VESICO-URETERAL REFLUX

CRITERIA FOR SURGERY

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Vesico Ureteral Reflux

RANSLEY (1974) the BIG-BANG

MOLLARD (1984)
« In summary it ’s difficult to determine precisely the cause, the evolution, the risks of vesico-ureteral reflux and then ... the surgical indications »

> 30 years after VUR remains « a problem »
vesico-ureteral reflux stade IV?

Yes and no
After 1.5 Y. of follow up
What about this one
Persistant reflux
Numerous UTI

post op.
CORRECTING THE REFLUX?

10 / 15 % VUR → Renal Insufficiency

VUR found in 25% of the patient with RI

> 80 % better clinical status after treatment

Only a normal kidney will have a normal growth

After treatment: UTI = 24 % - HTA = 10 %

Only an urodynamic abnormality (?)

Only a normal kidney will have a normal growth

° Ardissimo G Pediatrics 2003
+ Jacobson SH. 27 year follow-up BMJ 1989
Vesico Ureteral Reflux

TREATMENT

- Aetiology of vesico ureteral reflux
- Patient’s age and sex
- Grade of vesico ureteral reflux
- Clinical outcome
- Associated malformations
- Social environment
SECONDARY VUR

AETIOLOGY

1 - Implantation, uretra ①

2 - Sphincter dysynergia
   ( + faecal retention ②)

3 - Neurogenic bladder

The cause must be treated first

AETIOLOGY

- Posterior uretral valves
- Sphincter Dysynergia.
- Neurogenic bladder

Associated ‘pathologies’

- Pelvis duplication
- Mega-ureter (protected reflux)
- Pelvi ureteric Junction  obstruction

- Solitary kidney
AGE AND SEX

10 % will disappear each year

39 % high grade at 3 years, 23 % at 5 years

70 % low grade I-III will disappear at 15 months

Neonate male

54 % High grade

> 65 % will disappear

High grade in newborns males is "particular"

Fig. 1. The distribution of male (green) and female (red) reflux units among grades of VUR (international classification).

Grade function of sex
Vesico Ureteral Reflux

AGE AND SEXE

IN SUMMARY:

- If 42% of VUR will disappear at 2 years, only 49% (+7%) will have disappeared at 5 years.
- Male are more subject to UTI before 2 years.
- In female: after the age of three.

2 years remains a “frontier”

1 Birmingham (1983) - 2 Lyon-Tanagho
Vesico Ureteral Reflux

REFLUX’ GRADE

Meta-analysis : ( AFU, IRSC, BIRMINGHAM )

After 5 years :
grade I-II : 82 %
grade III : 46 %
grade IV : 15 %

will disappear at retrograde cystography
Vesico Ureteral Reflux

REFLUX GRADE

Evolution: If the grade will go down at controls: 40% ‘good evolution’ versus 16% if stability is noted between controls

Side: If unilateral 40% versus 10% if bilateral (all grades)

Intensity: real correlation between grade
- and disparition of VUR
- and kidney lesions

Vesico Ureteral Reflux

REFLUX GRADE

IN SUMMARY:

More the grade will be high
Less it will disappear
More kidney lesions will occur

Grade III is still a “limit”

① ARANT (1992) - ② IRSC (1992)
CLINICAL OUTCOME

- 50% had, during UTI, lesions on DMSA
- 30 - 40% with scars had VUR
- 36 - 46% : the lesions will persist

Oh MM J Urol 2008
CLINICAL OUTCOME

- **Antibiotics**: 20% (IRSC), 29% (Birmingham) will not avoid UTI

- **Therapeutic compliance**: 10 - 30% of children did not take correctly their antibiotics

30% à 50% of the children are not "well protected" in the long-term
SURGICAL TREATMENT

◆ Efficacy on VUR: 95 to 98%
◆ Authorize, if kidney is normal, its growth
◆ Diminish 2-3 times the number of UTI type pyelonephritis (low IU = id)

Normal Ureter

\[ a = \text{sub mucosal length} \]
Refluxing Ureter

Short sub mucosal funnel
Goal:
Augment the sub mucosal channel

Surgery
Reimplantation of the ureter

Endoscopy
Injection Sub meatal
Surgical treatment

Principles

- Respect of the ureter vascularisation
- Sub ureteral channel $4 \times$ ureteral diameter
- Strong ureteral fixation
Ureteral reimplantation

Opening the bladder

- Leadbetter-Politano (1958)
- Cohen (1975)
- Glenn-Anderson (1967)
- Gil-Vernet (1984)
- Mathisen (1964)
- Hutch (1963)

Without opening the bladder

- Lich-Gregoir (1964)
Cohen reimplantation

Glenn-Anderson

Leadbetter-Politano
Lich-Gregoir

Post. view
Modelage : Hendren procedure

be care of the vascularization
Endoscopic treatment: principle

Short sub mucosal funnel

b + c > a
PHYSIO-PATHOLOGY

Before injection

- Refluxing ureter
- Shortness of intramural tunnel
- Bad mooring of ureter to the trigone
- Wide ureteral orifice

After injection

- Detrusor
- Ureteral orifice in «nipple»
- Droplet of MPI under mucosa

Evite le déplacement de l’uretère vers le haut lors du remplissage, confère au trajet sous-muqueux un appui post.
Bulking agents

- **Macroplastique**: silicone particles
- **Deflux**: dextranomer, hyaluronic acid
- **Vortex**: polyacrylate, polyalcohol
Macroplastique injection
VESICO URETERAL REFLUX

Primary

< 2 ans
- Neonatal → 1 year
- Grade I-II
  - except if UTI multiple
  - if clinical status < 0
  - if associated malform.
- Treat the cause
- beware of male

> 2 ans
-Grade III-IV
- all grade
  - if clinical or
  - DMSA consequences
- Treat the cause
- beware of female

SECONDARY
THANK YOU
PARTICULAR CASES

- **Solitary kidney**
  - 15-20% vesico-u-reflux

- **Pelvi ureteral junction**
  - 1 - obstruction
  - 2 - VUR

- **Unilateral vesico-u.reflux**
  - 1 - aetiology
  - 2 - controlateral side

- **Reflux and non functionning K.**
  - ureterectomy
Antibio-prophylaxy

- In order to wait for spontaneous regression
- Ultrasonography and DMSA scan
- (6 months to 1 year)

without CBU weekly !!....
Antibioprophylaxis

- 1/3 to 1/4 dose mono or bi-therapy
- Continuous from 0-6 months to 1 Y.
- OK if clinical amelioration

- Others possibilities
  5 days / 7
  10 days a month
  etc.....
Urinary tract malformation

Can a ‘normal’ ultrasonography avoid cystography in young infant? NO

Constatation of every month in our practice

Failure of prenatal ultrasonography to present urinary infection...
Br J Urol. 1996;77:905-908 Lakhoo K
Patient No 1  
Hydronephrosis: 3 mm
Patient No 1

Retrograde Cystography
Patient No 2

4 mm

Even more
Diagnosis by the scintigraphy !!
Vesico ureteral reflux

08/05

2 UTI
DMSA OK
(Upper pole ok)

09/06

?
REIN FONCTIONNEL UNIQUE

LA FREQUENCE DU REFLUX VARIE SELON LE TYPE D’ANOMALIE RENALE

◆ Dysplasie rénale multikystique
  17% de reflux (5/30)

◆ Agénésie rénale
  41% de reflux (7/10)

La cystographie n’ est demandée qu’ en cas d’ anomalie parenchymateuse ou urétérale du rein fonctionnel
PYÉLECTASIE ANTENATALE

- 13 % correspondent à un reflux (40/302 – Y Aigrain)

- Particulièrement évocatrice quand elle est associée à :
  - une dilatation urétérale
  - des anomalies calicielles et/ou du parenchyme rénal
  - une petite taille du rein
  - Épaississement du bassinet
  - une grande vessie.
SELECTIVES INDICATIONS of UCR in case of antenatal diagnosis
(Protocole Trousseau / timone – 2003)

1. Hydronephrosis $\geq 10$ mm on US at 10 days

2. Associated to
   - Ureteral dilatation
   - Abnormality of the renal pelvis or parenchyma
   - Small kidney
   - Mega bladder

3. Familial notion of VUR (?)
« normal » Ureter

\[ a = \text{length of the sub mucosal funnel} \]
Refluxing ureter

Short sub mucosal funnel
Allongement du tunnel sous-muqueux après traitement par injection

\[ b + c > a \]
Réimplantation urétérale

Extra-vésicale: Lich-Gregoire (1964)

Extra- et intra-vésicale: Paquin (1959)

Intra-vésicale: Leadbetter-Politano (1958)
Cohen (1975)
Glenn-Anderson (1967)
Gil-Vernet (1984)
Mathisen (1964)
Hutch (1963)