Unraveling Testicular Torsion

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Normal Testicular Anatomy

http://www.aafp.org/afp/990215ap/817.html
Testicular Torsion

Extravaginal
--newborns
--usually congenital

Intravaginal
--ages 3-20 yo
--generally associated with a pre-existing anomaly (bell clapper)

http://www.emedicine.com/MED/topic2780.htm
How does torsion cause ischemia

Low degree of torsion

Venous obstruction

Increased venous pressure

Decreased perfusion pressure

High degree of torsion

Arterial compression

ISCHEMIA
The Acute Scrotum

- **Scrotal Trauma**
- **Scrotal Inflammation:** *Epidydimitis/orchitis*
- **Ischemia:** torsion of the testicular/epididymal appendages, testicular torsion, traumatic infarction, postherniorrhaphy/strangulated hernia
- **Rare:** Schonlein-Henoch purpura, neoplasm, varicocele, idiopathic

YOU MUST R/O TORSION!
Torsion on my mind…

- **Short duration of sx**
- **Negative urinalysis**
- **PE:** diffuse tenderness, negative Cremaster
- **Age:** usually between 3-20 yrs, with 65% between 12 and 18 yrs

  Arce et al, Ped Rad 2002 Jul; 32 (7): 485-91

However—don’t forget it in adults, it has been reported in ages up to 62 yrs, with lower salvage rates

  Cummings et al, J Urol 2002 May; 167 (5): 2109-10

- **Common! (1 in 4000 <25yrs)**

Approach to the Acute Scrotum

History, physical exam, urinalysis

Negative urinalysis
Suggestive hx

Positive urinalysis or hx/PE suggest low prob of torsion

Assess blood flow to testes

Surgical exploration

Decreased/absent Blood or equivocal results

Increased/Normal Blood flow

www.aafp.org/afp/99021ap/817.html
Imaging Testicular Blood Flow

• Direct
  Color Doppler Ultrasonography

• Indirect
  Gray scale sonography
  Tc-99m pertechnetate radionuclide
  Diffusion weighted MRI
Which imaging modality to use?

- **No radiation**
  - FAST
  - CDS
- **Images Anatomy**
- **More Accurate**
  - Wu et al, Clin Nuc Med 2002 Jul; 27(7):490-91
  - Arce et al, Ped Rad 2002 Jul; 32 (7):485-91
- **More Accurate**
  - Nukes
What can you see?

- **Normal flow**
- **Decreased flow**
  *Testicular torsion, incomplete torsion*
- **Increased flow**
  *Epididymitis, Intermittent torsion*
- **Abnormal distribution of flow**
  *Torsion of testicular/epididymal appendages*
Patient A: 12yo male w/L testicular pain x 4 hrs

No real difference in echogenicity

Enlarged testes

TORSION—difficult to distinguish without color doppler

Courtesy Robert Kane, MD, BIDMC
Patient B: 14yo male w/L testicular pain x 4 hrs

Lack of Intra-testicular Flow to affected side

Normal blood flow To unaffected side

TORSION

Patient C: 16yo male w/L testicular pain x 24h

Increased blood flow to affected side

Epididymitis

Intratesticular blood flow present

Patient D: 16yo male w/R testicular pain x 24 h

- No intratesticular blood flow
- Hypoechogenic
- Increased size

Increased extratesticular blood flow due to pudendal vessels perfusing scrotal sac

Testicular Infarction

Patient E: What if there is blood flow? You must image the cord

Arce et al, Ped Rad 2002 Jul; 32 (7): 485-91
Patient F: Imaging of the cord is essential when there is still flow

Arterial flow

Still retained arterial flow

Site of torsion

Distal to site of torsion

Arce et al, Ped Rad 2002 Jul; 32 (7): 485-91
Patient G: There’s blood flow, but…

Testicular appendage

Preserved intratesticular flow

No flow within appendage

Torsion of testicular appendage
Patient H: 38 yo man w/R scrotal swelling x 2 days

Increased extratesticular flow due to pudendal vessels perfusing the scrotal sac

No intratesticular flow

Donut sign on radionuclide scan (late in torsion)

http://brighamrad.harvard.edu/Cases/bwh/hcache/80/full.html
The role of MRI in torsion

- DWI imaging detects tissue ISCHEMIA by measuring changes in cellular water content and water diffusion
- Using ischemia instead of perfusion as criteria means detection at early phases (where arterial perfusion still present) and intermittent torsion
Torsion on T2 weighted image

No real difference between ischemic and normal on T2

Kangasniemi et al, J Urology 2001 Dec; 166(6): 2542-4
Torsion on Diffusion Weighted Imaging (DWI)

Hypointense signals (diffusion defects)

1 hour after onset of ischemia

2 hours after relief of torsion

Kangasniemi et al, J Urology 2001 Dec; 166 (6): 2542-4
How early is early?

Normal Histology

Histology at time of DWI

Kangasniemi et al, J Urology 2001 Dec; 166 (6): 2542-4
Conclusions

• CDS is the modality of choice for imaging the acute scrotum to differentiate torsion from other etiologies
• CDS examination is not complete without imaging of the spermatic cord or considering intermittent torsion
• DWI imaging offers a chance to detect torsion at its earliest stages as well as intermittent torsion
References


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