BG. The Female Pelvis. *Radiologic Clinics of North America* 1992; 41: 769-772.
- Levine, D. Women's Imaging: Obstetrics and Gynecology. *Radiologic Clinics of North America* 2003; 41: 757-767, 781-797.
- Hoffman BL, Schorge JO, Schaffer JI, Halvorson LM, Bradshaw KD, Cunningham F, Calver LE. Chapter 2: Techniques Used for Imaging in Gynecology. *Williams Gynecology, 2e*. New York, NY: McGraw-Hill; 2012.
- Hoffman BL, Schorge JO, Schaffer JI, Halvorson LM, Bradshaw KD, Cunningham F, Calver LE. Chapter 18: Anatomic Disorders. *Williams Gynecology, 2e*. New York, NY: McGraw-Hill; 2012.
- Purcell KJ, Taylor RN. Chapter 22. Disorders of the Female Reproductive Tract. In: McPhee SJ, Hammer GD. eds. *Pathophysiology of Disease, 6e*. New York, NY: McGraw-Hill; 2010.
- Troiano RN, Mccarthy SM. Mullerian duct anomalies: imaging and clinical issues. *Radiology*. 2004;233 (1): 19-34