



# DCMC Emergency Department Radiology Case of the Month

These cases have been removed of identifying information and are intended for peer review and educational purposes only.

Welcome to the DCMC Emergency  
Department Radiology Case of the Month!

In conjunction with our Pediatric Radiology specialists from ARA, we hope you enjoy these monthly radiological highlights from the case files of the Emergency Department at DCMC. These cases are meant to highlight important chief complaints, cases, and radiology findings that we all encounter every day.

If you enjoy these reviews, we invite you to check out Pediatric Emergency Medicine Fellowship Radiology rounds, which are offered quarterly and are held with the outstanding support of the Pediatric Radiology specialists at Austin Radiologic Association.

If you have any questions or feedback regarding the Case of the Month, feel free to email Robert Vezzetti, MD at [rmvezzetti@ascension.org](mailto:rmvezzetti@ascension.org).

## This Month:

Scrotal complaints are seen with frequency in the pediatric emergency department and primary care clinics. This month we present an infant with bilateral scrotal swelling. Is this a benign or concerning finding?



FELLOWSHIP - PEDIATRIC EMERGENCY MEDICINE

### PEM Fellowship Conference Schedule: February 2020

#### 5th - 9:00 Hand Injuries

10:00 Fever Without Localizing Source

11:00 Grand Rounds

#### 12th - 9:00 Major/Minor Head Injuries

10:00 Evaluation of the Returning Traveler

11:00 Understanding QI Measurement/QI Projects

12:00 Hematology/Oncology Series

#### 19th - 9:00 Toxicology: Street Drugs

10:00 Ultrasound: Shock/Resuscitation

12:00 ED Staff Meeting

#### 26th - 9:00 M&M

10:00 Board Review: Favorites!

Grand Rounds Guest Speaker: Leticia Manning Ryan, MD

Optimizing the Prevention and Care of Pediatric Injuries

Associate Professor of Pediatrics

The Johns Hopkins University School of Medicine

All presentations are in DCMC Command Rooms 3&4

Simulations are held in the CEC

Topics/Times/Speakers subject to change.

All are welcome!

Martin Luther King Jr. improvised the most iconic part of his "I Have a Dream Speech." The original speech did not include any reference to dreams, but as Dr King was delivering his speech, singer Mahalia Jackson told him "Tell 'em about the dream, Martin." Whether this inspired him or not, the speech is now considered now recognized as one of the greatest speeches in American history.



Ralph Bunche was the first African American to win the Nobel Prize. The political scientist, academic, and diplomat was awarded the Peace Prize for his late 1940s mediation in Israel.

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## Case History

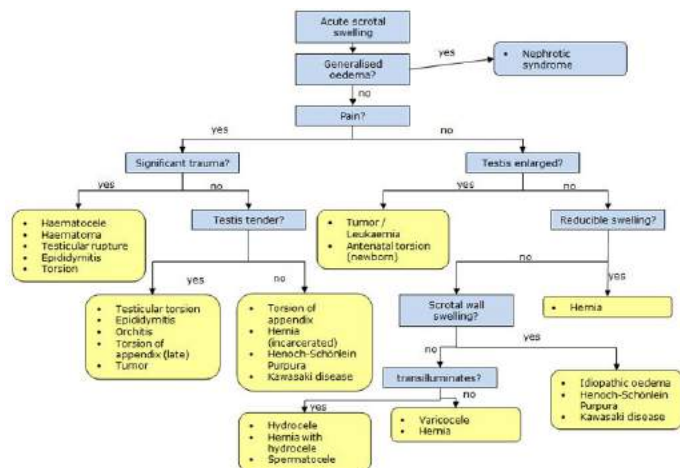
A four month old is referred to the Pediatric Emergency Department for bilateral scrotal swelling. Apparently this has been present since birth but has acutely worsened; the mother tells you she thinks the child has pain from time to time due to the swelling (what?). She also notes the right hemiscrotum now appears darker than it has in the past. The child has had cough and congestion for the past twenty-four hours and a temperature to 102.5 Fahrenheit. There have been no other symptoms, such as vomiting, diarrhea, difficulty breathing, apparent abdominal pain, fussiness, or rashes.

His birth history is unremarkable. He was born by spontaneous vaginal delivery at 39 weeks. The mother had excellent prenatal care and an uncomplicated pregnancy; her serologies were negative. The child stayed in the hospital two days and was discharged without incident. His mother tells you he was noted to have minimal bilateral scrotal swelling at discharge but was told "not to worry about it" (her words).

He was seen today by his primary care provider for the fever and congestion; an influenza test was performed and this was negative. The mother mentioned the worsening swelling to the physician, prompting the referral to the Department.

The child's exam is, at first glance, unimpressive. He appears vigorous and not toxic. He does have a fever of 102.5 Fahrenheit. His anterior fontanelle is soft and flat. There is mild bilateral nasal congestion but his tympanic membranes are clear. He has a normal cardiovascular examination. His chest has bilateral rhonchi at the bases but there are no crackles and there is no stridor, grunting, or nasal flaring. His abdominal examination is completely benign. He is a norma-appearing male and is not circumcised. There are no lesions or erythema of the glans or penile shaft. He has, admittedly impressive, bilateral scrotal swelling. There are no palpable masses or hernias. The scrotum does not appear to be tender to palpation bilaterally. The swelling does not feel solid, rather, there is more of a fluid feeling, although somewhat tense. There is no warmth and or fluctuance, but the scrotum does appear red throughout.

You think about the differential of scrotal swelling in infancy. You also think about whether imaging will be helpful in this patient.



The differential diagnosis for scrotal swelling is long, but history plays a big role in narrowing it down. Some questions to ask are:

- Acute or chronic?
- Painful or non-painful?
- One side or both sides?
- Reducible swelling (ie hernia)?



The concept of inoculation was introduced to the United States by a slave named Onesimus. He was enslaved to Boston preacher Cotton Mather in 1706 and during the smallpox epidemic of 1721, he told Mather about the practice of taking material from an infected person and scratching the skin of an uninfected person, practiced in Africa. Mather convinced Boston physician Dr Zabdiel Boylston to experiment with this, inoculating 240 people.



You decide to obtain a scrotal ultrasound. While the child most likely has a hydrocele, the swelling is impressive, the mother is concerned, and the primary care provider really would like an ultrasound. Selected images are noted below. The right and left testis are normal in echotexture and location. There are no associated focal lesions. The epididymides are normal. There are large bilateral scrotal hydroceles noted. There is normal blood flow to the testes without evidence of acute torsion and there is no varicocele on either side.

### Hydrocele

A very common cause of scrotal swelling, hydroceles are fluid collections around the testicle within the tunica vaginalis. There are several types:

1. Communicating Hydrocele - These are hydroceles that arise in the setting of a patent processus vaginalis.
2. Non-communicating Hydrocele - These are hydroceles that arise in the setting of a closed processus vaginalis.
3. Spermatic Cord - these are loculated fluid collections along the spermatic cord and are separated from the testis and the epididymis, resulting from aberrant closure of the processus vaginalis.

The fluid in a hydrocele can be:

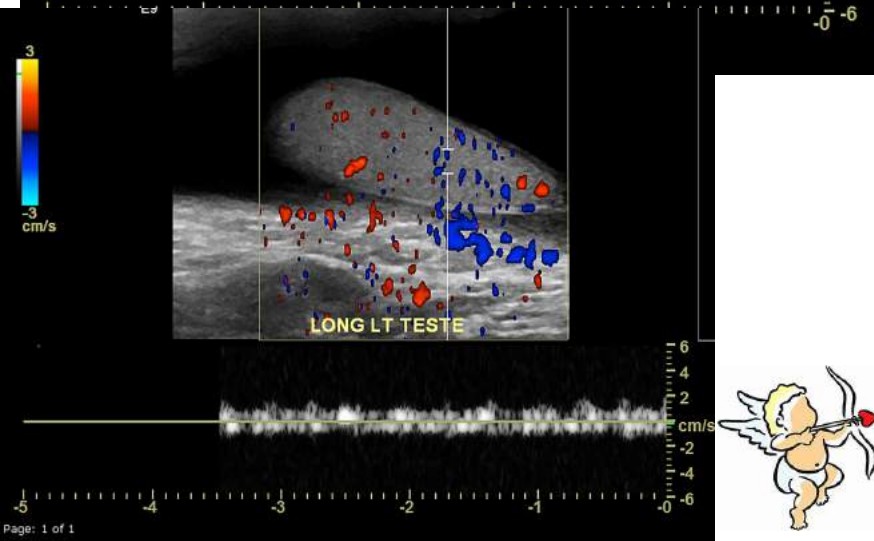
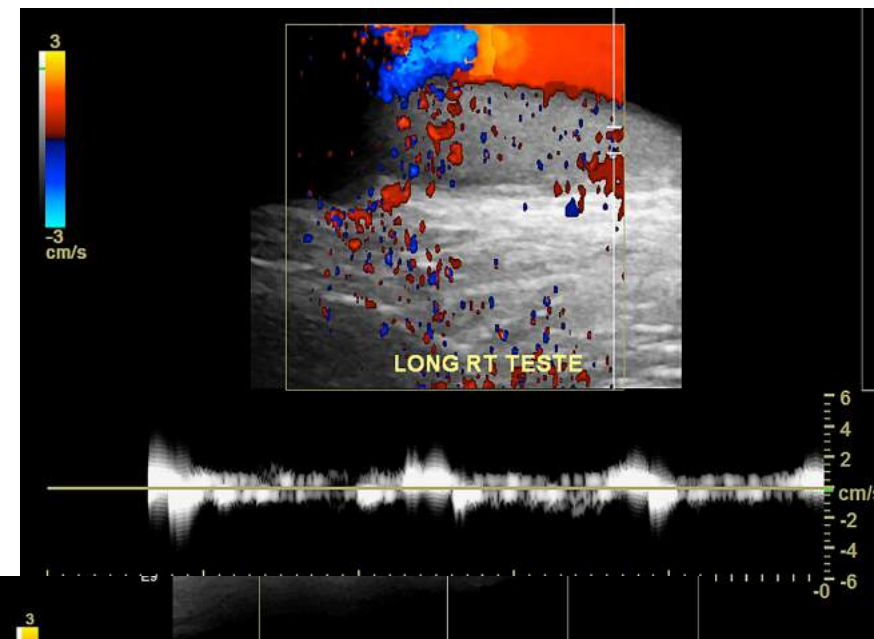
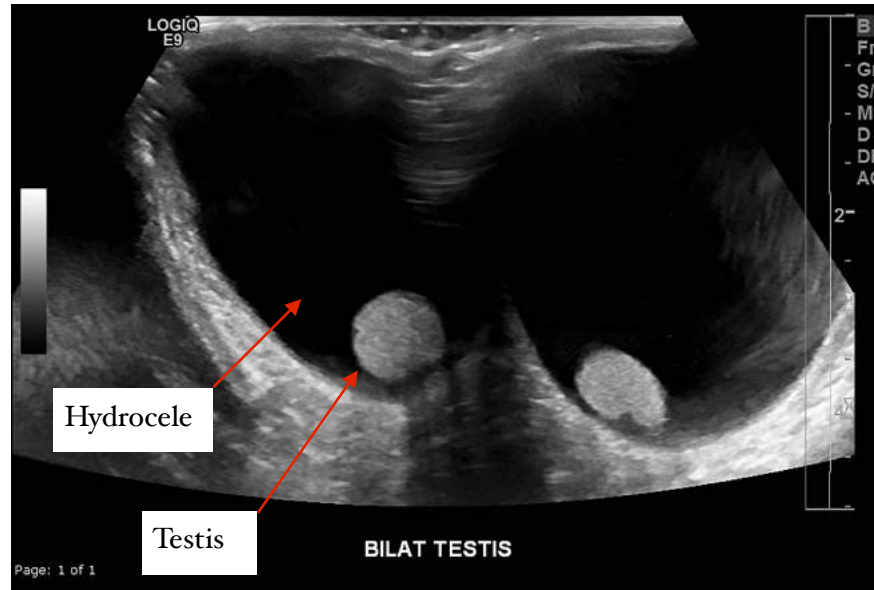
1. Simple - anechoic fluid on ultrasound and are the most common hydroceles in infants.
2. Complex - these evolving hydroceles contain more heterogenous components and may contain pus or blood.

### Imaging Infant Scrotal Swelling

Ultrasound is the imaging modality of choice to evaluate scrotal swelling. This modality is readily available, quick, painless, and lacks ionizing radiation exposure. Pediatric expertise, though, is required to obtain a meaningful study.

Hydroceles on ultrasound appear as avascular simple fluid collections, though they may contain calcifications and septations. Communicating hydroceles can be seen surrounding the adjacent testicle. Spermatic cord hydroceles are seen as an anechoic mass in the groin along the spermatic cord; they are usually very well-demarcated and avascular on color Doppler.

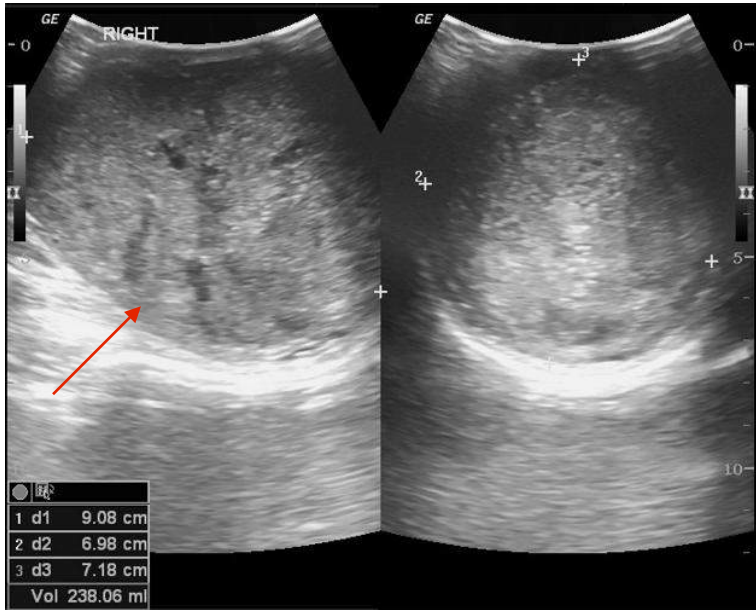
While not a first-line modality, hydroceles can be visualized on MRI. T1 sequencing demonstrates a low intensity signal and T2 sequencing a high signal.



The "Lone Ranger" was inspired by an African American man named Bass Reeves. Reeves had been born a slave but escaped West during the Civil War where he lived in what was then known as Indian Territory. He eventually became a Deputy U.S. Marshal, was a master of disguise, an expert marksman, had a Native American companion, and rode a silver horse.



The legendary tennis player Arthur Ashe was the first black player selected to the United States Davis Cup team and remains the only black man to have won the singles title at Wimbledon, the Australian Open and the US Open. He was posthumously awarded the Presidential Medal of Freedom in 1993.



### Other Causes of Neonatal Scrotal Swelling: Neoplasm

These are not common in the pediatric population, accounting for 1%-2% of male solid tumors. They arise from two sources:

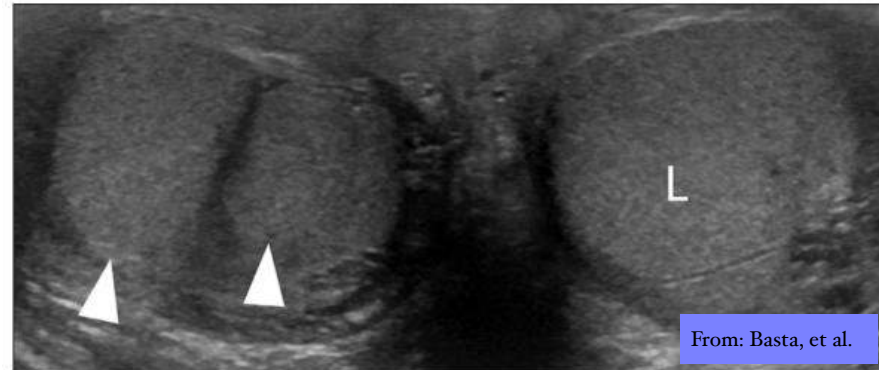
1. Germ cells (yolk sac tumors, teratomas) - the most common.
2. Stromal tumors - rare but benign.

If a tumor is suspected, evaluation includes alpha-fetoprotein (AFP), B-human chorionic gonadotropin (B-HCG), lactate dehydrogenase (LDH) should be obtained. These serve to help arrive at the diagnosis and can be used to predict prognosis.

The ultrasound to the left demonstrates a large right scrotal mass that was ultimately found to be a teratoma. Testicular teratomas are aggressive and management depends on the age of the patient, the stage of tumor and the histology of the tumor. In pediatric patients, mature teratomas have a benign clinical course ; up to 30% of adults, however, will have metastasis.

### Other Causes of Neonatal Scrotal Swelling: Supernumerary Testicle

Polyorchidism is a rare entity. The condition is thought to be due to a division of the genital ridge, mesonephros, or testis during embryogenesis. Triorchidism is the most common manifestation. Associated conditions include cryptorchidism, indirect inguinal hernia, torsion, and malignancy (least common). The extra testis may or may not have reproductive potential. On ultrasound, the testis appears to have normal tissue. To the right is an ultrasound from Basta, et al, demonstrating this condition on the right side, where two testis are seen. There is no associated masses and both appear normal.



### Other Causes of Neonatal Scrotal Swelling: Scrotal Hematoma

Scrotal hematomas can result from birth trauma and bleeding disorders and are associated with high birth weight as well as sepsis. There may be involvement of the abdomen, as the hemorrhage may extend from the abdomen through a patent processus vaginalis or along the retroperitoneum into the scrotum. Scrotal hematomas can be associated with adrenal hemorrhage as well. As a general rule, scrotal hematomas themselves do not require intervention and can be treated with close monitoring. If there is an associated hemorrhage from another source or other underlying condition, then management with appropriate treatment.

The ultrasound to the right demonstrates a right testicular hematoma. These appear as well-defined heterogeneous pattern.

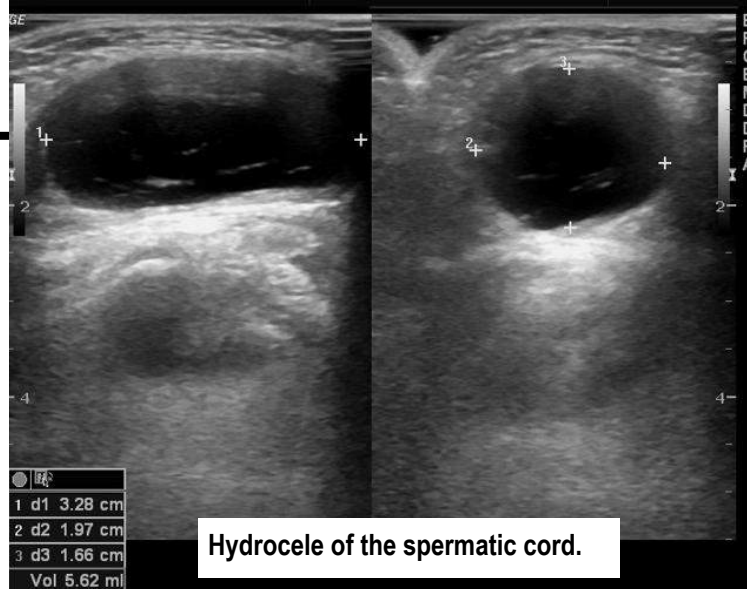
The first licensed African American Female pilot was named Bessie Coleman. Born in Atlanta, Texas in 1892, Bessie Coleman grew up in a world of harsh poverty, discrimination and segregation. She moved to Chicago at 23 to seek her fortune, but found little opportunity there as well. She set her sights on France in order to reach her dreams and began studying French. In 1920, Coleman crossed the ocean with all of her savings and the financial support of Robert Abbott, one of the first African American millionaires. Over the next seven months, she learned to fly and in June of 1921, the Fédération Aéronautique Internationale awarded her an international pilot's license.



Abolitionist Harriet Tubman, who escorted over 300 slaves to freedom – using the antislavery safe houses known as the Underground Railroad – over the course of her lifetime, will grace the United States' \$20 bill on new currency notes that will come in circulation in 2020.



The jazz legend Louis Armstrong, who was a trumpeter, bandleader, singer, soloist, film star and comedian, learned to play the cornet while living at what was essentially juvenile hall. He'd been sent there at 11, after shooting a shot gun into the air at a New Year's Eve celebration.



## When To Refer To Pediatric Urology

1. Non-communicating hydroceles that are present after 12 to 18 months of age, apparently symptomatic, or worsening.
2. Any suspicion of communicating hydrocele. This usually means hydroceles that are discovered after 1-2 years of age or, as above, initially suspected communicating hydroceles that are still present after 18 months of age.
3. If a hernia is associated with the hydrocele.

## Case Resolution:

After having the ultrasound confirm this was, in fact, large bilateral hydroceles without evidence of torsion or other pathology, the child was discharged home. The fever was felt to be due to a viral upper respiratory tract infection. Because the child was uncircumcised, a catheterized urinalysis was obtained which showed no signs of infection. His urine culture did not grow any bacteria. He followed-up with his primary care provider, who monitored the hydroceles. At 1 year of age, they are still present but appear to be diminishing in size. He will continue to be monitored until resolution with Pediatric Urology and his primary care provider.

## Teaching Points

1. Hydroceles are a clinical diagnosis and imaging is generally not indicated for diagnosis.
2. Imaging should be considered if the diagnosis is in question: sudden pain/suspicion of torsion, trauma, concern for associated hernia, concern for infection, or any sudden/acute symptoms that are not consistent with a hydrocele.
3. While hydroceles can be seen on with advanced imaging tests, such as magnetic resonance imaging, these modalities are not indicated for the diagnosis of hydrocele.
4. If imaging is indicated, ultrasound is the modality of choice.
5. Referral to Pediatric Urology or Pediatric Surgery is indicated in patients with persistent hydroceles (beyond 12 to 18 months of age) or hydroceles discovered of outside infancy.

## References

1. Jin Z, Wang F. Effectiveness of Laparoscopy in the Treatment of Pediatric Hydrocele: A Systematic Review. *J Laparoendosc Adv Surg Tech A*. 2018 Dec;28(12):1531-1539.
2. Shields LBE, White JT, Peppas DS, et al. Scrotal Ultrasound Is Not Routinely Indicated in the Management of Cryptorchidism, Retractable Testes, and Hydrocele in Children. *Glob Pediatr Health*. 2019 Nov 21;6.
3. Esposito C, Escolino M, Turrà F, et al. Current concepts in the management of inguinal hernia and hydrocele in pediatric patients in laparoscopic era. *Semin Pediatr Surg*. 2016 Aug;25(4):232-240.
4. Fernandez S. A Pediatrician's Take on a Few Common Infant Urologic and Gynecologic Issues. *Pediatr Ann*. 2017 Nov 1;46(11):e397-e399.
5. Chalmers DJ, Vemulakonda VM. Pediatric Urology for the General Surgeon. *J Pediatr Surg*. 2016 May;51(5):815-818.
6. Dargosa LM, McMenaman KS, Pais VM Jr. Tension Hydrocele: An Unusual Cause of Acute Scrotal Pain. *Pediatr Emerg Care*. 2015 Aug;31(8):584-585.
7. Basta AM, Courtier J, Phelps A, et al. Scrotal swelling in the neonate. *J Ultrasound Med*. 2015 Mar;34(3):495-505.
8. Munden MM, Trautwein LM. Scrotal pathology in pediatrics with sonographic imaging. *Curr Probl Diagn Radiol*. 2000;29:185-205.
9. Sung EK, Setty BN, Castro-Aragon I. Sonography of the pediatric scrotum: emphasis on the Ts—torsion, trauma, and tumors. *AJR Am J Roentgenol*. 2012;198:996-1003.
10. Lao OB, Fitzgibbons RJ, Jr, Cusick RA. Pediatric inguinal hernias, hydroceles, and undescended testicles. *Surg Clin North Am*. 2012;92:487-504.
11. Lim GY, Lim SA, Jeong YJ, Hahn ST, Lee JM. Infantile scrotal pyocele simulating missed testicular torsion on sonography. *J Clin Ultrasound*. 2003;31:116-118.