

ASSESSMENT OF THE URODYNAMIC PATTERN IN PATIENTS WITH URINARY INCONTINENCE ASSOCIATED WITH ADULT NORMAL PRESSURE HYDROCEPHALUS

Hypothesis / aims of study

Normal Pressure Hydrocephalus of Adult (NPH) is defined as an increased ventricular size, without rise of cerebrospinal fluid (CSF) pressure. It is associated with classic clinical features of gait disturbances, dementia and urinary incontinence (UI) [1].

UI in NPH is often preceded of urgency, and it usually worsens with the progression of the disease. Unlike other causes of UI in elderly population, this symptom disappears or gets better with etiological treatment of neurological disease [1,3]. This improvement varies between different studies.

There are few published studies about the urological mechanisms that cause this incontinence, and many of them are based on a limited number of patients [2].

With the hypothesis that a urodynamic pattern is predominant in patients with UI in NPH, we conducted a study to assess the urodynamic pattern present on urinary incontinence on patients diagnosed with Normal Pressure Hydrocephalus (NPH) of Adult diagnosis in our Medical Institution.

This data would allow for empirical drug treatment for urinary incontinence in this subgroup of patients, to complement the therapeutic benefit of ventricle-peritoneal shunt (VPS) surgical intervention.

Study design, materials and methods

We analyze, in an ambispective way, Medical History and Urological Clinical History, Uroflowmetry, Cystometry and Pressure/Volume Test studies made in our Urology Department in patients with a previous diagnosis of Adult Normotensive Hydrocephalus (NPH)

We only chose patients with a confirmed diagnosis made in the Neurosurgery Department of our Institution, with the necessary imaging studies showing an enlarged ventricular size and invasive measurement of CSF pressure. Most patients were also re-confirmed diagnosis with the improvement of their clinical features following the shunt surgical operation performed.

Patients' data were always rigorously compiled prior to the shunt operation. Data we collected include clinical information (age, sex, co-morbidities, prior urological disease, prior uro-gynecological surgery, time and time of evolution of voiding and neurological symptoms), imaging information, and data of the Urodynamic Study.

We performed the Urodynamic Test following the International Continence Society (ICS) definitions and methods, and all patients filled an informed consent form prior to the study.

We performed a descriptive analysis of all data collected, with special focus in the final urodynamic diagnosis. To our knowledge, this is the report with the most extensive series of urodynamic tests performed in NPH population to date.

Results

Between April 2003 and October 2011, we performed 54 Urodynamic Studies on patients with confirmed diagnosis of NPH. 33 Males (61,1%) and 21 Females (38,9%). Mean age of 76,56 ±8,07 years. The average time of symptoms/signs development was 25,08 months (range 4-288 months). The intracranial pressure (ICP) average was 8,57 mmHg (range 2-20 mmHg), and the mean of Evans' index (frontal horn ratio, defined as the maximal frontal horn ventricular width divided by the transverse inner diameter of the skull) was 0,38±0,05.

We performed uroflowmetry tests only in 22 patients due to their advanced age, gait and cognitive disturbances, and difficulties in the exploration. These tests showed maximum flow rate (Qmax) of 10,95±5,96 ml/s, Qmed of 5,13±2,62 ml/s and voided volume of 241,82±147,82 ml.

Urodynamic diagnosis was:

1. Detrusor Overactivity in 36 patients (66,7%). In filling Cystometry and Pressure-Flow Studies, the Maximum Cystometric Capacity (MCC) was 211,75±109,74 ml, and Maximum Pressure of Detrusor was 57,86±37,32 cmH₂O. All patients presented involuntary contractions, starting at 139,59±85,22 ml, with Pmax of 52,50±32,71 cmH₂O, and with Detrusor Leak point of 51,62±32,00 cmH₂O. Detrusor pressure in maximum flow rate (P/Qmax) was 52,19±28,64 cmH₂O. Post-void residual volume was 46,09 ml (range 0-277ml) and compliance was 19,34 (range 1,4-121,50). Detrusor/sphincter dyssynergia appears in 5 patients (14,3%)
2. Stress Urinary Incontinence in 4 patients (7,4%). Average Abdominal Leak Point Pressure was 78,50±18,08 cmH₂O.
3. Detrusor Hypocontractility in 1 patient (1,9%), with 2,90 μW/mm² Work Factor.
4. Bladder Outlet Obstruction (BOO) was found in 17 patients (51,5% of male group). 76,5% showed also Detrusor Overactivity. Qmax was 10,07±5,24 ml/s, P/Qmax was 71,06±25,74 cmH₂O and Post-void residual volume 75,31 (range 0-277 ml). Obstruction was labeled as Compressive 52,9%, Constrictive 23,5%, and Combined 23,5%.
5. Normal Result in 11 patients (22,2%).
6. Urodynamic Test was described as not valuable in 1 case (1,9%).

Shunt surgery was performed on 45,6% of patients during follow-up (Ventriculoperitoneal shunt on 86,4%, ventriculo-atrial shunt on 4,5%, ventriculo-jugular vein shunt on 4,5% and ventriculo-atrial shunt on 4,5%). One case presented postoperative complications, requiring the withdrawal of the valve system. Most patients (90,9%) became less symptomatic after shunt surgery, at least from the urinary point of view.

Interpretation of results

NPH appears in elderly population (>76 year old in our series), and usually presents the classic triad of symptoms, including UI [1]. Cognitive deficit and gait disturbances make Urodynamic Study difficult because lack of cooperation in performance. The most frequent urodynamic diagnosis in this group of patients was Detrusor Overactivity (66,7% in our group of patients), results that match previously published [2]. The raise age of patients is probably related with the 51,5% of male group showing BOO.

The etiological treatment of NPH with shunt surgery is highly effective to improve the symptoms of this patients (90,9%) [1,3], particularly in terms of urinary symptoms. It seemed is quite safe, with only one patient developing complications [3]. However the procedure is not feasible in all patients due to age and comorbidities. Knowledge of the urodynamic pattern of UI in this group of patients may allow for trying out other treatments associated with SL shunting or alone, in order to improve the quality of life in NPH.

Concluding message

Detrusor Overactivity is the most frequent urodynamic diagnosis in patients with confirmed Normal Pressure Hydrocephalus in our series. Is also elevated the percentage of patients with infravesical obstruction. With shunt surgery, most of patients appear to solve their voiding problems.

References

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Disclosures

Funding: Funding/support and role os sponsor: None **Clinical Trial:** No **Subjects:** HUMAN **Ethics not Req'd:** Because all patients performed these urodynamical tests as part of their diagnosis study, routinely performed. We only conducted a descriptive study. **Helsinki:** Yes **Informed Consent:** Yes