# Discussões e Confidências sobre as Infecções do Trato Genitourinário em Pediatria.

Emmanuela Reis

Nefropediatra

www.conepmt.com.br

2º CONEP-MT Congresso de Nefrologia Pediátrica de Mato Grosso
Da embriogênese ao transplante

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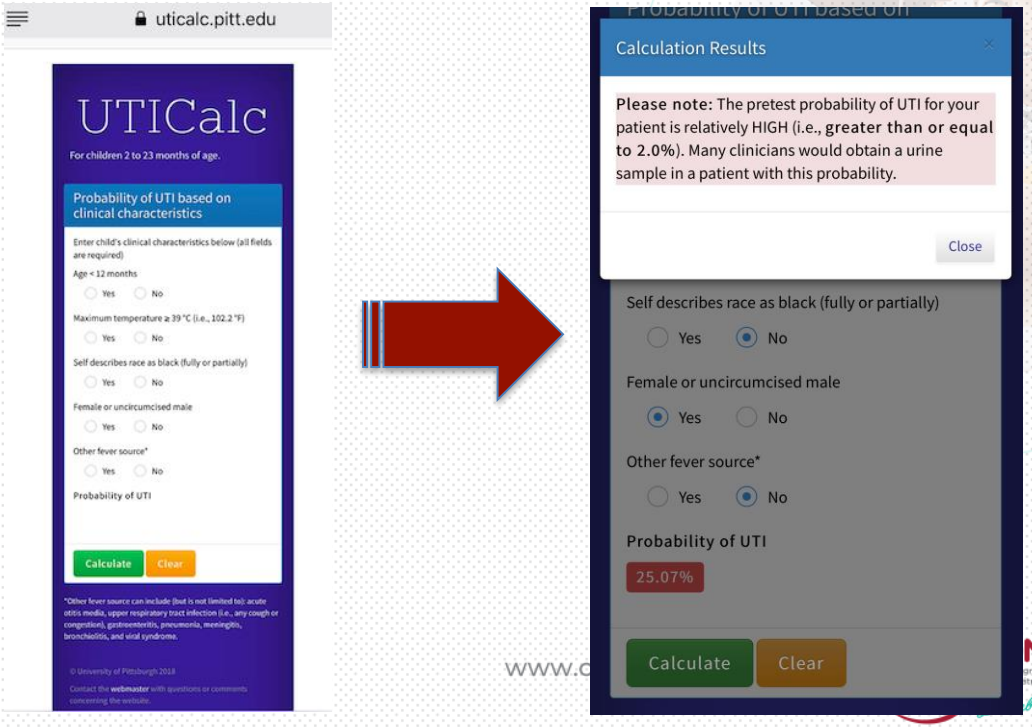
De acordo com a norma 1595/2000 do Conselho Federal de Medicina e a Resolução RDC 96/2008 da ANVISA, a **declaração de conflito de interesse** é imprescindível e deve ser apresentada ao iniciar a aula.

# Objetivos:

- Definição;
- Fisiopatologia;
- Manifestações clínicas e laboratoriais;
- Tratamento de escolha.

# Universidade de Pittsburgh:

desenvolveu aplicativo para cálculo de risco de ITU Febril em crianças de 2- 24 meses em crianças com febre (> 38°C) antes do resultado de exames laboratoriais.

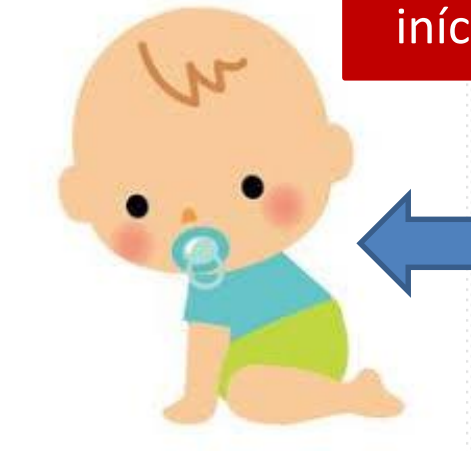


**“É a identificação de um único germe patogênico em qualquer segmento do trato urinário, identificado por urocultura coletada por método confiável.”**

https://www.sbp.com.br/fileadmin/user_upload/2016/12/Nefrologia-Infeccao-Trato-Urinario.pdf

Controle Esfincteriano:
3 a 5 anos

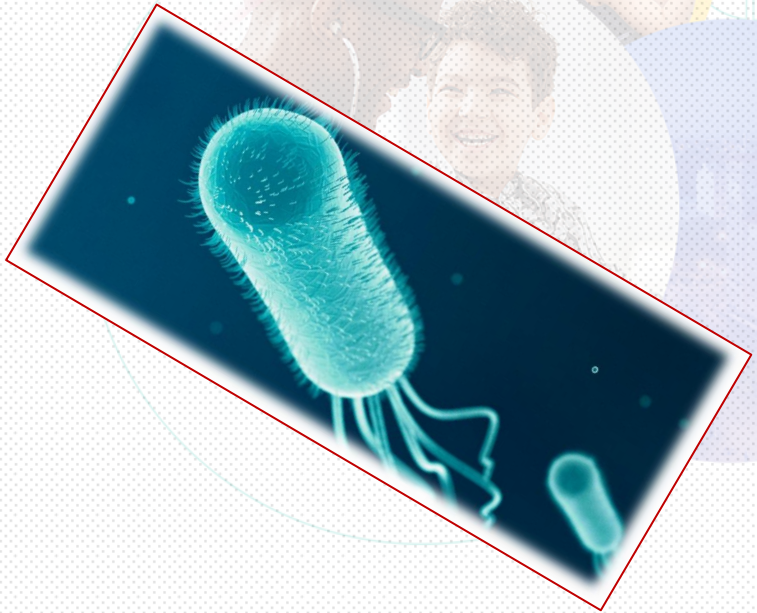
Adolescentes:
Alterações hormonais e
início de atividade sexual



Malformações:
0 a 6 meses

# Patógenos:

- **E. Coli**
- Proteus
- Klebsiella
- Staphylococus saprophyticus
- Enterococcus
- Enterobacter
- Pseudomonas
- Streptococcus Grupo B
- Staphylococcus aureus
- Staphylococcus epidermidis
- Haemophilus influenza.



# Patógenos:

| AGENTE ETIOLÓGICO | FAIXA ETÁRIA | SEXO | ASSOCIAÇÃO |
|---|---|---|---|
| E. coli | todas | igual | |
| Klebsiella | neonatos | igual | |
| Proteus | | masculino (30%) | litíase<br>(depósito uréia)<br>Esmegma/glande |
| Staphylococcus saprophyticus | adolescentes | feminino | sexualmente ativas |
| Providence, Citrobacter, Strepto grupo D, Enterobacter, Pseudomonas, Staphilo aureus ou epidermidis, fungos | | | imunossupressão, malfomação, cirurgias, catéteres,<br>etc. |



REFERÊNCIA BIBLIOGRÁFICA: Toporovski J. et al, Nefrologia Pediátrica, 2ed, 2006

**Figura 1** – Representação esquemática *E.coli* uropatogênica[10]

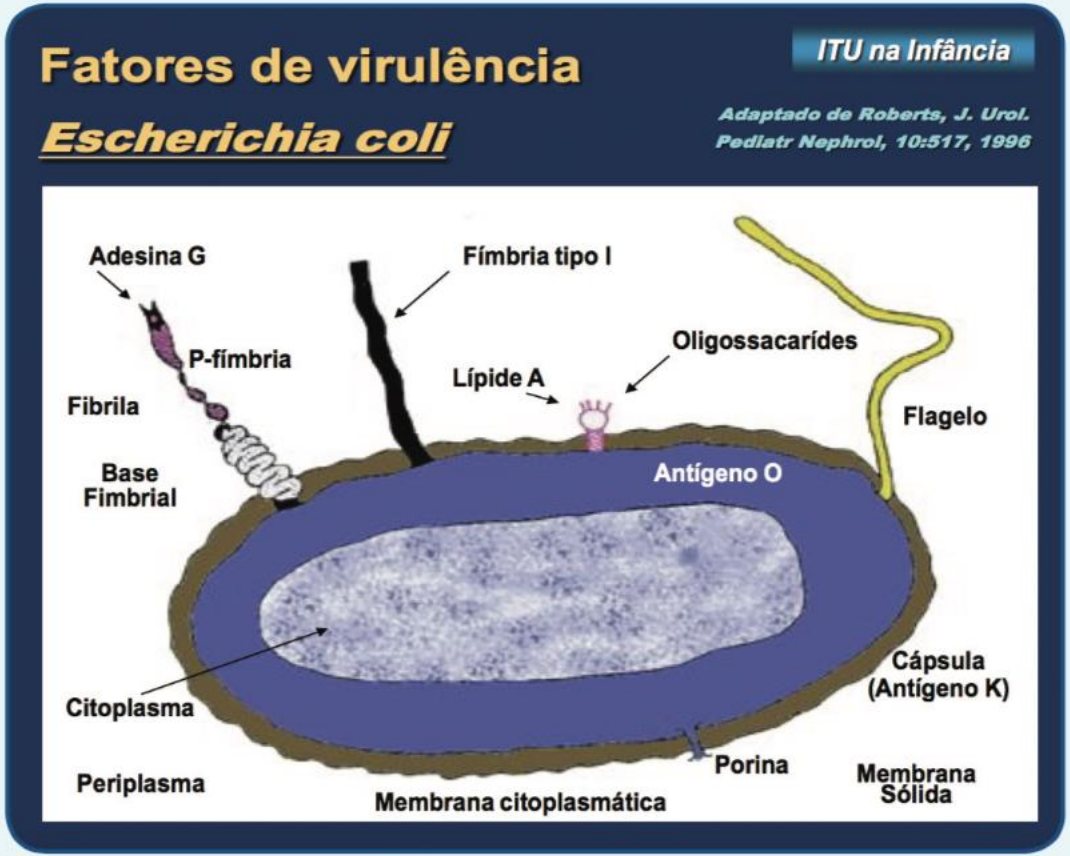
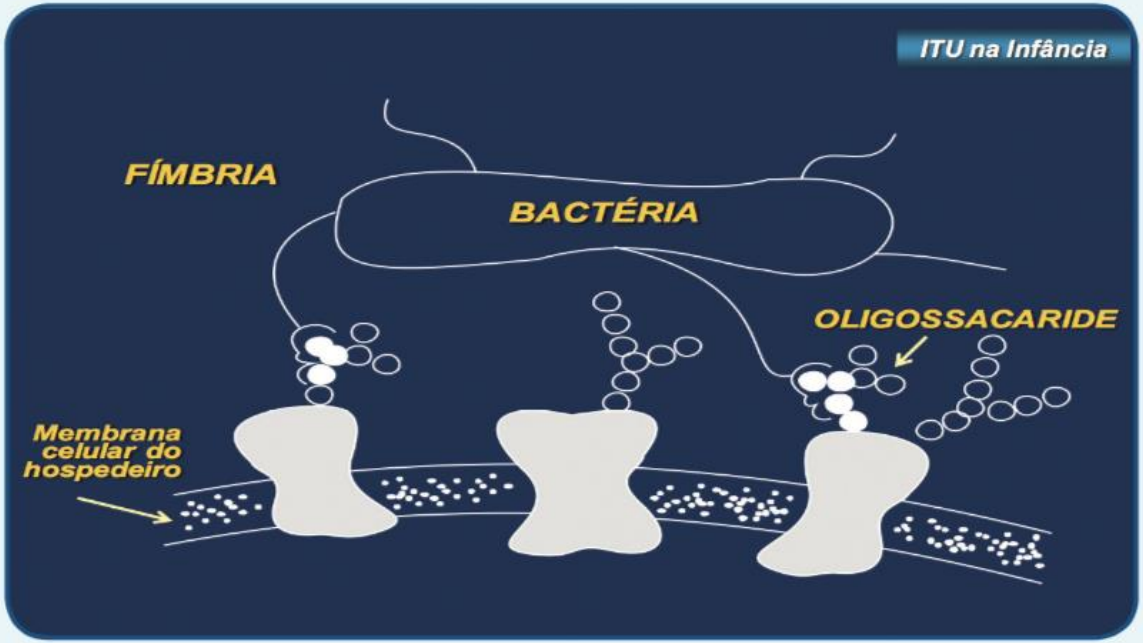


**Figura 2** – Representação esquemática da adesão bacteriana[10]



# Classificação:

- Localização:
  - Cistite (TUI):
    - inflamação da mucosa
  - Pielonefrite (TUS):
    - infecção difusa do parênquima e pelve renal acompanhado de febre (>39°).
- Episódio:
  - Primoinfecção;
  - Infecções Recorrentes.

> As acknowledged by the American Academy of Pediatrics (AAP) in its practice parameters, the presence of high fever (≥39°C) with clinical diagnosis of UTI is an important indicator of pyelonephritis compared with no fever (≤38°C) in those with cystitis [12, 13]. Indirect tests of inflammation

REFERÊNCIA BIBLIOGRÁFICA: **1.** Raimund Stein et al. Urinary Tract Infections in Children: EAU/ESPU Guidelines. EUROPEAN UROLOGY 67 (2015) 546–558. **2 .** Sermin A. Saadeh & Tej K. Mattoo. Managing urinary tract infections. Pediatr Nephrol (2011). http://pediatrics.aappublications.org/content/pediatrics/138/6/e20163026.full.pdf

# Classificação:

- Sintomas:
  - Bacteriúria Assintomática;
  - Sintomática: específicos (c
    inespecíficos.
- Fator de Complicação:
  - Com malformação associada;
  - Sem malformações.

> Asymptomatic bacteriuria (ABU) is defined as the growth of a significant number of a single organism [often> 100,000 colony-forming units (CFU)/ml] from a urine sample of an asymptomatic child with no pyuria. It is often an incidental finding and can be demonstrated on repeat urine cultures. The bacterium isolated is most often an *E.*

REFERÊNCIA BIBLIOGRÁFICA: **1.** Raimund Stein et al. Urinary Tract Infections in Children: EAU/ESPU Guidelines. EUROPEAN UROLOGY 67 (2015) 546–558. **2 .** Sermin A. Saadeh & Tej K. Mattoo. Managing urinary tract infections**.** Pediatr Nephrol (2011). http://pediatrics.aappublications.org/content/pediatrics/138/6/e20163026.full.pdf

Journal of Pediatric Urology (2017) 13, 567–573

Review Article

# Urinary tract infection in children: Diagnosis, treatment, imaging – Comparison of current guidelines

M. Okarska-Napierała [a], A. Wasilewska [b], E. Kuchar [a]

# Classificação (NICE):

- Recorrente:
  - PN (2 ou +) ou PN + cistite ou >3 cistites
- Atípica:
  - Sepse, acumulo de escórias renais, não resposta a antibioticoterapia estipulada, não E. coli etc.

| Faixa Etária | Neonatos: | Lactentes: | Demais: |
|---|---|---|---|
| | ❖ Instabilidade térmica<br>❖ Letargia<br>❖ Irritabilidade<br>❖ Hiporexia<br>❖ Vômitos<br>❖ Icterícia<br>❖ Labilidade glicêmica | ❖ Instabilidade térmica<br>❖ Febre sem causa aparente<br>❖ **Anorexia, Vômitos, palidez, cólicas (95%)**<br>❖ Dif. Ganho de peso<br>❖ Icterícia<br>❖ Hepatomegalia<br>❖ Esplenomegalia<br>❖ Retenção urinária<br>❖ Jato urinário fino<br>❖ IRA | ❖ Febre de Origem Obscura<br>❖ Disúria<br>❖ Dor lombar<br>❖ Dor supra púbica<br>❖ Poliúria<br>❖ Hematúria<br>❖ Enurese de início recente |



REFERÊNCIA BIBLIOGRÁFICA: **1.** Raimund Stein et al. Urinary Tract Infections in Children: EAU/ESPU Guidelines. EUROPEAN UROLOGY 67 (2015) 546–558. **2 .** Sermin A. Saadeh & Tej K. Mattoo. Managing urinary tract infections**.** Pediatr Nephrol (2011). http://pediatrics.aappublications.org/content/pediatrics/138/6/e20163026.full.pdf.

# Exame de Urina Simples:

| | LEUCOCITÚRIA | BACTERIOSCOPIA | ESTEARASE LEUCOCITÁRIA | NITRITO | ESTEARASE NITRITO |
|---|---|---|---|---|---|
| SENSIBILIDADE (+) | 74% | 91% | 79% | 49% | 88% |
| ESPECIFICIDADE (-) | 86% | 96% | 87% | 98% | 79% |

REFERÊNCIA BIBLIOGRÁFICA: Williams GJ, Macaskill P, Chan SF, Turner RM, Hodson E, Craig JC (2010) Absolute and relative accuracy of rapid urine tests for urinary tract infection in children: a meta-analysis. . Lancet Infect Dis 10:240–250. Avaliação da urina (Rushton,1999; Downs, 1999; Sermin,2011)
http://pediatrics.aappublications.org/content/pediatrics/138/6/e20163026.full.pdf

# Cultura de Urina:

| MÉTODO DE COLETA | RISCO DE CONTAMINAÇÃO | CONSIDERAR ITU |
|---|---|---|
| JATO MÉDIO | DIMINUI | ≥ 100.000 UFC/ml |
| SACO COLETOR | AUMENTADA<br>AMERICAN ACADEMIC OF PEDIATRICS - DX EXCLUSÃO (85% FP) | ≥ 100.000 UFC/ml |
| PUNÇÃO SUPRA-PÚBICA | PRATICAMENTE NULA | QUALQUER VALOR (99%) |
| SONDAGEM VESICAL | BAIXO RISCO<br>CRIANÇAS COM VULVOVAGINITES OU BALANOPOSTITES (ESCOLHA) | ≥ 100.000 UFC/ml (95%)<br>10.000 - 100.000: provável |



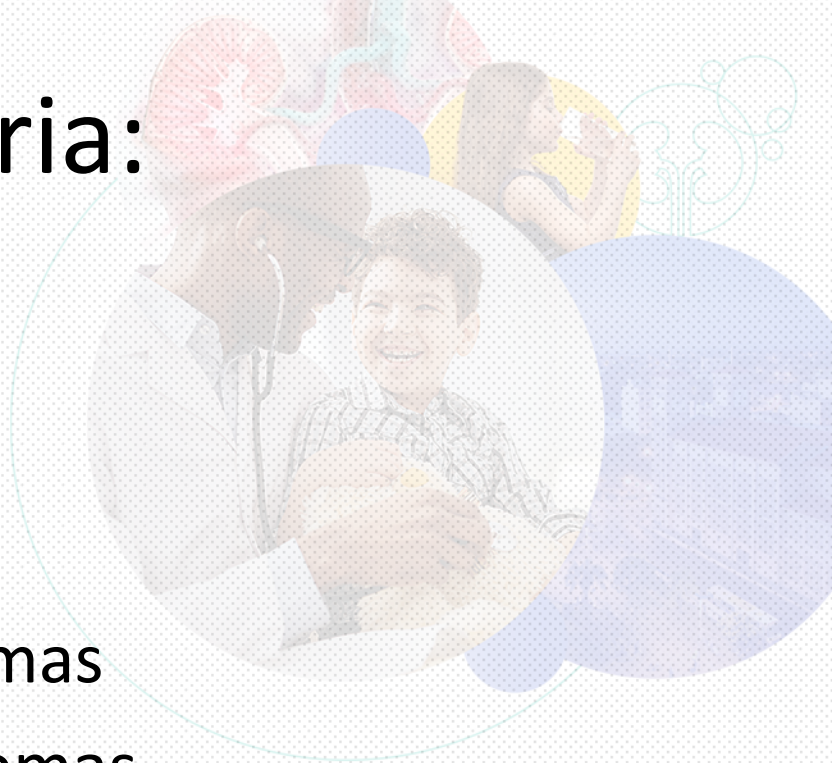
REFERÊNCIA BIBLIOGRÁFICA:Saadeh S.A & Matoo T.K., Managing urinary tract infection, Ped. Nephrol, 2011

**Table 1** Comparison of the guidelines.

| | NICE 2007 | AAP 2011 | ISPN 2011 | CPS 2014 | PSPN 2015 | EAU/ESPU 2016 | Our proposal of recommendation | References |
|---|---|---|---|---|---|---|---|---|
| Urine collection in non-toilet-trained children | **Clean catch mid-stream void** Alternatively: collection bag | **Bladder catheterization** or **SPA** (relates to children aged <2 years) | **Bladder catheterization** (in poor general health) or **clean catch mid-stream void** (method of choice) Collection bag is acceptable for urinalysis, not for culture | No recommendation, but bladder catheterization or clean catch mid-stream void are the preferred methods | Any method for urinalysis **Clean catch mid-stream void, bladder catheterization** or **SPA** for culture | **Clean catch mid-stream void, bladder catheterization** or **SPA** for diagnosis Collection bag only as a method of exclusion | **Bladder catheterization** or **clean catch mid-stream void** Collection bag only as a method of exclusion | Finnell 2011 Tosif 2012 |
| Significant bacteriuria | Not included | Catheterization: $5 \times 10^4$ CFU/ml | Catheterization: $>10^4$ CFU/ml Clean voided urine: $>10^5$ CFU/ml Urinary bag: $>10^5$ CFU/ml | Catheterization: $>5 \times 10^4$ or $>10^4$ CFU/ml (depending on the laboratory standard) Clean voided urine: $>10^5$ CFU/ml SPA: any growth of bacteria | | Catheterization: $\geq 10^3$–$10^5$ CFU/ml Clean voided urine: $>10^4$ CFU/ml with symptoms OR $>10^5$ without symptoms SPA: any growth of bacteria | Catheterization: $\geq 10^3$ CFU/ml Clean voided urine: $>10^4$ CFU/ml with symptoms OR $>10^5$ without symptoms SPA: any growth of bacteria | Hoberman 1994 Swerkersson 2016 |
| Route of antibiotic administration | ***Parenteral*** in all children <3 months and in those who are unable to eat and/or in poor general health Parenteral antibiotics should be switched to oral after 2–4 days ***Oral*** in other children >3 months | ***Parenteral*** only in children unable to eat and/or in poor general health Parenteral antibiotics should be switched to oral as soon as clinical improvement is observed ***Oral*** in all other patients | ***Parenteral*** only in children unable to eat and/or in poor general health Parenteral antibiotics should be switched to oral after 2–4 days ***Oral*** in all other patients | ***Parenteral*** only in children unable to eat and/or in poor general health ***Oral*** in all other patients, but children <3 months; need close monitoring | ***Parenteral*** in most children <3 months and in those who are unable to eat and/or in poor general health ***Oral*** in all other patients | ***Parenteral*** in all children <2 months and in those who are unable to eat and/or in poor general health ***Oral*** in all other patients | ***Parenteral*** only in children unable to eat and/or in poor general health Parenteral antibiotics should be switched to oral as soon as clinical improvement is observed ***Oral*** in all other patients | Hoberman 1999 Pohl 2007 |
| Treatment duration | Upper UTI: 7–10 days Lower UTI: 3 days | 7–14 days | 7–14 days | Upper UTI: 7–14 days Lower UTI: 2–4 days | Upper UTI: 7–10 days Lower UTI: 3–5 days | Upper UTI: 7–14 days Lower UTI: at least 3–5 days | Upper UTI: 7–10 days Lower UTI: 3 days | Strohmeier 2014 |

SPA – suprapubic aspiration; CFU – colony forming units.

# Bacteriúria:



- Cateter uretral:
  - > 1.000 UFC/mL
- Jato Médio:
  - > 1.000 UFC/mL com sintomas
  - > 10.000 UFC/mL sem sintomas

**Quadro 4** – Agentes antimicrobianos para o tratamento parenteral da ITU[2]

| Agente antimicrobiano | Dosagem |
|---|---|
| Ceftriaxone | 75 mg/kg – 150mg/kg / 24hs |
| Cefotaxime | 75 mg/kg – 150mg/kg / 24hs |
| Ceftazidime | 100 mg/kg – 150mg/kg/d/8hs |
| Gentamicina | 7,5mg/kg/24hs |
| Tobramicina | 6mg/kg/24hs (dividida cada 6 a 8hs) |
| Amicacina | 15mg/kg/24hs |
| Piperaciclina | 300mg/kg/24hs (dividida cada 6-8hs) |

https://www.sbp.com.br/fileadmin/user_upload/2016/12/Nefrologia-Infeccao-Trato-Urinario.pdf

**Quadro 5** – Agentes antimicrobianos para tratamento oral da ITU[2]

| Agente antimicrobiano | Dosagem |
|---|---|
| Amoxacilina-Clavulanato | 20-40mg/kg/dia/8hs |
| Sulfametoxazol-Trimetropim | 30-60mg/kg/dia/12hs |
| Cefalexina | 50-100mg/kg/dia/6hs |
| Axetil-Cefuroxime | 20-30mg/kg/dia/12hs |
| Cefprozil | 30mg/kg/dia/12hs |

https://www.sbp.com.br/fileadmin/user_upload/2016/12/Nefrologia-Infeccao-Trato-Urinario.pdf

# Quimioprofilaxia:

- Prophylaxis has been shown to be beneficial in preventing new renal scars in infant girls with dilating reflux III and IV. Reflux should be excluded in patients with febrile UTIs.

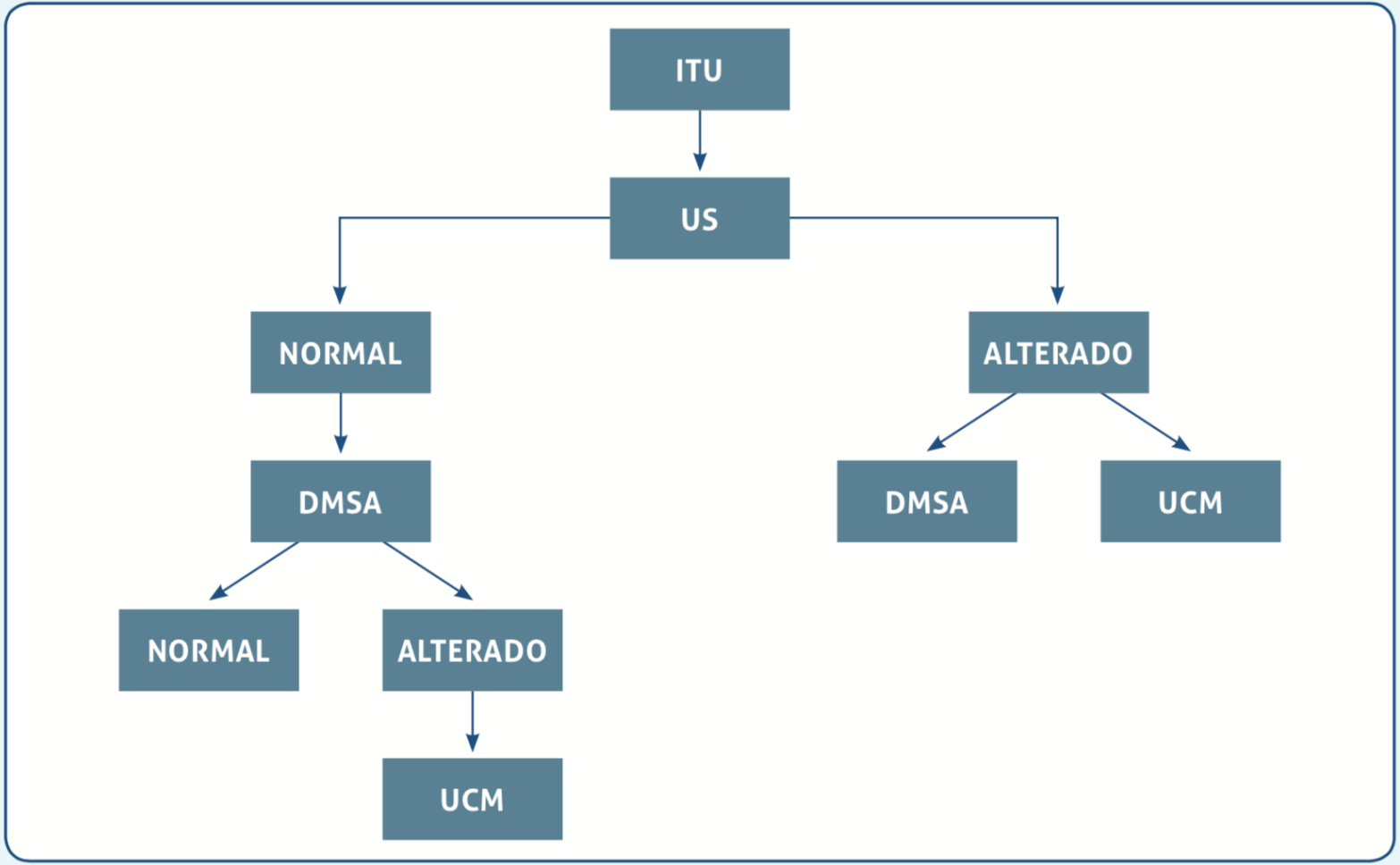
ITU febril R;
Dsf miccional e
RVU alto grau

The recently published Randomized Intervention for Children with Vesicoureteral Reflux (RIVUR) trial including 607 children (280 with a reflux I or II and 322 with a reflux III or IV) demonstrated that antimicrobial prophylaxis with trimethoprim/sulfamethoxazole reduced the risk of recurrence by 50%. In particular, children with a febrile index infection, bladder and bowel dysfunction (BBD), or dilating reflux benefitted from prophylaxis. The number of new renal scars was not different in this study [83].

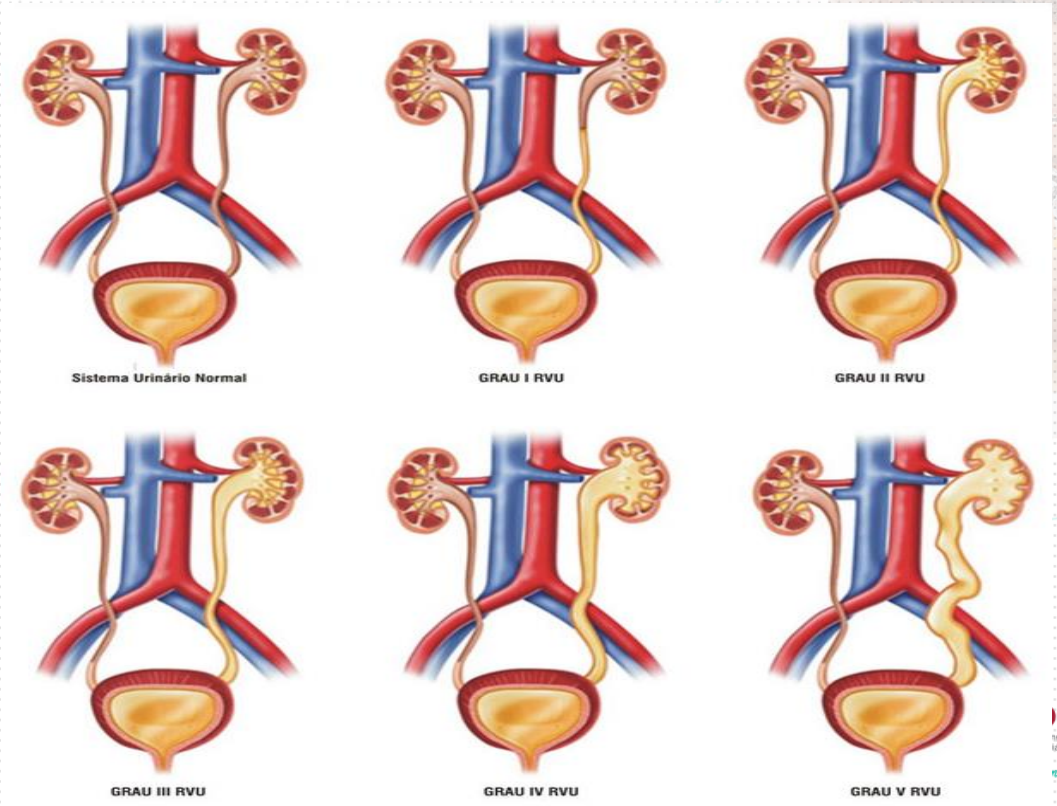


REFERÊNCIA BIBLIOGRÁFICA: **1.** Raimund Stein et al. Urinary Tract Infections in Children: EAU/ESPU Guidelines. EUROPEAN UROLOGY 67 (2015) 546–558.**2.** Park S, Song SH, Lee C, Kim JW, Kim KS. Bacterial pathogens in first febrile urinary tract infection affect breakthrough infections in infants with vesicoureteral reflux treated with prophylactic anti- biotics. Urology 2013;81:1342–5. **83.** RIVUR Trial Investigators. Hoberman A, Greenfield SP, Mattoo TK, et al. Antimicrobial prophylaxis for children with vesicoureteral reflux. N Engl J Med 2014;370:2367–76.

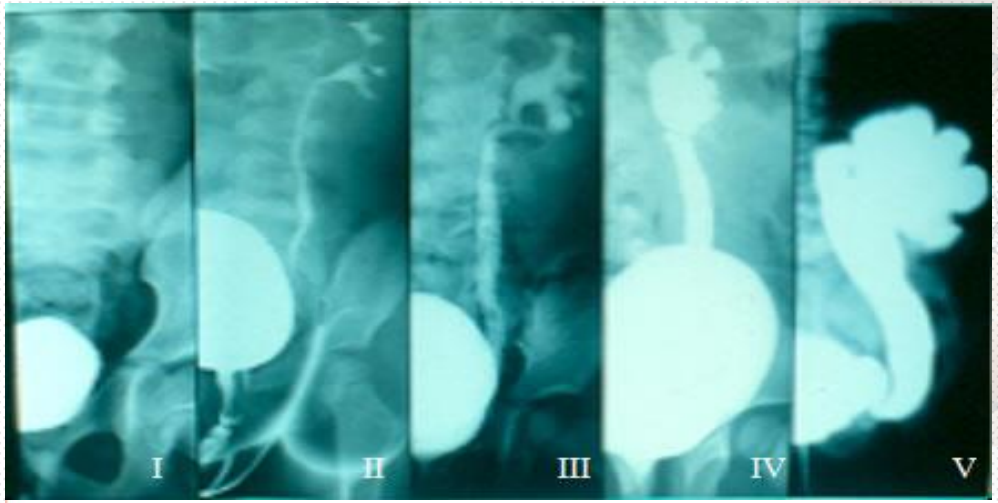
## ALGORITIMO DA INVESTIGAÇÃO POR IMAGEM DA ITU[1]

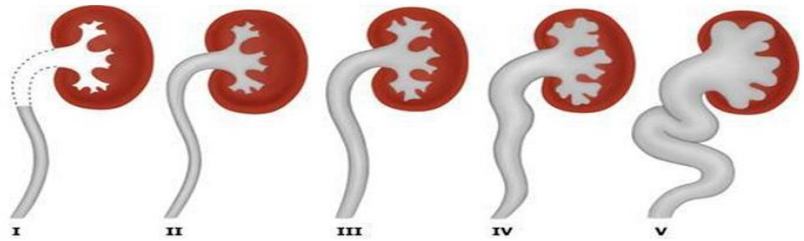


# Refluxo Vesico Ureteral



# Refluxo Vesico Ureteral

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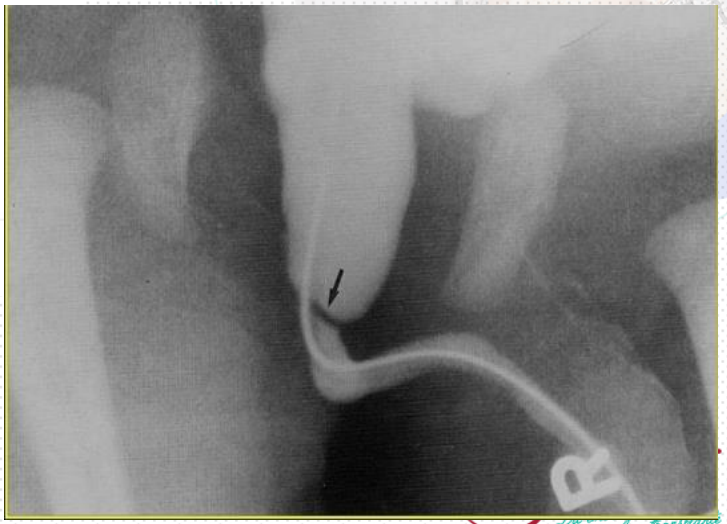
# Válvula de Uretra Posterior

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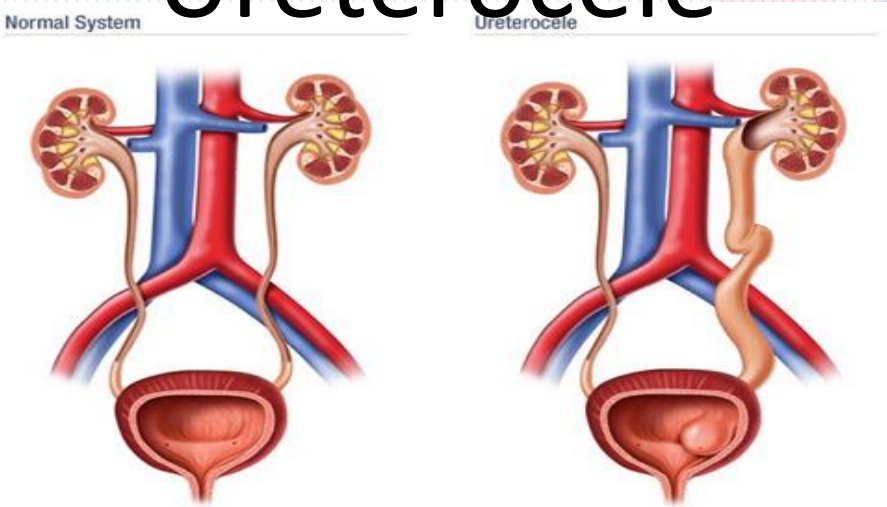
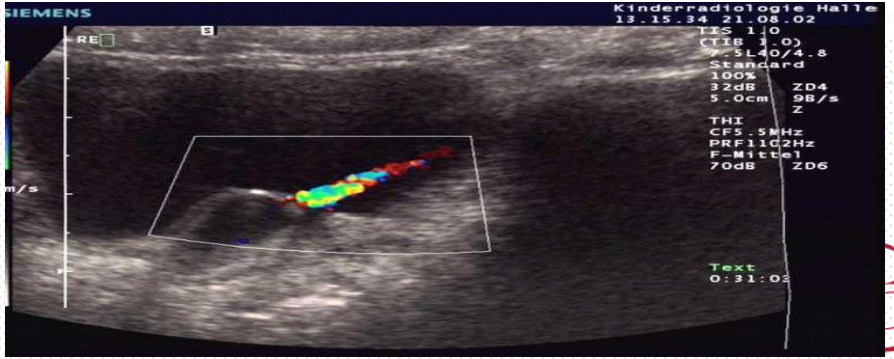
# Estenose de JUP

**Sistema Urinário Normal**

**Estenose de Junção Pielo-Ureteral (JUP)**

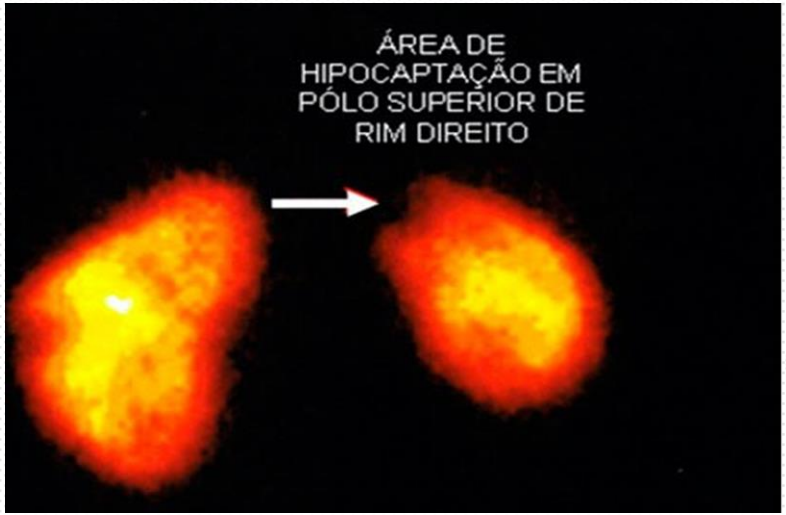
# Ureterocele

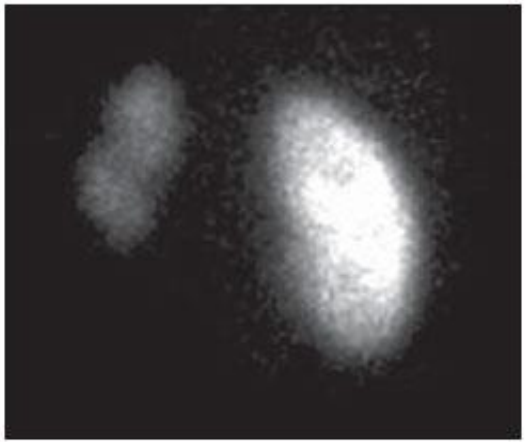


# Rins Policísticos

# Cintilografia - DMSA



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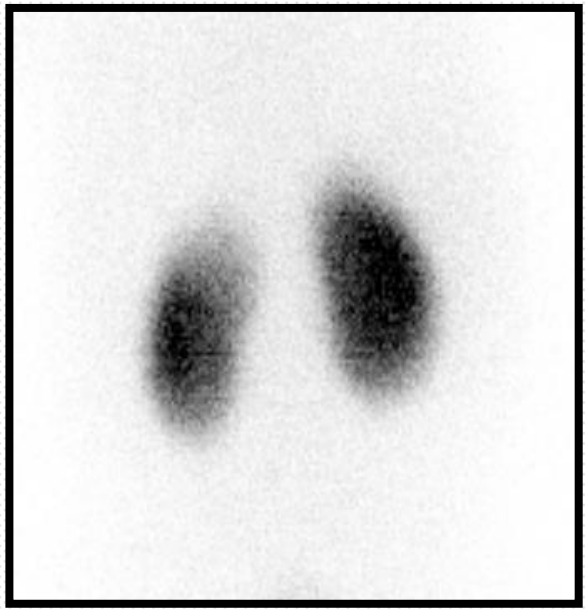

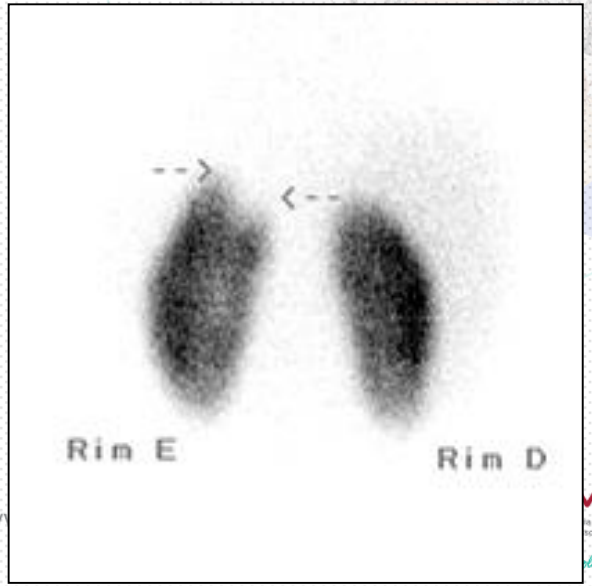


manu1311@gmail.com

(65) 99640-3099

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