



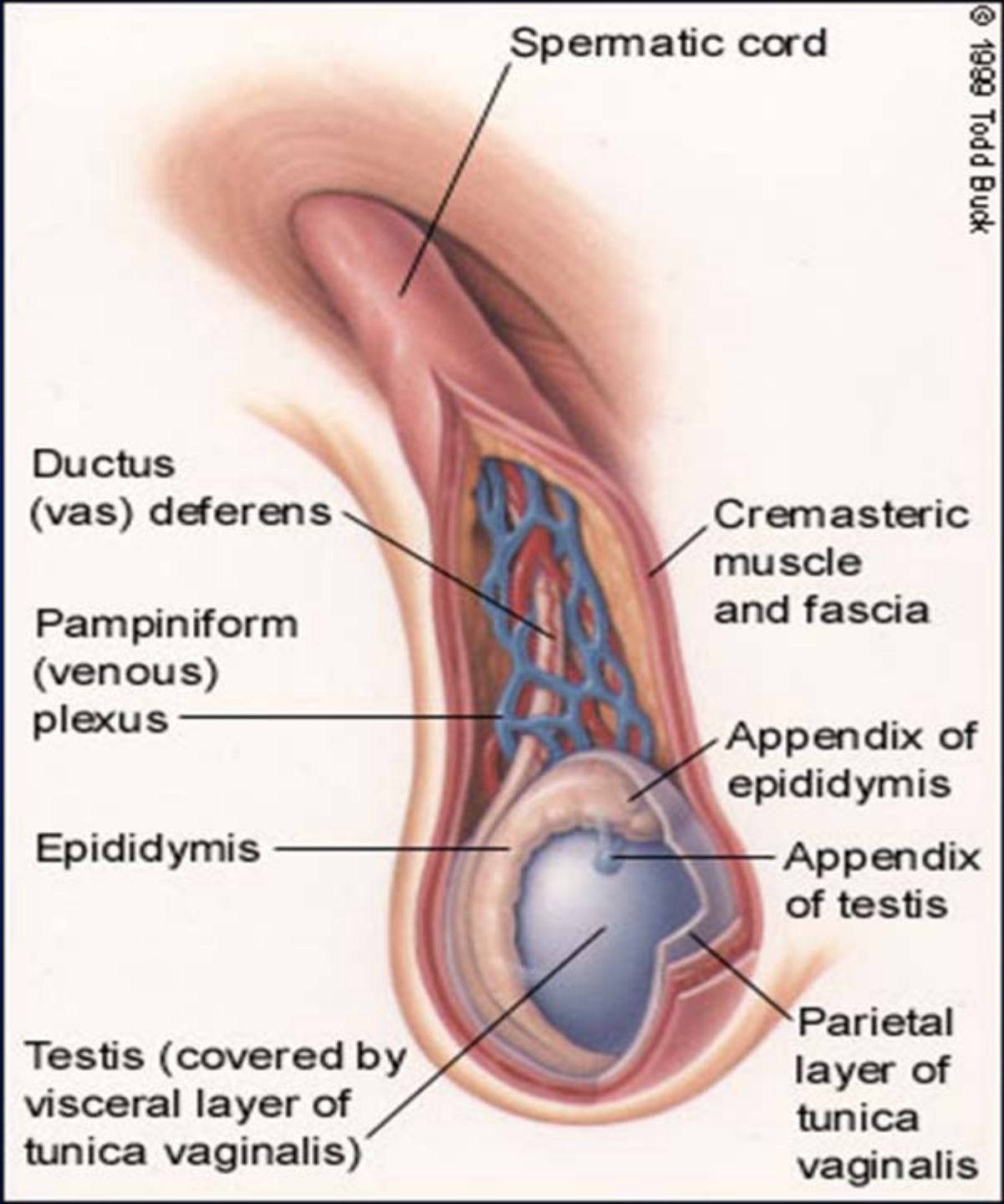
Unraveling Testicular Torsion

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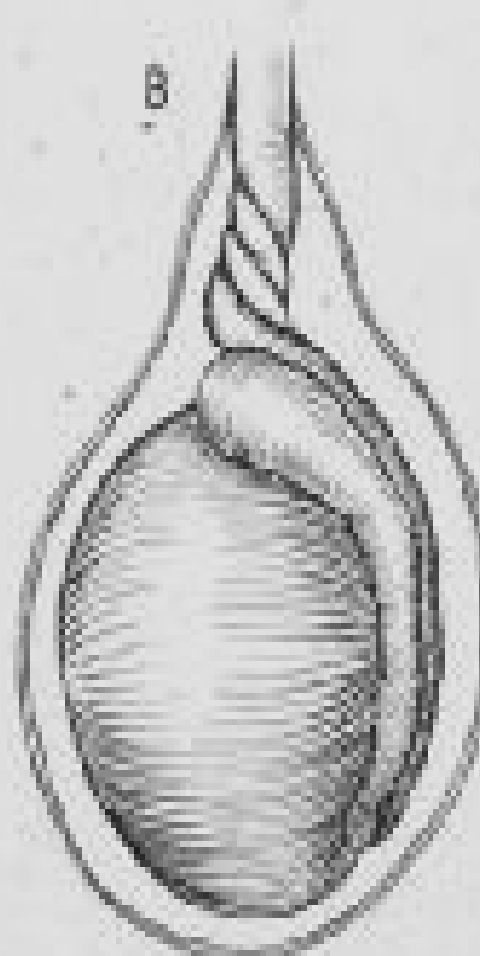
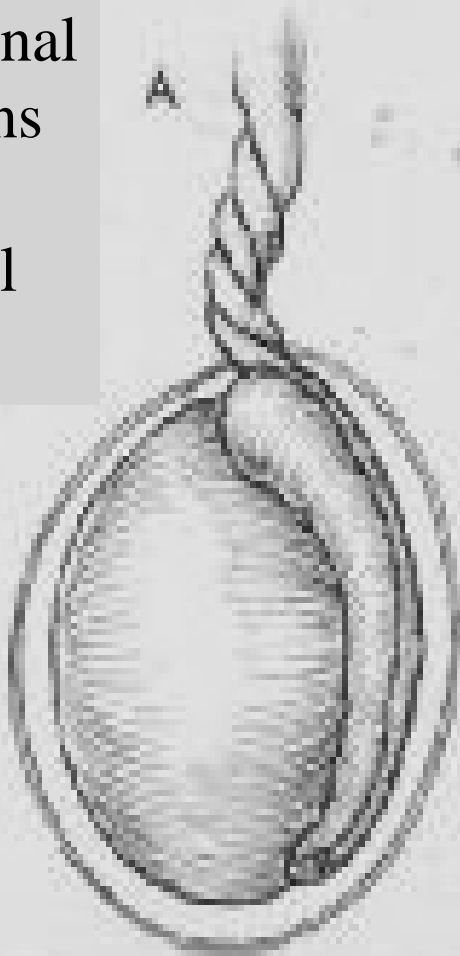
Normal Testicular Anatomy





Testicular Torsion

Extravaginal
--newborns
--usually
congenital



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



How does torsion cause ischemia

Low degree of torsion



Venous obstruction



Increased venous pressure



Decreased perfusion pressure

High degree of torsion



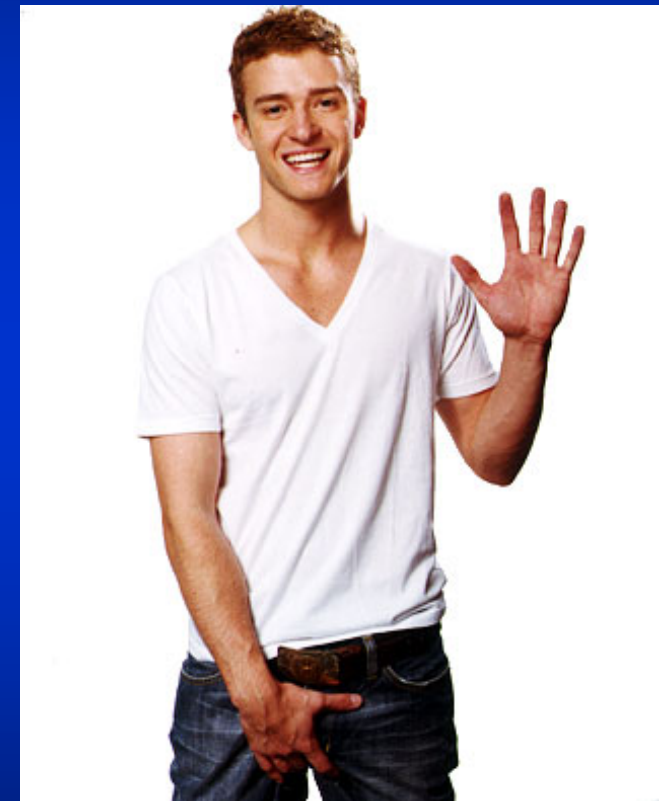
Arterial compression





The Acute Scrotum

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



www.ew.com

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)

Wu et al, *Clin Nuc Med* 2002 Jul; 27(7): 490-3



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



Imaging Testicular Blood Flow

- Direct

 - Color Doppler Ultrasonography

- Indirect

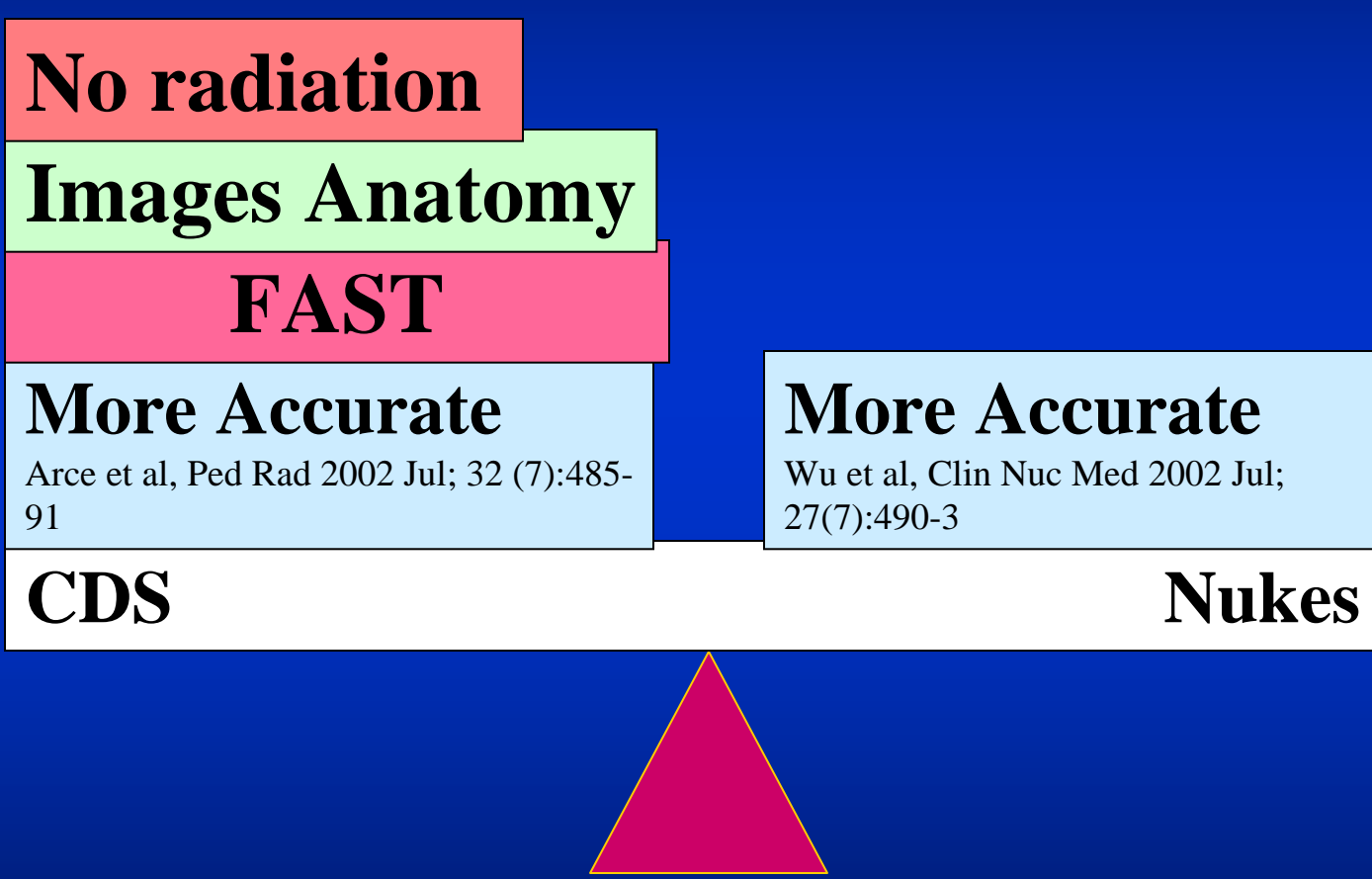
 - ~~Gray scale sonography~~

 - Tc-99m pertechnetate radionuclide

 - Diffusion weighted MRI



Which imaging modality to use?



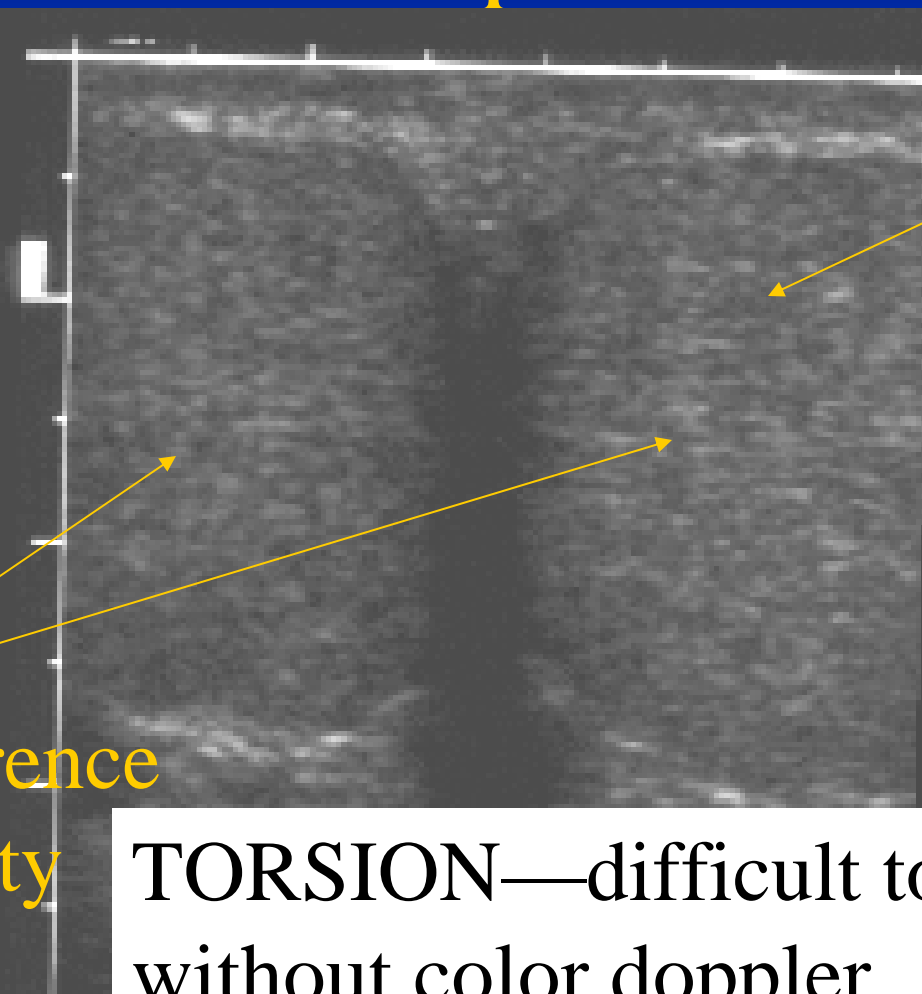


What can you see?

- 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



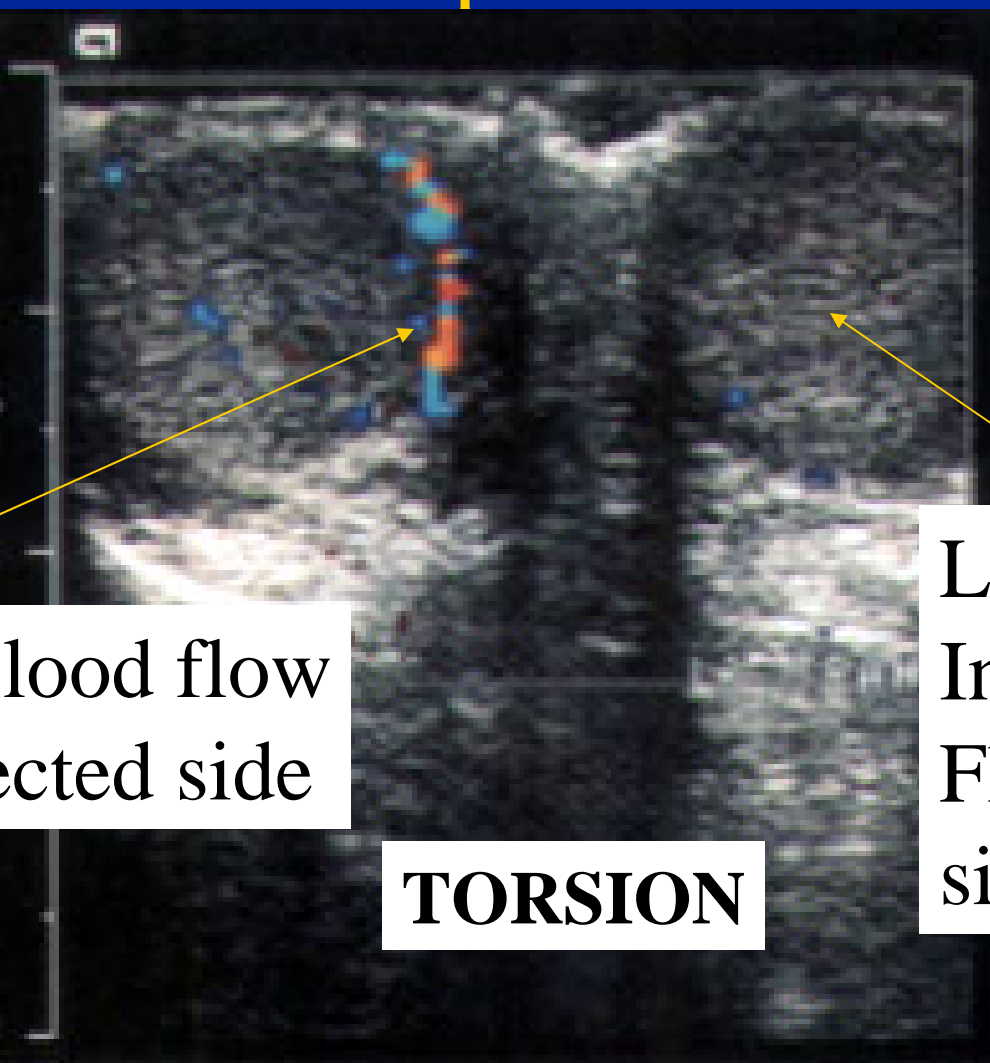
Enlarged
testes

No real difference
in echogenicity

TORSION—difficult to distinguish
without color doppler



Patient B: 14yo male w/L testicular pain x 4 hrs



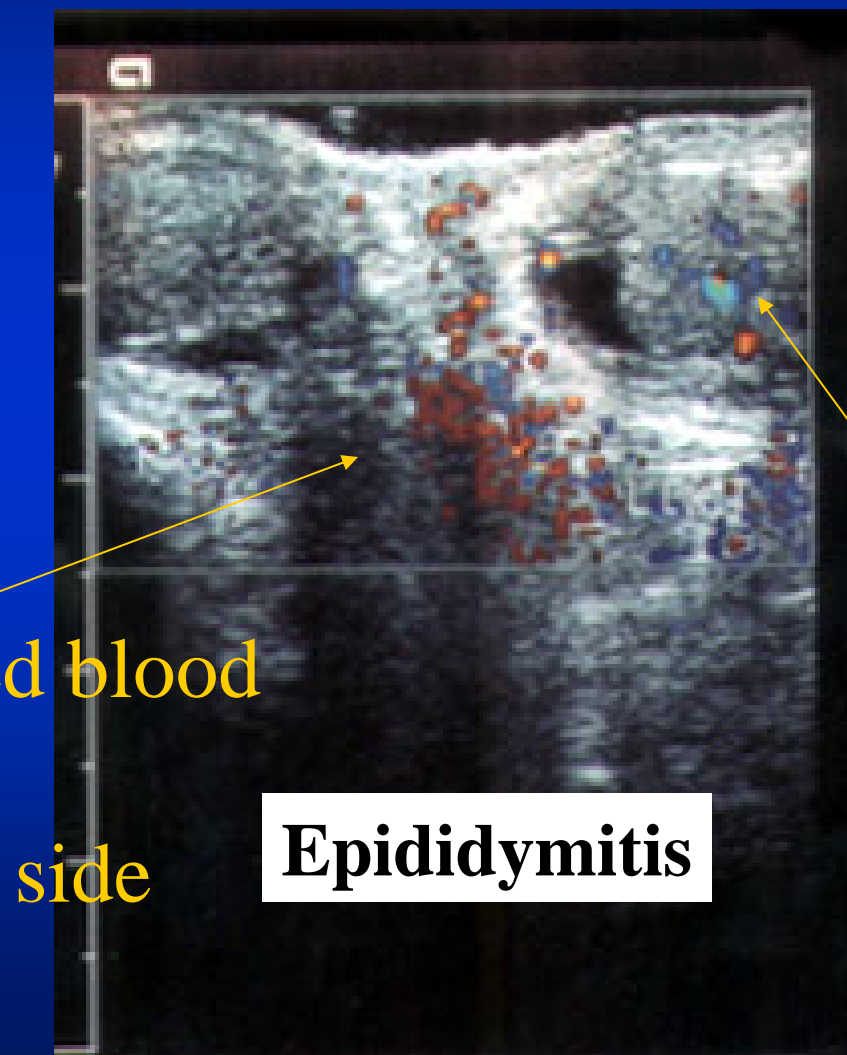
Normal blood flow
To unaffected side

Lack of
Intra-testicular
Flow to affected
side

TORSION



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



Increased blood
flow to
affected side

Epididymitis

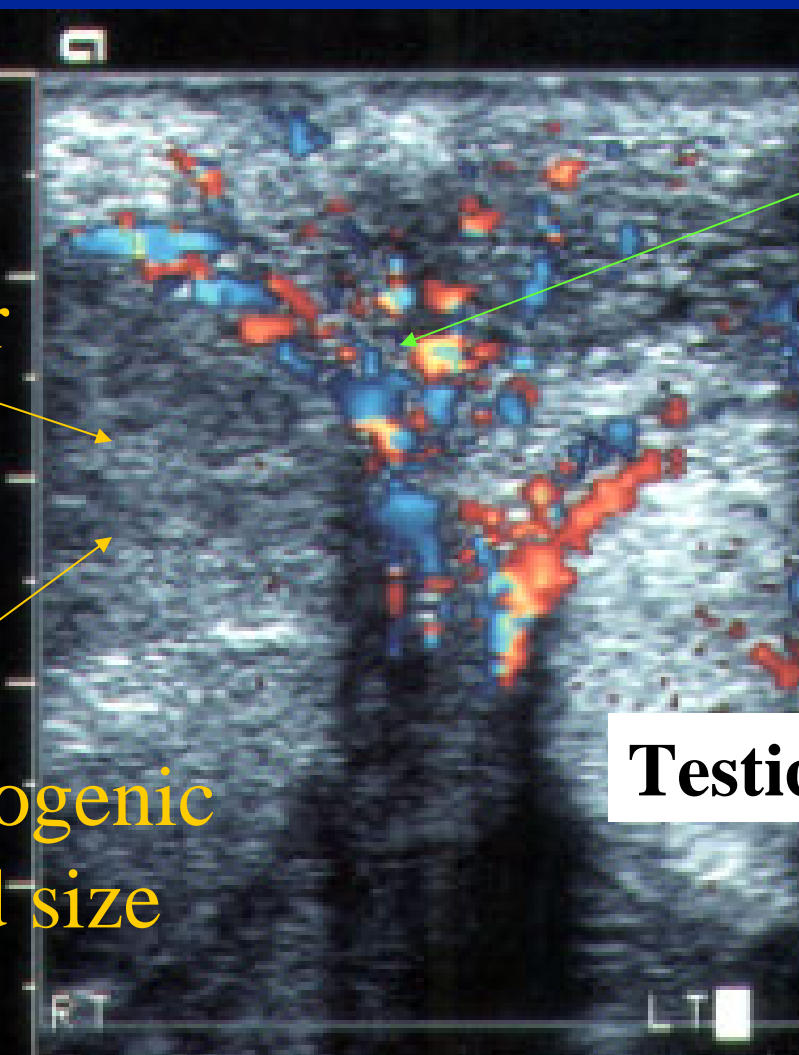
Intratesticular
blood flow
present



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

No
intratesticular
blood flow

Increased
extratesticular blood
flow due to pudendal
vessels perfusing
scrotal sac

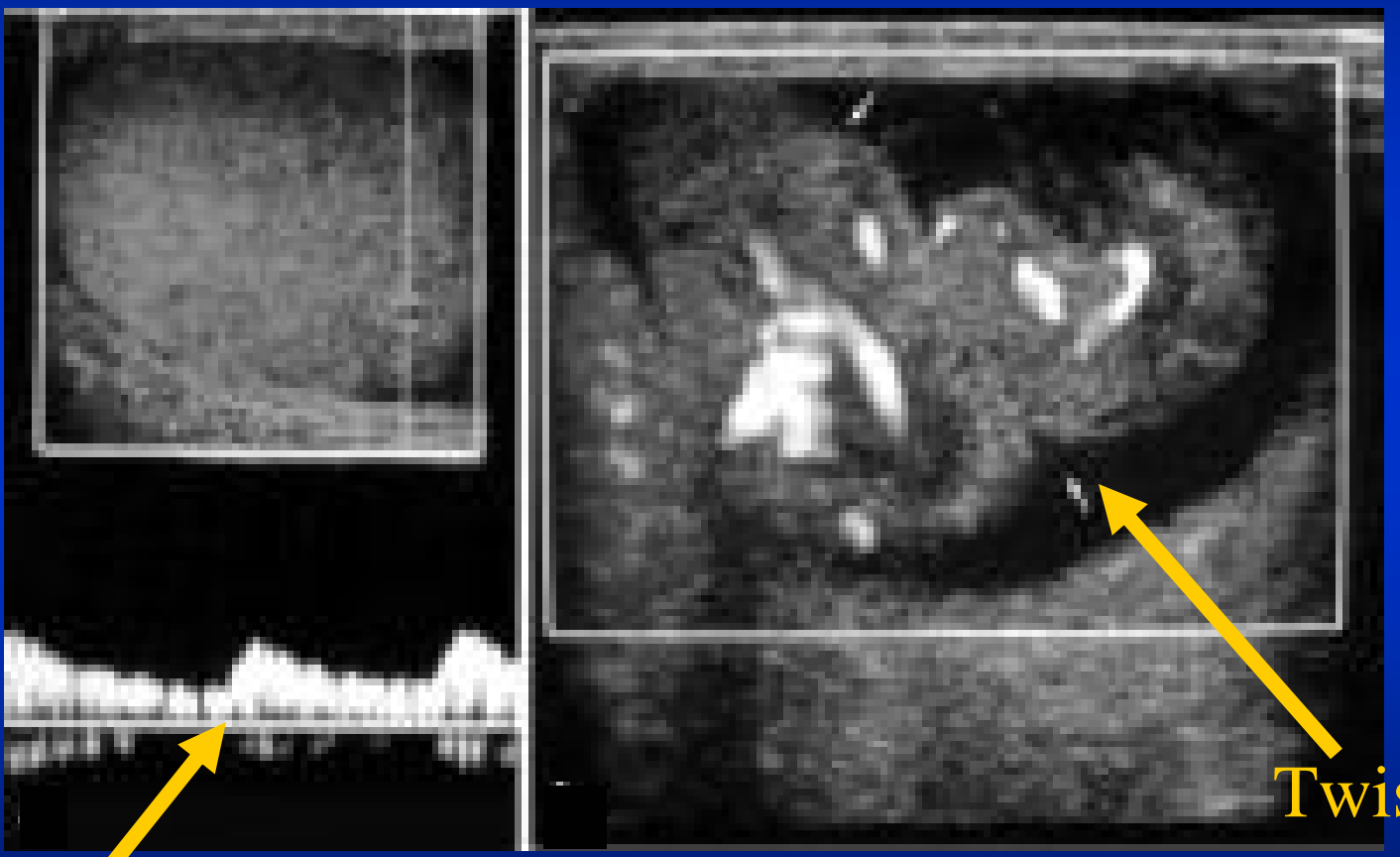


Hypoechoogenic
Increased size

Testicular Infarction



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

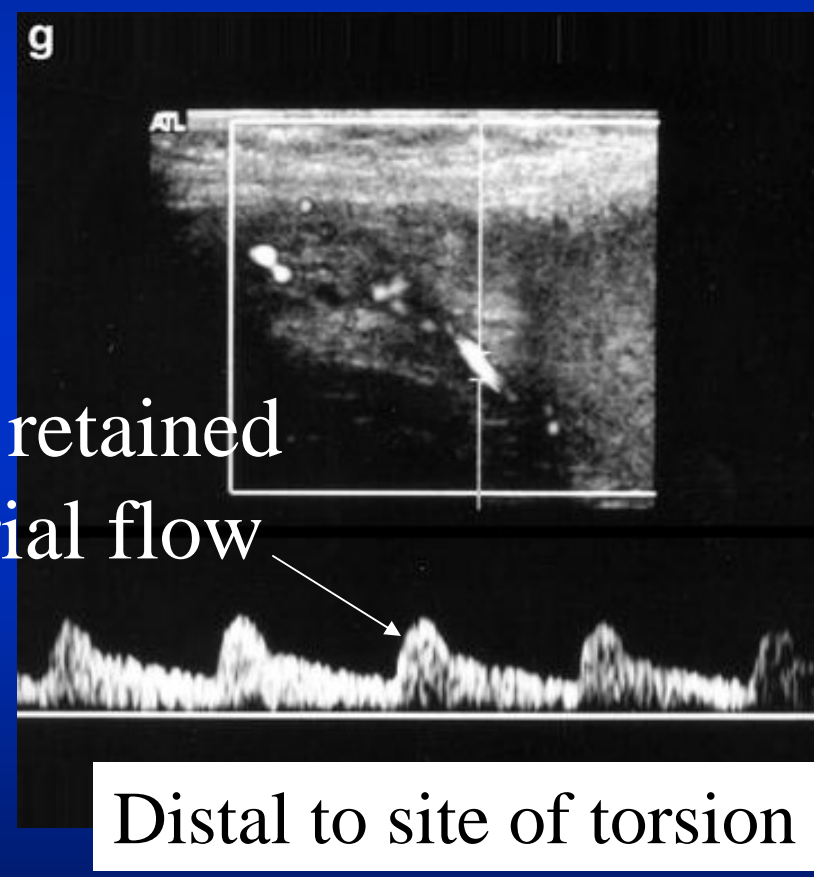
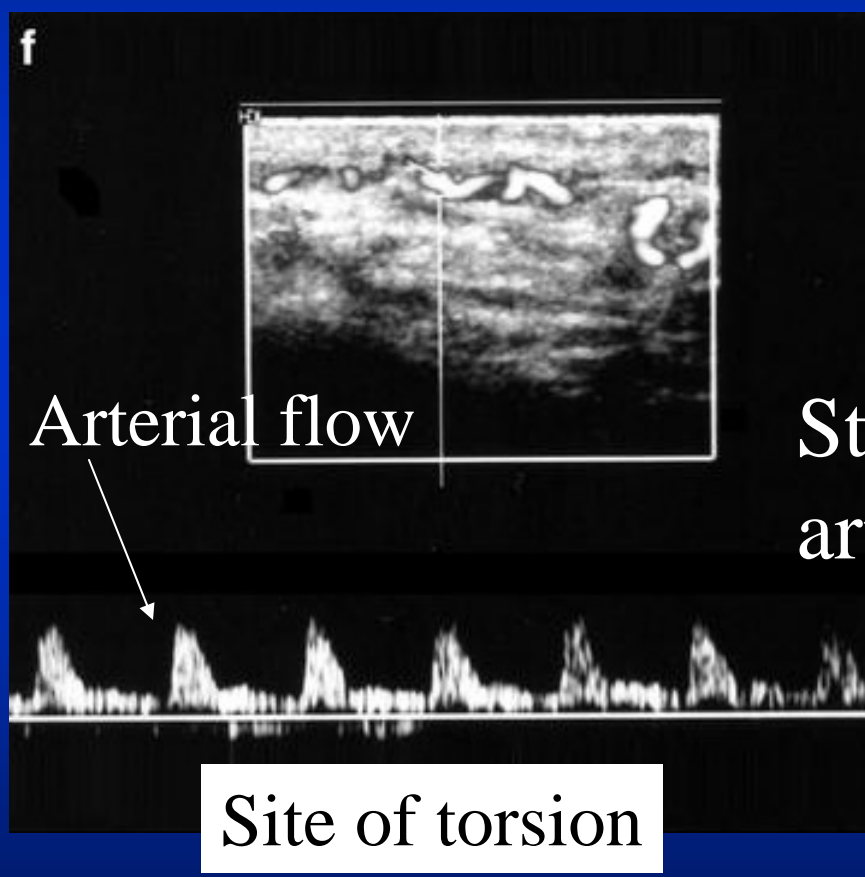


Arterial flow in testes

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

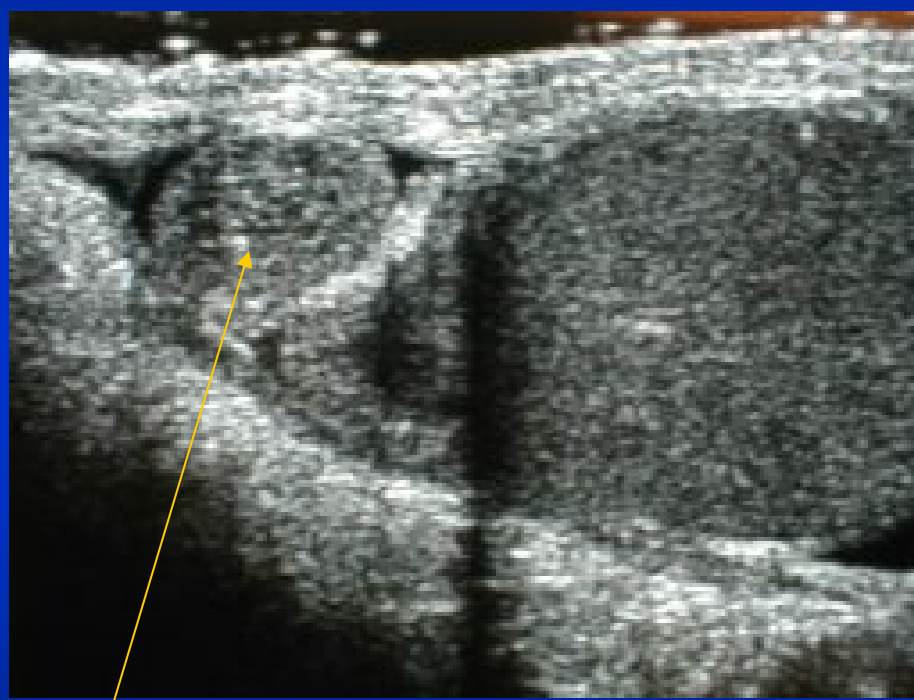


Patient F: Imaging of the cord is essential when there is still flow

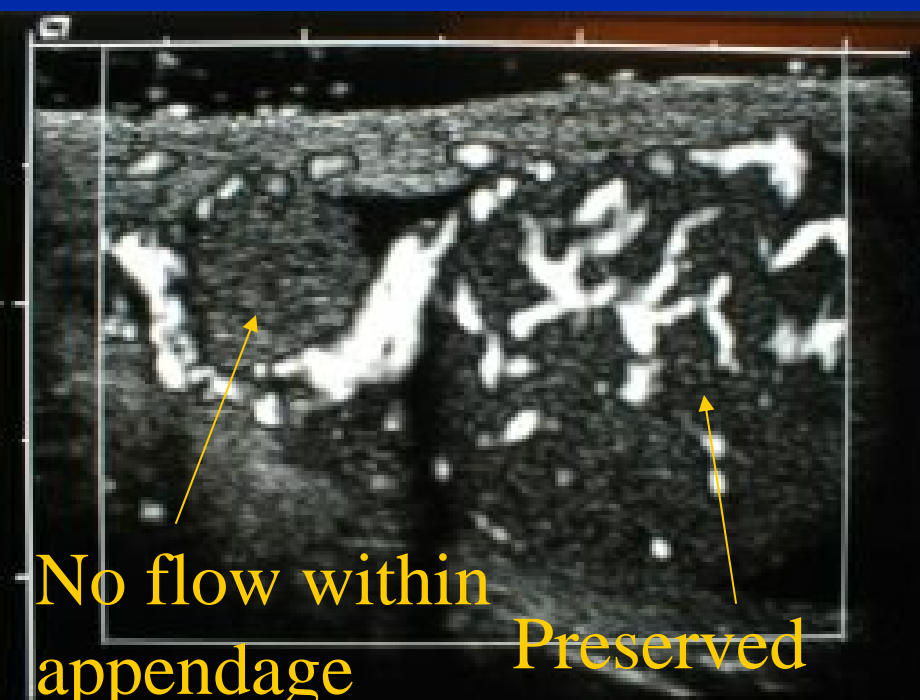




Patient G: There's blood flow, but...



Testicular appendage



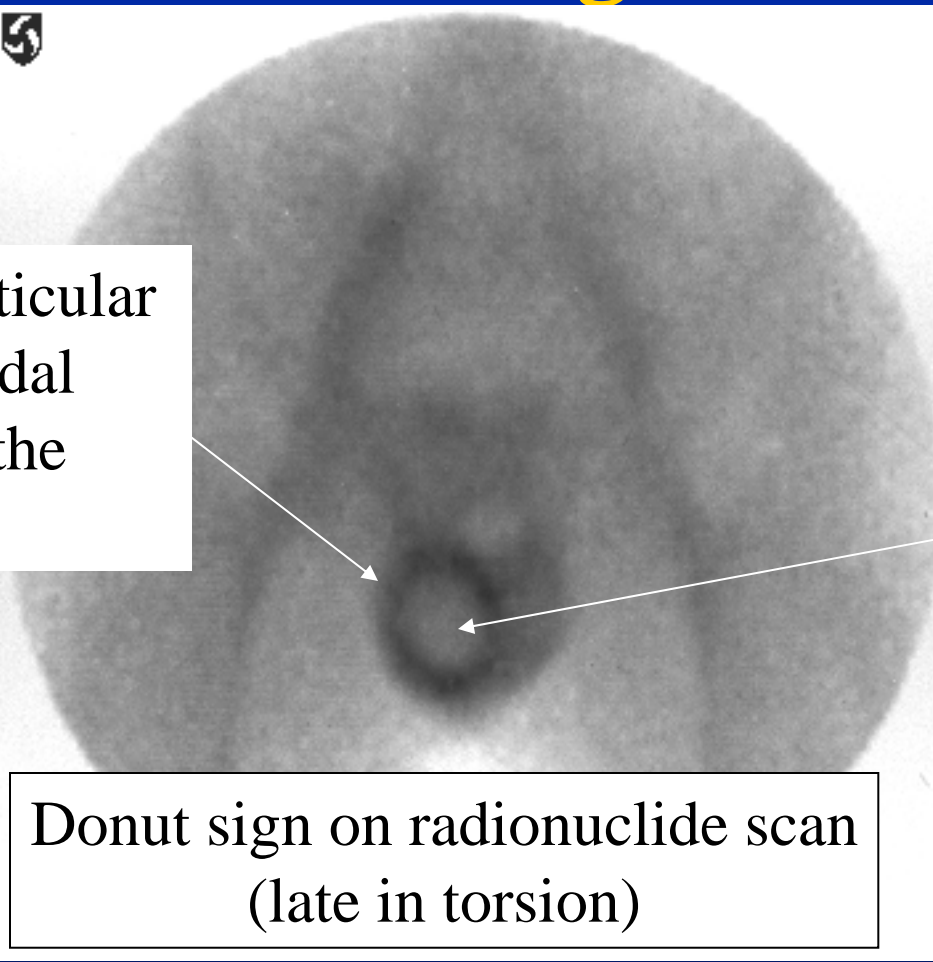
No flow within
appendage

Preserved
intratesticular
flow

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)



The role of MRI in torsion

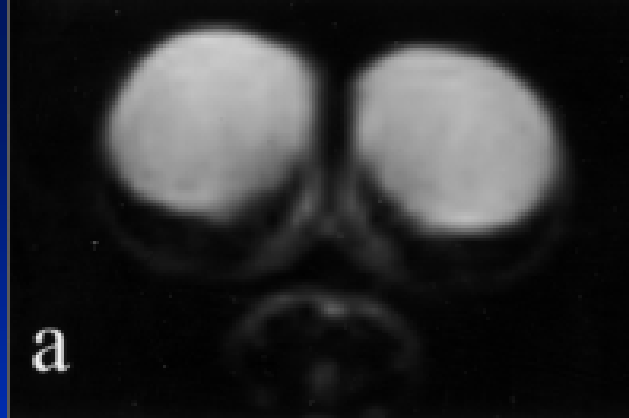
- DWI imaging detects tissue ISCHEMIA by measuring changes in cellular water content and water diffusion
- Using ischemia instead of perfusion as criteria means detection at early phases (where arterial perfusion still present) and intermittent torsion



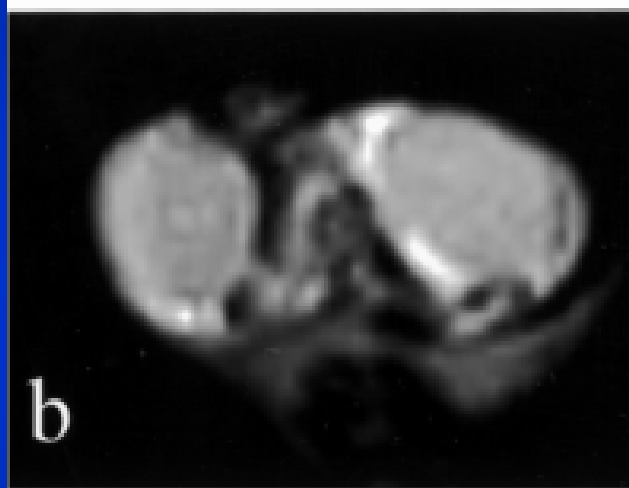
Torsion on T2 weighted image

No real difference
between ischemic
and normal on T2

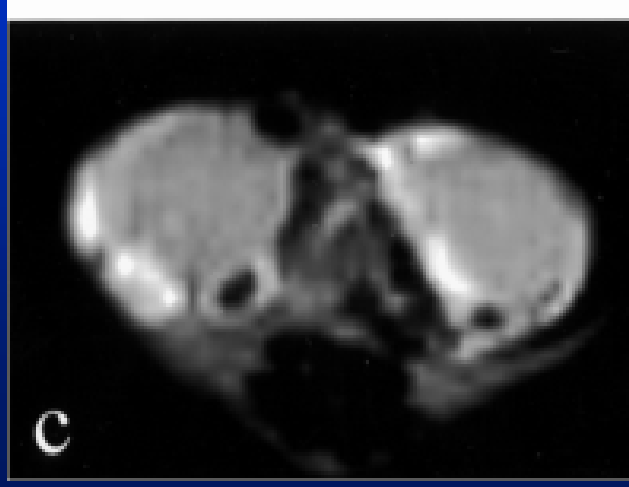
Normal



1 hour
post
ischemia



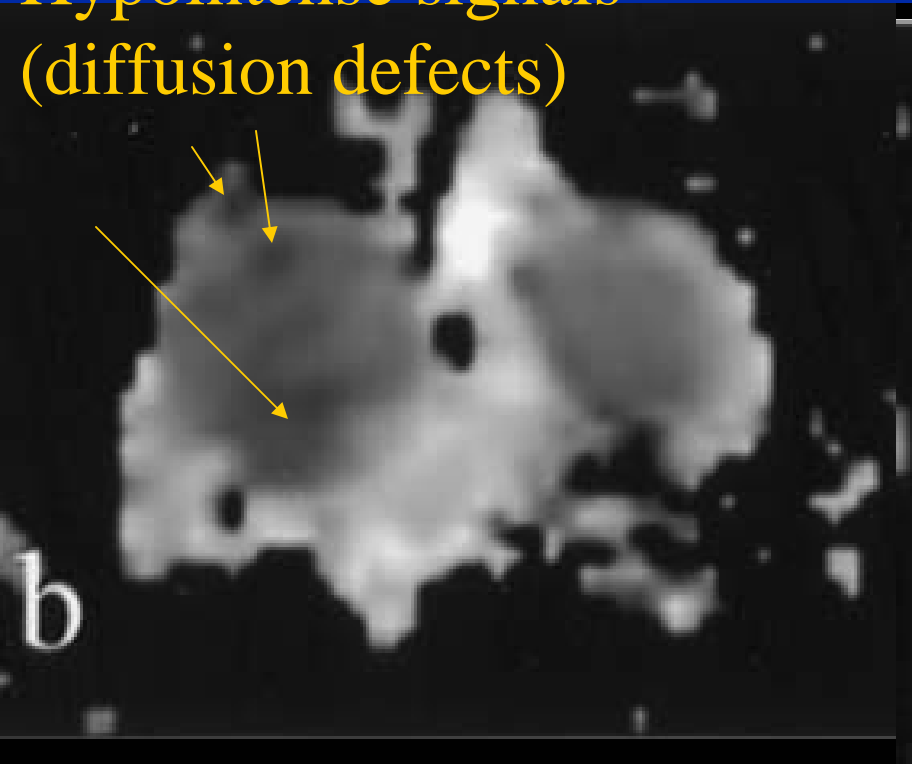
2 hours
post
ischemia



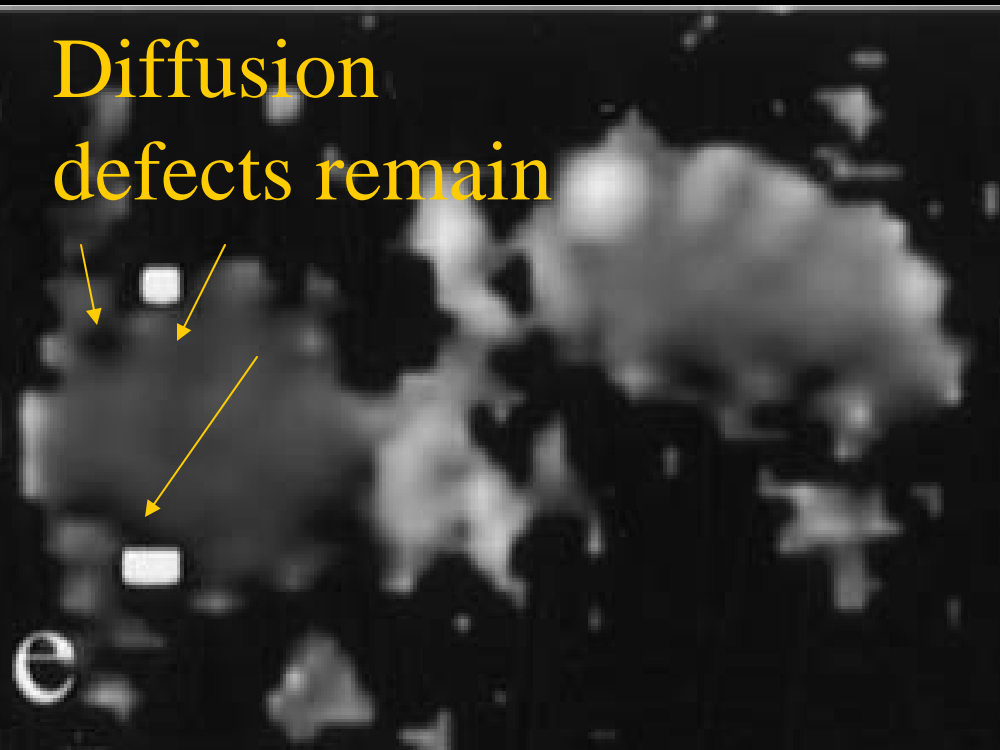


Torsion on Diffusion Weighted Imaging (DWI)

Hypointense signals
(diffusion defects)



Diffusion defects remain

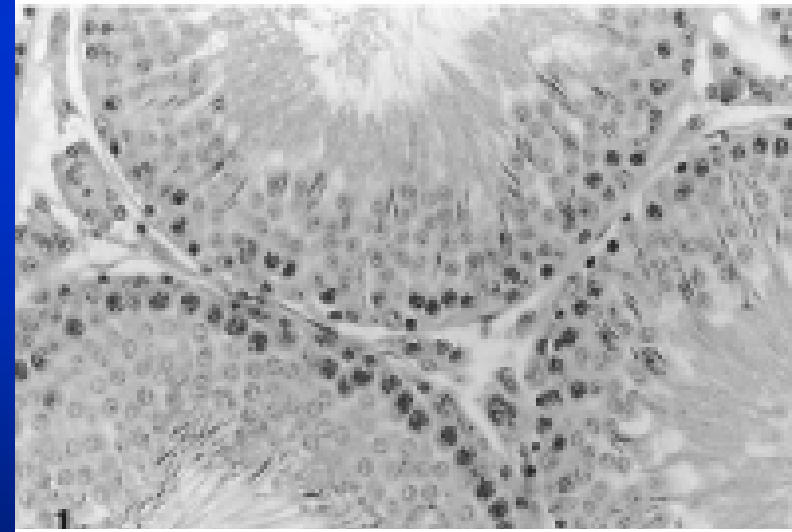
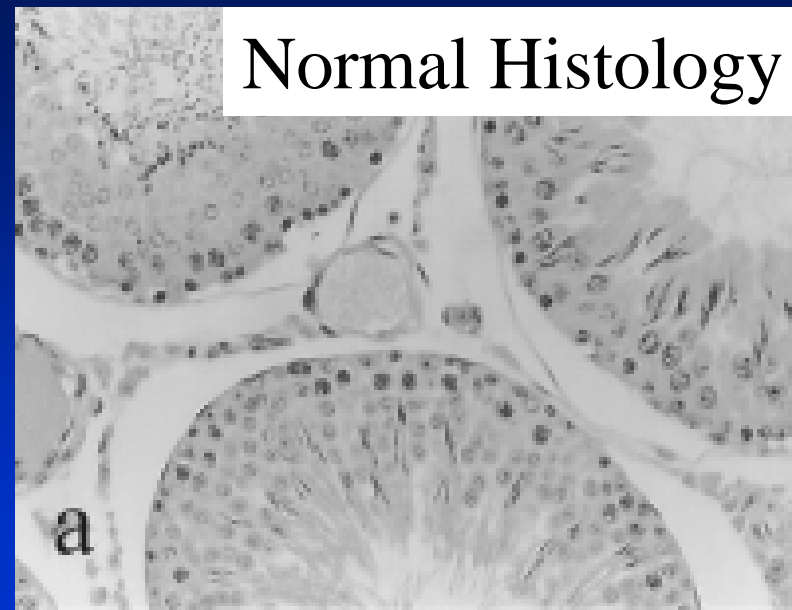
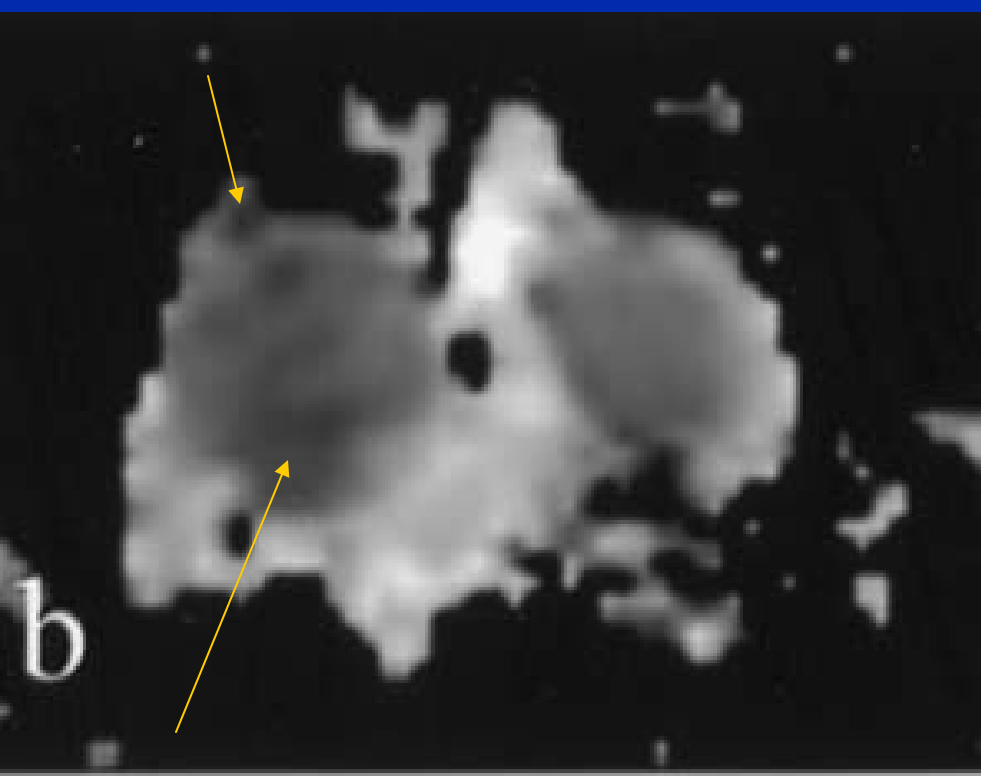


1 hour after onset of ischemia

2 hours after relief of torsion



How early is early?



DWI with hypointense defects

Histology at time of DWI



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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