

Fetal
General Postgraduate Course - May 15, 2018
SAM References

Myelomeningocele Imaging

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1. **What features distinguish myelomeningocele from other forms of spinal dysraphism that you might see on prenatal imaging?**
 - A. It is a closed spinal dysraphism characterized by a placode interface that is external to the spinal dysraphic defect.
 - B. It is a closed spinal dysraphism characterized by a placode interface that is flush with the spinal dysraphic defect.
 - C. It is an open spinal dysraphism characterized by a placode that is external to the spinal dysraphic defect terminating upon the wall of a sac.
 - D. It is an open spinal dysraphism characterized by a placode that is flush with the spinal dysraphic defect.

Correct Answer: C

Rationale: Myelomeningocele is an open spinal dysraphism (ie, non-skin covered) that is characterized by a placode interface that is external to the spinal dysraphic defect without a lipoma.

References:

- Tortori-Donati P, Rossi A, Cama A. Spinal dysraphism: a review of neuroradiological features with embryological correlations and proposal for a new classification. *Neuroradiology*. 2000 Jul;42(7):471-91.

2. **The MOMS trial showed which of the following outcomes in comparison with conventional operative repair?**
 - A. Lower maternal morbidity
 - B. Lower rate of preterm deliveries
 - C. Fewer features of Chiari II malformation
 - D. No improvement in motor outcomes at 30 months

Correct Answer: C

Rationale: Fetal repair is associated with fewer and less severe features of Chiari II malformation and 50% reduction in need for shunting when compared to conventional postnatal repair.

References:

- Adzick NS, Thom EA, Spong CY, Brock JW 3rd, Burrows PK, Johnson MP, Howell LJ, Farrell JA, Dabrowiak ME, Sutton LN, Gupta N, Tulipan NB, D'Alton ME, Farmer DL; MOMS Investigators. A randomized trial of prenatal versus postnatal repair of myelomeningocele. *N Engl J Med*. 2011 Mar 17;364(11):993-1004

Fetal Neck Masses

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3. **Which of the following imaging findings is *least* useful in differentiating a lymphatic malformation from a cervical teratoma?**
 - A. Cysts
 - B. Vasculature
 - C. Infiltration
 - D. Calcification

Correct Answer: A

Rationale: Cysts can be present in both lymphatic malformations and teratomas, and their presence alone is therefore not helpful to differentiate lesion type.

Reference:

- Meyers ML, Dannull KA. *The Neck*, in Fundamental and Advanced Fetal Imaging, Wolter Kluwer 2015.

4. What is the added value of MRI over ultrasound in the evaluation of a fetal neck mass?

- Define vascularity
- Exclude spinal canal invasion
- Define the airway
- Exclude associated brain anomaly

Correct Answer: C

Rationale: The compression of the airway is only variably seen with ultrasound but reliably with MRI due to the high contrast of the technique. In terms of delivery planning, it is most important to protect and support the airway.

Reference:

- Meyers ML, Dannull KA. *The Neck*, in Fundamental and Advanced Fetal Imaging, Wolter Kluwer 2015.

Congenital Diaphragmatic Hernia Update

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5. Which of the following MRI findings is associated with better outcome in patients with CDH:

- Herniation of the liver
- Presence of a hernia sac
- Stomach behind the heart
- Low lung volumes

Correct Answer: B

Rationale: Presence of hernia sac is associated with lower morbidity and possibly mortality. One theory is that the sac creates a physical barrier that restricts further herniation of the abdominal organs.

Reference:

- Oluyomi-Obi T, Van Mieghem T, Ryan G (2017) Fetal imaging and therapy for CDH-Current status. *Semin Pediatr Surg* 26:140-146.
- Victoria T, Danzer E, Adzick NS (2013) Use of ultrasound and MRI for evaluation of lung volumes in fetuses with isolated left congenital diaphragmatic hernia. *Semin Pediatr Surg* 22:30-36.

6. The most commonly encountered congenital diaphragmatic hernia is:

- Left sided
- Right-sided
- Bilateral
- None of the above

Correct Answer: A

Rationale: Left-sided, for reasons not completely understood. The ratio is 85%, 13%, 2% for left, right and bilateral CDH.

References:

- Oluyomi-Obi T, Van Mieghem T, Ryan G (2017) Fetal imaging and therapy for CDH-Current status. *Semin Pediatr Surg* 26:140-146.
- Victoria T, Danzer E, Adzick NS (2013) Use of ultrasound and MRI for evaluation of lung volumes in fetuses with isolated left congenital diaphragmatic hernia. *Semin Pediatr Surg* 22:30-36.

7. Which therapy is no longer utilized in the treatment of CDH?

- A. Emergent surgical repair
- B. Fetal tracheal occlusion
- C. Extra-corporeal membrane oxygenation
- D. Non-surgical management

Correct Answer: A

Rationale: In the late 80's CDH was felt to be the most urgent surgical emergency in the newborn. It was believed that the bowel was causing pulmonary compression and that emergently removing the bowel from the chest would improve the situation. Soon it was realized that emergent decompression was not optimal and that initial neonatal stabilization was optimal, followed by eventual repair.

Reference:

- Oluyomi-Obi T, Van Mieghem T, Ryan G (2017) Fetal imaging and therapy for CDH-Current status. *Semin Pediatr Surg* 26:140-146.
- Victoria T, Danzer E, Adzick NS (2013) Use of ultrasound and MRI for evaluation of lung volumes in fetuses with isolated left congenital diaphragmatic hernia. *Semin Pediatr Surg* 22:30-36.

Placental Imaging

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8. Which two MR pulse sequences, when used in combination, are best for identifying placental vasculature on non-contrast MRI?

- A. T1 spoiled GRE and SSFSE
- B. T1 spoiled GRE and SSFP
- C. SSFSE and SSFP
- D. SSFSE and DWI

Correct Answer: C

Rationale: Combining these two common prenatal MR pulse sequences takes advantage of bright blood (SSFP) and dark blood (SSFSE) imaging properties to distinguish between hypointense signal from flow voids, and hypointense signal from other, non-vascular causes.

References:

- [D'Antonio F](#), [Iacovella C](#), [Palacios-Jaraquemada J](#), Bruno CH, Manzoli L, Bhide A. Prenatal identification of invasive placentation using magnetic resonance imaging: systematic review and meta-analysis. *Ultrasound Obstet Gynecol* 2014; 44 (1): 8-16.
- [Ueno Y](#), [Maeda T](#), [Tanaka U](#), Tanimura K, Kitajima K, Suenaga Y, Takahashi S, Yamada H, Sugimura K. Evaluation of interobserver variability and diagnostic performance of developed MRI-based radiological scoring system for invasive placenta previa. *J Magn Reson Imaging* 2016; 44 (3): 573-83

9. Which of the following imaging findings shows the highest sensitivity and specificity for the diagnosis of invasive placenta/placenta accreta:

- A. A thin, hypoechoic rim at the inner aspect of the myometrium
- B. Multiple vascular lacunae within the placenta and abnormal uteroplacental vascularity on color Doppler imaging
- C. Diffuse myometrial thinning
- D. Increased placental thickening and heterogeneity

Correct Answer: B

Rationale: Abnormal intraplacental hypervascularity, lacunae, inseparable cotyledonal and intervillous circulations and tortuous vascularity with chaotic branching demonstrate highest sensitivity and specificity for invasive placenta/accreta.

References:

- *Aoife Kilcoyne¹, Anuradha S. Shenoy-Bhangle², Drucilla J. Roberts³, Rachel Clark Sisodia. MRI of Placenta Accreta, Placenta Increta, and Placenta Percreta: Pearls and Pitfalls. American Journal of Roentgenology. 2017;208: 214-221. 10.2214/AJR.16.16281.*
- *W. Christopher Baughman, MD, Jane E. Corteville, MD, Rajiv R. Shah, MD Placenta Accreta: Spectrum of US and MR Imaging Findings. RadioGraphics 2008; 28:1905–1916.*