Male Infertility Imaging
The Lower Tract

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LYON
male infertility: the US approach

is a complete GU exam

⇒ kidneys & bladder (SV)
  3.5 MHz + abdomen and pelvic look
⇒ scrotum

⇒ DRE
⇒ TRUS (≥ 7 MHz)

sometimes: MRI, urethrography, CT, IVP, punctures etc...
the lower tract exam

⇒ DRE
⇒ vas deferens
⇒ seminal vesicles
⇒ prostate
the lower tract exam

- DRE
- vas deferens
- seminal vesicles
- prostate
the lower tract exam

- DRE
- vas deferens
- seminal vesicles
- prostate
foetal development (androgene-dpdt foetal test.)

• regression of the Muller canal (prostatic utricule)
• wolff dev. + UGS : male genital organs
• the prostate is formed at the 4th month

small and non-functional until the puberty

exocrine gland
¼ seminal plasma
role in fertility (pH, viscosity, infections)

BPH

Muller cysts
wolffian abnormalities

in Delmas V, Dauge MC. Embryology of the prostate – current state of knowledge.
Khoury SCC, Murphy G. Denis L eds. Prostate cancer in questions.
Edinburgh, UK, ICI publications, 1991:16-7
prostate: mac Neal

transitional zone
fibromuscular anterior stroma
central zone
peripheral zone

PZ = 70 %  CZ = 25 %  TZ = 5 %
US : normal prostate

16 g
US: normal prostate

16 cc (g)  \[\frac{W \times T \times L}{2}\]

Width +, Thickness +, Length +/-
US : base
US: base

bladder neck (retr. ejac.)
ejaculatory duct
B. P. H.
vascularisation

TZ / PZ

vascular bundles
prostatic MRI

- T1 (axial)
- T2 4 mm (3 planes)
- T2 with endorectal coil
  3-4mm TE 120 - TR 3425 - ETL 14 - Bande passante 20
  matrice 256 x 256 - NEX 4
- sometimes T1 with IV gadolinium
MRI T2: endorectal coil
MRI T2: endorectal coil
MRI T2 endo : nodules BPH
Cystic Fibrosis

- 1-2% of men investigated for infertility, 10% of men with azoospermia

- Incomplete form of Cystic Fibrosis:
  - Link between absence of the VD and mutations in the CFTR gene (CF transmembrane conductance regulator). (Dumur, 1990)
  - ΔF508 mutation, > 900 mutations identified

- CF = severe autosomal recessive disease, affecting 1/2500 wh.
  - Risk for heterozygoty 1/25
  - Abnormal flux of chloride in the apical membrane of epithelial cells
  - Pancreas, pulmonary, meconium ileus, elevated sweat levels of chloride. Absence of the VD in 95% of men with CF

- P Ex: Bilat nonpalpable VD, absence of the last part of the epid., azoospermia, low semen plasma vol, acidic pH

  >> Absence of the VD, absence or hypotrophy of the SV
CBAVD : Congenital Bilateral Absence of the Vas Deferens

isolated CBAVD = minor form of phenotypic expression of CF

109 azoospermia
  51 BAVD
  17 UAVD (7 w/out ren. agen.)

BAVD :
0 SV 34 %
1 SV 53 %
2 SV 12,5%

100% abnormal SV
fluid collection w/out glandular struct. ++
CBAVD

I inf 2 Y
BAVD
1 SV = L
azoo, ph<
congenital lesions
### Embryologic origins of the male genital tract

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**Figure 3.** Drawing (lateral view) shows a 5-week-old embryo. 
A = pronephros, B = mesonephros, C = wolfian (mesonephric) duct, 
D = metanephros, E = ureteric bud, F = cloaca, G = allantois. (Adapted and reprinted.)
wolffian duct anomalies

more common than Müll. duct anom. include:

- renal agenesis (0.1% population)
- agenesis of the vas deferens
  unilat (1-7 %), bilat (1% infert, CF)
- absent or small S V
- SV cysts
- ejac. duct cysts

- Zinner syndrome = renal agenesis (or dysgenesis) with ipsilat. SV cyst
  - when ureteric bud fails to meet the metanephric blastema (to induce the development of the kidney)
wolffian duct anomalies
wolffian duct anomalies

ureteric bud with insertion in the prostatic urethra

ureteric insertion in mesonephrotic tissues:
B neck, prostatic urethra, ej. duct, SV
SV cyst

beg...

I inf 2 Y
L K agenesis
L ur bud
R SV dilat
wolffian duct anomalies

R kidney agenesis
R ureter L4
R SV present
seminal vesicle distension
polycystic disease

cystic dilation: no cyst and no obstruction (XR opacification of the ED)
atonia, dyskinesia (mechanism?)

ejaculatory duct obstruction

- low semen volume, 0 fructose, low pH, VD palpation +
- SV dilatation (> 15 mm)
- cyst of the prostatic base
- chronic prostatitis: ED dilatation
- calcification or stone within the ED

- congenital: prostatic cysts, polycystic kidney
- acquired: inflammatory or iatrogenic ED stenosis, lithiasis
SV distension

puncture- aspiration of the dilated SV ... (Jarow 1994)
SV : hémospermia
VD: enlargement and lithiasis

hemosp...

keb...
SV : lithiasis
SV : R hypotrophy, L dilation
SV : wall hypertrophy

wall = 3 mm

irregular cal  ED

chron inf...
VD & SV dilation

Pain, no obstacle
Prost = normal

No visible obstruction
prostatic cysts
prostatic cysts

- Mullerian duct cysts
  midline, sup extension above the base, large volume, 0 sperm
  associated GU anomalies are rare

- utricule cysts
  dilation of the prostatic utricule
  midline, small, sperm
  associated GU anomalies

- wolffian duct origin
  SV, ejaculatory ducts
  kidneys, ectopic ureter, sperm +

- acquired prostatic retention cysts (BPH)
  and Cowper duct cysts

MRI: situation, type of fluid, etc...
utricule cyst
utricule cyst
cyst of the prostatic base
utricule / müllerian

bar...
Müllerian duct cyst
Müllerian duct cyst
Müllerian duct cyst: TUR

unroofing
SV before and after TUR of the cyst
Müllerian duct cyst: puncture
P. cysts: percutaneous aspiration

- Normal coagulation (8 d. acet. sal.)
- Urinary infection < 0
- Antibiotherapy
- Rectal enema
- Local anesthesia < 5 cc xylo
- 22 G needle
- 45 min observation
prostatitis
prostatitis

- **subacute and acute**
  focal hyper- et hypoechogenicity
  asymmetry of the margins
  periprostatic plexus enlargement

- **chronic**
  calcifications (PZ > TZ, ED)
  ED dilatations

- **MRI**
  PZ hyposignal T2
  local deletion of the capsule
prostatitis
anterior urethra stenosis
BPH, medial lobe
chronic prostatitis
prostatitis: MRI
ED dilations
chronic prostatitis

lithiasis

SV : calcifications
lower tract: conclusion

complete GU exam (US and color-Doppler): kidneys, bladder, scrotum, VD, SV, prostate and ED

assess a distal excretory factor

⇒ confirm or discover BAVD or UAVD
  - distal types (scrotal palpation +)
  - limits: huge controlateral SV (MRI)
  - absence of SV = strong orientation for mutation research
  - renal agenesia = 0 mutation research, wolffian duct anomalies assessm.

⇒ impact of the obstruction (dilatations) et sometimes the causal factor
  - prostatic cyst (percutaneous treatment)
  - infectious lesions and sequelae (ED and SV dilatation, lithiasis)

⇒ distal assessment before proximal anastomosis

⇒ MRI, ponctions, opacifications