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## CHILDHOOD URINARY SYMPTOMS: DO THEY “PREDICT” URINARY PROBLEMS IN YOUNG ADULT WOMEN?

### Hypothesis / aims of study

One of the most interesting areas of research in urology is the correlation between childhood and adult urological conditions. The aim of our study is to evaluate if Lower Urinary Tract Dysfunctions (LUTD) in women 18-40 years old, an age group not studied before, may be the result of previous, pediatric urological diseases. The results may identify the "risk conditions" that, if treated properly in childhood, could help avoiding debilitating symptoms that manifest in adults or possibly allow us design and implement a prevention strategy.

### Study design, materials and methods

This is a multicenter prospective case-control study registered on the ClinicalTrials.gov. Women referred to urological clinics were divided in 2 groups: healthy volunteers (group A) and patients (group B). Inclusion criteria were: age 18 to 40 years and any urological disease. Exclusion criteria were: diabetes mellitus, neurological disease, pelvic inflammatory disease, vaginal delivery  $\geq 2$  and baby with birth weight  $\geq 4$  kg. All women completed a self-administered 77-item questionnaire. It consists of 2 parts: part I explores the female urological and bowel history until the age of 14, and part II refers to the current urological, bowel, and sexual status. The questions that comprise it have been partly extracted from - validated questionnaires and partly devised by the authors of this study. It was assessed the test-retest reliability of this questionnaire. Symptoms and dysfunctions were evaluated using the International Continence Society (ICS) definitions. Statistical analysis was performed using the non parametric Mann-Whitney U test and X<sup>2</sup> test. p-value <0.05 was considered significant

### Results

254 women were enrolled, 134 in group A and 120 in group B. Groups were comparable for demographic characteristics. Tables 1 and 2 show the percentage of LUTS in each group in adult and pediatric age. During childhood, OAB symptoms were the most frequent urological dysfunction (43.3%) without statistically significant difference between group A and group B. All the other symptoms were significantly more frequent in group B. Also during adulthood OAB symptoms were the most frequent LUTD (68.4%) with statistical difference between group A and B (p=0.001). All the other LUTDs were significantly more frequent in group B

Multivariate analysis demonstrated that urinary incontinence (UI) during childhood can be a risk factor for UI during adulthood (OR 3.36, IC 95% [1.5-7.5]). In fact in univariate analysis women with UI during childhood had a higher prevalence of UI during adulthood (50% vs 22.9%, p=0.002) compared to women without UI during childhood.

Voiding symptoms (VS) during childhood were a risk factors for VS and urinary tract infections (UTIs) during adulthood (OR 2.72, IC 95% [1.1-6.2]; OR 3.37, IC 95% [1.3-8.2] respectively): in fact children with VS (voiding with strain and interrupted flow) had higher prevalence of VS and UTI during adulthood (67.9% vs 43.7% p=0.27, and 75% vs 47.0% p=0.010 respectively), compared to women without VS during childhood. Storage symptoms (SS) (increased urinary frequency -with more than 7 daytime voids- and urgency) during childhood were a risk factor for SS during adulthood (OR 2.94, IC 95% [1.6-5.2]; OR 2.09, IC 95% [1.2-3.5] respectively). In fact girls with increased urinary frequency and urgency had a higher prevalence of these symptoms during adulthood compared to women without them during childhood (50% vs 29.5%, p=0.04 and 79.4% vs 56.0%, p=0.001 respectively). Nocturnal enuresis (NE) was present in 19.4% and 14.2% respectively in group A and B. NE during childhood was significantly correlated with urinary incontinence (UI) and urgency in adulthood: 26.8% and 69% of the women with enuresis will develop urinary incontinence (UI) (p=0.008) and urgency (p=0.028), respectively, during adulthood. There is a correlation between NE and OAB symptoms during adulthood (p=0.009), while no correlation between childhood NE and voiding symptoms during adulthood emerged in the analysis.

UTIs during childhood appeared to increase the risk for UTIs during adulthood (OR 4.35, IC 95% [2.2-8.5]): 74.5% of women with UTIs in childhood presented UTIs in adulthood (p=0.001). Finally, 21.9% of women with childhood constipation presented recurrent UTIs in adulthood (p=0.03).

### Interpretation of results

OAB symptoms are the most frequent urological dysfunction during childhood and adulthood. LUTDs during childhood can be risk factors for LUTDs in adulthood. In fact VS during childhood can be risk factors for VS and UTIs in adulthood. It is possible that in the long term, a voiding dysfunction can lead to weakening of the detrusor muscle, which can in turn lead to postvoid residual volumes and recurrent UTIs. SS in girls can be risk factors for SS in adults. Pathophysiological mechanisms underlying adult OAB may first manifest in childhood. Detrusor instability and urge incontinence have been attributed to myogenic and neurological causes, we can hypothesize these alterations may result in childhood urinary symptoms, and later manifest as OAB symptoms in women. There are correlations between NE during childhood and UI, urgency and OAB symptoms during adulthood, while NE is not correlated with voiding symptoms.

Also UTIs in childhood can be a risk factors and are correlated to them in adulthood, infact 75% children with UTIs will have them in adulthood. A genetic predisposition can be supposed but In the long term it may be also the result of hystopathological alteration of the urothelium. There is a correlation also between childhood constipation and rUTI in adulthood linking gastrointestinal problem and UTI as possible risk factor. Another important result is that some LUTDs are present also in group A (healthy group) both during childhood and during adulthood, this element shows how some dysfunctions are undervalued specially in childhood, and are not considered signs of disease, determining dysfunctions during adulthood.

#### Concluding message

Our data demonstrated that an important correlation emerge between childhood and adulthood urological conditions. Girls with LUTDs or UTIs should be carefully monitored to identify treatment or prevention strategy and confirming the need of a strict collaboration between pediatrics and urologists. Many of these informations should be carefully and critically interpreted allowing us to improve our knowledge on the physiology and physiopatology or urinary tract dysfunctions

**Table 1 The percentage of LUTDs present in both groups in pediatric age**

	Total population N (%)	Group A N (%)	Group B N (%)	p
Childhood daytime incontinence	19 (7.5%)	3 (2.2%)	16 (13.2%)	p=0.001
Childhood voiding difficulty	29 (11.4%)	9 (6.7%)	20 (16.7%)	p=0.013
Childhood Intermittent flow	24 (9.4%)	5 (3.7%)	19 (15.8%)	p=0.001
Childhood UTIs	56 (23.2%)	24 (18.2%)	32 (29.4%)	p=0.041
Recurrent childhood UTIs*	28 (37.3%)	8 (21.1%)	20 (54.1%)	p=0.003
Childhood constipation	28 (11.2%)	10 (7.5%)	18 (15.5%)	p=0.044
Childhood daytime frequency	9 (3.5%)	4 (3.0%)	5(4.2%)	P=0.601
Childhood OAB	109 (43.3%)	56 (41.8%)	53 (44.9%)	p=0.617

\*179 patients (70.5%) did not respond to the question

**Table 2 The percentage of LUTDs present in both groups in adult age**

	Total population N (%)	Group A N (%)	Group B N (%)	p
Adult incontinence	64 (26.0%)	19 (14.4%)	45 (39.5%)	p=0.000
Adult urgency	164 (66.1%)	73 (55.3%)	91 (78.4%)	p=0.000
Adult daytime frequency	108 (45.2%)	46 (35.6%)	62 (56.4%)	p=0.002
Adult nocturia	97 (40.1%)	44(33.8%)	53 (47.3%)	p=0.033
Adult OAB	171 (68.4%)	79 (59.4%)	92 (78.6%)	p=0.001
Adult incomplete emptying	116 (46.4%)	70 (59.3%)	70 (59.3%)	p=0.000
Adult UTIs	124 (50.2%)	46 (35.1%)	78 (67.2%)	p=0.000
Adult recurrent UTIs	46 (37.4%)	7 (14.6%)	39 (52.0%)	p=0.000
Coital incontinence	24 (9.6%)	8 (6.1%)	16 (13.4%)	p=0.049
Adult constipation	32 (13.0%)	8 (6.1%)	24 (21.1%)	p=0.000
Adult stress incontinence*	40 (64.5%)	14 (70.0%)	26 (61.9%)	p=0.553
Adult urgency incontinence	41 (16.4%)	10 (7.6%)	31 (26.5%)	p=0.034

\*179 patients (70.5%) did not respond to the question

#### Disclosures

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