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ORIGINAL ARTICLE

Usefulness of ice water test to unmask detrusor overactivity

Utilité du test à l'eau glacée pour démasquer un détrusor hyperactif

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Ice water test;
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Summary
Purpose. — Ice Water Test (IWT) is not frequently used today. IWT triggers a non-inhibited involuntary detrusor contraction (NIDC) when the bladder is being filled with cold saline solution. NIDC is unmasked via a segmental reflex loop different from the physiological micturition reflex. Our purpose was to search for usefulness of IWT to expose detrusor overactivity (DO).
Methods. — One hundred and seventy-nine IWT performed in patients with overactive bladder syndrome (OAB) and conventional cystometry (CC) non-contributive to diagnosis were retrospectively analyzed. An increase of detrusor pressure of 15 cm H_2O allowed defining positive IWT (with leakage) or intermediate (without leakage).
Results. — The population comprised of 131 women (58.2 ± 17.3 years) and 48 men (56.1 ± 15.3 years). Main complaints were mixed or urge incontinence (76/179). Hundred and twenty-four patients had a history of neurological disease. From CC, detrusor behavior was founded uncategorized for 106, normal for 53 patients and underactive for 20. These results did not contribute to diagnose a DO. IWT was positive for 22 patients and intermediate for 20. DO was unmasked by IWT for 42 patients (23.4%) of whom 34 had neurological disease. The positive predictive value was 80.9%, the negative predictive value was 34.3%.
Conclusion. — In patients with OAB syndrome, IWT is contributory to unmask DO when CC is not contributive. Our study underlines the interest to perform IWT when urodynamic diagnosis is unclear.
Level of evidence.— 4.

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MOTS CLÉS
Test à l'eau glacée ;
Vessie neurologique ;
Urodynamique ;
Neuro-urologie

Résumé
But. — Le test à l'eau glacée (TEG) est peu utilisé en pratique courante. Il déclenche une contraction non inhibée du détrusor (CNID) quand la vessie est remplie par du sérum physiologique froid. Cette CNID est déclenchée via une boucle réflexe segmentaire différente du réflexe mictionnel physiologique. Le but de l'étude était de rechercher l'utilité du TEG pour démasquer une hyperactivité du détrusor (HD).
Méthodes. — Rétrospectivement, 179 TEG réalisés chez des patients se plaignant d'un syndrome d'hyperactivité vésicale sans observation de CNID à la cystomanométrie ont été analysés. Une augmentation de la pression détrusorienne de 15 cm d'eau permettait de définir un TEG positif (avec fuites) ou intermédiaire (sans fuite).
Résultats. — La population comprenait 131 femmes (58,2 ± 17,3 ans) et 48 hommes (56,1 ± 15,3 ans). Le motif principal de consultation était une incontinence mixte ou par urgenturie (76/179). Cent vingt-quatre patients avaient une pathologie neurologique. À la cystomanométrie, l'activité du détrusor était indéterminée pour 106, normale pour 53 et hypoactive pour 20. Ces résultats ne permettaient pas de diagnostiquer une hyperactivité détrusorienne. Le TEG était positif chez 22 patients et intermédiaire chez 20. Une hyperactivité du détrusor a été démasquée chez 42 patients (soit 23,4 %) dont 34 avaient des antécédents neurologiques. La valeur prédictive positive était de 80,9 %, la valeur prédictive négative de 34,3 %.
Conclusion. — Chez des patients ayant un syndrome d'hyperactivité vésicale, le TEG contribue à démasquer une hyperactivité détrusorienne lorsque la cystomanométrie n'a pas permis de conclure. Notre étude souligne l'intérêt de pratiquer le TEG quand l'urodynamique « standard » n'a pas permis d'affirmer le diagnostic.
Niveau de preuve.— 4.

Introduction

IWT was first described in 1957 by Bors and Blinn [1]. It was useful to discriminate between spinal cord injury (SCI), upper (UMN) and lower motoneuron (LMN) lesions associated with neurogenic bladder. Animal and clinical studies have given more explanation on characteristics of IWT [2—4]. It uses a lower motoneuron segmental reflex involving cold receptors and C fiber afferents [3,5]. IWT is positive in subjects less than 5 years old, negative after because central inhibition exists [3]. Recall that physiological micturition reflex uses a different pathway implying mecanoreceptors, Aδ fibers and pontine reflex. Our purpose was to analyze IWT of patients with neurological condition in order to unmask detrusor overactivity (DO); a control population was patients without neurological condition. These patients complained of overactive bladder (OAB) syndrome without DO during Conventional Cystometry (CC). Could IWT be a help to diagnose DO?

Materials and methods

Retrospectively, 179 IWT of patients whose complaint was suggestive of OAB syndrome were analyzed. Detrusor function during CC was identified as normal, uncategorized or underactive. Normal detrusor function is the presence of a clear detrusor contraction during voiding. Uncategorized detrusor function is the absence of detrusor contraction or an impossible voiding in seated position. According to the definition of the International Continence Society, detrusor underactivity is a detrusor contraction of reduced strength and/or duration, resulting in prolonged bladder emptying and/or a failure to achieve complete bladder emptying within a normal time span. After CC, patients underwent IWT to search for hidden DO.

In literature, IWT is always negative in healthy people, stress incontinence or bladder painful syndrome. IWT can be positive with neurological disease (UMN), obstruction, infection. Historically, IWT was described negative in neurological patients with 2nd motoneuron dysfunction (i.e. LMN).

All patients had an evaluation including a detailed medical history, review of medications, bladder diary for at least 48 h including voiding times and voided volumes both day and night, physical examination and dipstick urinalysis. If neurological disease is known, we try to precise it clinically or radiologically. If patient do not know, we practice easily a clinical examination, cerebral and medullar RMN.

CC was performed with the patient in seated position with a 7-F triple-lumen urethral catheter perfused with saline at room temperature using a filling rate of 50 ml/min. Pressure transducers were zeroed to atmospheric pressure at the upper edge of the symphysis pubis. Rectal pressure was recorded using a punctured intrarectal balloon catheter