ORIGINAL ARTICLE

Descriptive epidemiological study of the diagnosis of detrusor overactivity in urodynamic units in Spain

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KEYWORDS
Overactive bladder syndrome; Detrusor overactivity; Epidemiology; Diagnosis

Abstract
Objective: To know the relative weight of the diagnosis of detrusor overactivity (DO) in the Urodynamic Units of Spain and relate the prevalence of the overactive bladder (OB) syndrome.

Material and method: An epidemiological, descriptive, retrospective, multicenter, national study conducted according to registered data in 47 Urodynamic Units covering the Spanish geographic area in the different areas of health distributed among the regional communities. These data inform about the health care received by 35% of the Spanish population. Urodynamic diagnoses and related variables, recorded during 2007 and 2008, were collected.

Results: A mean of 346.45 (SD = 304.03) and 349.72 (SD = 296.49) urodynamics studies per care unit were performed in women during 2007 and 2008, respectively and 181.20 (SD = 212.71) and 195.68 (SD = 257.58) in men. The relative weight of the diagnosis of non-neurogenic DO in women per unit was 31.39% and 35.28%, in 2007 and 2008, and in men it was 21.06% and 20.43%. The diagnostic capacity of DO was 19.28 new cases per 100,000 inhabitants/year. The diagnosis of non-neurogenic DO in the woman accounts for one-third of all the urodynamic/year diagnoses and more than half of the diagnoses of DO. In men, DO accounts for 25% of the diagnoses, the most frequent one being that associated with benign prostatic hyperplasia, followed by that of neurogenic cause. Approximately half of the DO diagnoses in children correspond to non-neurogenic DO.

Conclusions: The differences between the capacity of diagnosis of DO (ratio per 100,000 inhabitants) is far from many of the estimations of the prevalence of OB (relationship %). The doubt may exist about whether part of this quota is secondary and not-idiopathic, given the large difference between the frequency of OB and the capacity of diagnosis of DO.

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PALABRAS CLAVE
Síndrome vejiga hiperactiva; Hiperactividad del detrusor; Epidemiología; Diagnóstico

Estudio epidemiológico descriptivo del diagnóstico de hiperactividad del detrusor en las unidades de diagnóstico urodinámico de España

Resumen
Objetivo: Conocer el peso relativo del diagnóstico de la hiperactividad del detrusor (HD) en las Unidades de Urodinámica de España y relacionar la prevalencia de síndrome de vejiga hiperactiva (VH).

Material y métodos: Estudio epidemiológico, descriptivo, retrospectivo, multicéntrico, de carácter nacional, llevado a cabo según los datos registrados en 47 Unidades de Urodinámica que cubre la geografía española en diferentes áreas de salud distribuidas por comunidades autónomas. Estos datos informan de la atención sanitaria recibida por el 35% de la población española. Se recogieron diagnósticos urodinámicos y variables relacionadas, registrados durante los años 2007 y 2008.

Resultados: Se realizaron un total de 346,45 (DE=304,03) y 349,72 (DE=296,49) estudios urodinámicos por unidad asistencial en mujeres durante los años 2007 y 2008, respectivamente, y 181,20 (DE=212,71) y 195,68 (DE=257,58) en varones. El peso relativo del diagnóstico de HD no neurogénica en mujeres por unidad fue 31,39 y 35,28%, en 2007 y 2008, y en varones el 21,06 y 20,43%. La capacidad de diagnóstico de HD fue 19,28 casos nuevos por 100.000 habitantes/año. El diagnóstico de HD no neurogénico en la mujer supone un tercio del total de los diagnósticos urodinámicos/año y más de la mitad de los diagnósticos de HD. En varones la HD supone el 25% de los diagnósticos, siendo la más frecuente la que se asocia a hiperplasia prostática benigna, seguida de la de causa neurogénica. Aproximadamente la mitad de los diagnósticos de HD en niños corresponden HD no neurogénica.

Conclusiones: La diferencia entre capacidad de diagnóstico de la HD (relación por 100.000 habitantes) dista mucho de las estimaciones de prevalencia de la VH (relación en porcentaje). Puede plantearse la duda de que parte de este contingente sea secundaria y no idiopática, dada la gran diferencia entre la frecuencia de VH y la capacidad de diagnóstico de HD.

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Introduction

The definition of overactive bladder (OAB) given by the International Continence Society (ICS) in 19881 substantially altered the concept of bladder instability and enforces the concept of OAB syndrome.2-3 The ICS defines the syndrome as ‘urinary urgency, with or without incontinence, usually associated with frequency and nocturia’. This combination of symptoms is suggestive of detrusor overactivity, demonstrable by urodynamic study, but it can also be due to other disorders.

The use of this terminology with regard to the OAB syndrome, having perspective already, supposes advantages such as the opportunity to associate a set of patients under the common symptoms and address them. It also allows for the management of patients with these symptoms from primary care, because the application of its criteria of defined symptoms, voiding diary, and quality of life questionnaires are useful, inexpensive, quantifiable, and they are readily available. The disadvantages result from the fact that this simplification has limitations for the field of specialized medicine, since under this syndrome, currently, we include from bladder OAB secondary to another disease such as idiopathic, an important circumstance to clarify. Prevalent examples are, from the typically established lower urinary tract obstruction by typically established benign prostate hyperplasia (BPH), which, collaterally, has urinary urgency and high urinary frequency, poorly cataloged from the non-specialized primary care. According to Blaivas et al.,4 the OAB should be considered a symptomatic complex rather than a syndrome. Thus, the concept of the OAB as a syndrome may include different types of patients, so the lack of specificity of this terminology implies a significant heterogeneity in epidemiological investigations with regard to the frequency of the OAB.5 In Spain, the estimated prevalence in a sample of 1669 individuals over 40 years was 21.5%, reaching 19.9% by adjusting the result to the Spanish population.6 A previous study is also available, in which a prevalence of OAB in the Spanish population over 40 years of 22% was estimated; however, we must bear in mind that, in this study, they considered the previous definition of OAB given by the ICS in 1988.1

The main aim is to obtain objective information of the diagnostic capacity (diagnostic relative weight) of detrusor overactivity and urodynamic diagnosis distribution in healthcare activity of the Urodynamic Units in Spain. The secondary aim was to know the difference in estimate diagnostic ability of detrusor overactivity (DO) versus OAB syndrome.

Material and methods

A descriptive epidemiological, retrospective, multicenter, national study, in which 47 Urodynamic Units from the different autonomous communities of our country took part, was conducted. A selection of Urodynamic Units was carried out taking into account the population treated in each autonomous community (one unit was assigned per one million inhabitants), in order to cover the entire country. We
collected information on the healthcare activity of the participating Units, including the number of inhabitants of the relevant health area, as well as the populations outside the area from which patients come, and urodynamic diagnoses per Urodynamic Unit performed in the years 2007 and 2008. These data included the total number of urodynamic studies in men and women, the number of urodynamic diagnoses based on sex and type of urodynamic diagnosis: non-neurogenic DO, neurogenic bladder overactivity, bladder overactivity associated with prolapse, and incontinence or prolapse surgery bladder overactivity, and number of urodynamic diagnoses in men of different types (non-neurogenic DO, neurogenic bladder overactivity, bladder overactivity associated with BPH, and post-surgery bladder overactivity of lower urinary tract symptoms [LUTS], or obstruction symptoms). The number of urodynamic diagnoses in children was also reflected (non-neurogenic DO, and neurogenic bladder overactivity).

The collected data were extrapolated to the total population of the country; to do so, the data were weighted taking into account the number of inhabitants in each health area. The population covered by this study was slightly above 17 million inhabitants (for each weighting group: men, women, and pediatric patients) per year, representing, approximately, 35% of the Spanish population, considering a census of 46 million inhabitants.

The weighted average of the number of diagnoses is extrapolated to the total Spanish population (in groups: women, men, and pediatric patients). In the available databases, data on 7,477,844 women, 7,210,233 men, and 2,703,221 children in the year 2007, and on 7,481,013 women, 7,229,894 men, and 2,680,391 children in the year 2008 are collected. A descriptive analysis of absolute and relative frequencies of response to each of the study variables was performed.

For data analysis, we used the statistical software SPSS 14.0 for Windows. Furthermore, a quality control of data, carrying out the review and correction of inaccurate or incomplete data, was performed. The design of the database was subjected to internal consistency rules and ranges to control inconsistencies and/or corrections in the collection and tabulation of data. We only considered the population of the area of each Unit. In all the Urodynamic Units, the distribution by sex and age corresponds to that observed for the entire Spanish population. The Spanish population has been taken from the municipal census of the INE – from 2007 to January 2008, and from 2008 to January 2009. The estimated prevalence of the demonstrated DO diagnostic capacity was calculated by reference health area of each healthcare Unit. The study was approved by the Ethics Committee and met the current Data Protection Act.

**Results**

The relative weight of the DO urodynamic diagnosis in Urodynamic Units is greater than 75% of the diagnoses. The diagnoses average data by years and totals are shown in Tables 1–3 and Fig. 1. Fig. 2 shows the Spanish population pyramid, with the various cuts of age, subject of various studies.

The data of the researchers were collected by healthcare Unit and area treated by the different Urodynamic Units that collaborated on this project. The results are presented according to the female, male, or pediatric population.

**Urodynamic diagnoses in women**

The mean total urodynamic studies performed by Unit in women in Spain is 347 cases/Unit/year for an estimated total of 38,342. The number of cases diagnosed with non-neurogenic DO in women is on average 117 cases/Unit/year, for an estimated total 13,281 cases/year, and a rate of 6.60 per 100,000 inhabitants/year. The number of cases diagnosed with neurogenic DO in women is on average of 39 cases/Unit/year for an estimated total of 4854 cases a year and a rate of 2.41 per 100,000 inhabitants/year.

The number of cases diagnosed with DO associated with pelvic organ prolapse in women in Spain is on an average of 40 cases/Unit/year, for an estimated total of 4333 cases/year, and a rate of 2.15 per 100,000 inhabitants/year. The number of cases diagnosed with DO associated with urinary stress incontinence in women in Spain is on an average of 18 cases/Unit/year, for a total of 2290 cases/year, and a rate of 1.13 per 100,000 inhabitants/year.

The diagnosis of non-neurogenic DO in women accounts for 55% of all the diagnoses of detrusor overactivity of the total DO diagnoses in a Urodynamic Unit type.

**Urodynamic diagnoses in men**

The total mean of studies in males is 188 cases/Unit/year, for an estimated total of 21,457 cases/year. The number of cases diagnosed with non-neurogenic DO in men in Spain is on an average of 42 cases/Unit/year for an estimated total of 3707 cases/year and a rate of 1.91 per 100,000 inhabitants/year. The number of diagnosed cases of neurogenic detrusor overactivity in men in Spain is on an average of 47 cases/Unit/year, for an estimated total of 5618 cases/year, and a rate of 2.89 per 100,000 inhabitants/year.

The number of cases diagnosed with DO associated with BPH in men in Spain is on average of 53 cases/Unit/year, for an estimated total of 5706 cases/year, and a rate of 2.94 per 100,000 inhabitants/year. The number of cases diagnosed with DO associated with obstruction surgery with LUTS in men in Spain is on an average of 16.5 cases/Unit/year, for an estimated total of 2129 cases/year, and a rate of 1.09 per 100,000 inhabitants/year.

**Urodynamic diagnoses in pediatric age**

The number of diagnosed cases of non-neurogenic DO in pediatric age in Spain is on an average of 10 cases/Unit/year, for an estimated total of 925 cases/year, and a rate of 1.27 per 100,000 inhabitants/year.

The number of diagnosed cases of neurogenic detrusor overactivity in children in Spain is on an average of 20 cases/Unit/year, for an estimated total of 1704 cases/year and a rate of 2.34 per 100,000 inhabitants/year. The shown
DO means for this sample is a total estimate of 19.28 per 100,000 inhabitants/year (17,160 cases/year).

Discussion

There is no fully defined profile of the patient with OAB; therefore, epidemiological data are highly variable. These are known facts that affect the female population in a greater proportion, and prevalence increases with age. Moreover, we have no demonstrated data on the epidemiology or diagnostic capacity of DO, as it is as variable as the indication and/or performance of urodynamic studies. There are many epidemiological studies that warn us of an enormous prevalence of the OAB and they categorize it as a major health problem because of its impact and cost.

The prevalence of OAB in the Spanish general population aged ≥40 years is estimated at 21.5%, according to a study by David Castro et al. In Europe, there is a total prevalence of 16.6%. The prevalence of OAB increases equally in both sexes with advancing age. This is reflected in the 2005 EPIC study, showing a prevalence in Europe and Canada of 10.8% in men, and 12.8% in women. Stewart et al. bring in the U.S. an overall prevalence of 16.5%. In Canada, the overall prevalence of OAB is 18.1%. The prevalence of OAB and/or urinary incontinence in Spain is about 10% in women between 25 and 64. It is 5% in men between 50 and 65, and above 50% in people over 65 of both sexes. The prevalence of nocturnal enuresis in children between 6 and 11 is about 8%.

Hashim and Abrams, taking into account the definition of the OAB syndrome of the 2002 ICS in both sexes, in patients with OAB syndrome, in 69% of men, and 44% of women with urinary urgency, show DO in the urodynamic study. In a more recent study, conducted with a sample of women aged 80 years or more, the main urodynamic diagnosis observed was DO (45%). 54% of women who showed urgency had such diagnosis. This variability is dependent on the definitions and reproducibility of the urodynamic study. We accept that the non-reproduction of symptoms in the urodynamic study also has an important range (2–28%) in the different series and that, reciprocally, involuntary artifact or spurious contractions can be shown in the urodynamic study.

Regarding the Spanish population, if we assume a prevalence of the OAB syndrome of 21.5%, it means

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Total number of urodynamic studies in women.</th>
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<tr>
<td></td>
<td>n</td>
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<td>---------</td>
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<td>2007</td>
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<tr>
<td>2008</td>
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Diagnosis of non-neurogenic detrusor overactivity in women

Estimated diagnostic capacity: 6.60 per 100,000 inhabitants/year

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Diagnosis of neurogenic detrusor overactivity in women

Estimated diagnostic capacity: 2.41 per 100,000 inhabitants/year

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Diagnosis of detrusor overactivity associated with prolapse

Estimated diagnostic capacity: 2.15 per 100,000 inhabitants/year

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Diagnosis of detrusor overactivity associated with incontinence surgery in women

Estimated diagnostic capacity: 1.13 per 100,000 inhabitants/year

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<td>16.93</td>
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Table 2  Total number of urodynamic studies in men.

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<td>2008</td>
<td>47</td>
<td>195.68</td>
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Diagnosis of non-neurogenic detrusor overactivity in men

*Estimated diagnostic capacity: 1.91 per 100,000 inhabitants/year*

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<td>81.90</td>
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Diagnosis of neurogenic detrusor overactivity in men

*Estimated diagnostic capacity: 2.89 per 100,000 inhabitants/year*

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<td>48.72</td>
<td>157.50</td>
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Diagnosis of bladder overactivity associated with benign prostate hyperplasia in men

*Estimated diagnostic capacity: 2.94 per 100,000 inhabitants/year*

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<td>99.22</td>
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<td>500</td>
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<td>2008</td>
<td>47</td>
<td>56.11</td>
<td>108.27</td>
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</table>

Diagnosis of postsurgery bladder overactivity of lower urinary tract symptoms (LUTS) or obstruction in men

*Estimated diagnostic capacity: 1.09 per 100,000 inhabitants/year*

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<td>41</td>
<td>15.32</td>
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<tr>
<td>2008</td>
<td>45</td>
<td>18.33</td>
<td>25.04</td>
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4,746,553 cases/year, and if we accept a 12% means a total of 2,712,316 cases/year. The shown DO corresponds to 19.28 cases per 100,000 inhabitants/year, which is 17,160 cases/year (only 0.36% of the OAB); understanding, thus, that they are very different concepts. Studying the relative weight of the different diagnostic types of DO on the total urodynamic studies performed in each participating center, in the case of women, the different overactivity diagnoses

Table 3  Diagnosis of detrusor overactivity in pediatric age.

**Diagnosis of non-neurogenic detrusor overactivity in pediatric age**

*Estimated diagnostic capacity: 1.27 per 100,000 inhabitants/year*

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<tr>
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<td>8.60</td>
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<td>2008</td>
<td>32</td>
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**Diagnosis of neurogenic detrusor overactivity in pediatric age**

*Estimated diagnostic capacity: 2.34 per 100,000 inhabitants/year*

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<td>20.45</td>
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<tr>
<td>2008</td>
<td>31</td>
<td>20.55</td>
<td>67.34</td>
<td>0</td>
<td>377</td>
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</table>
Figure 1  Total and average urodynamic studies/year by sexes and diagnoses for 35% of the Spanish population, with distribution of 1 Unit per million inhabitants, with geographic distribution by autonomous communities except Ceuta and Melilla.

represent, on average, more than half of the urodynamic studies performed, this rate being higher in 2008 compared to 2007, i.e. 63 and 57%, respectively. In the case of males, these percentages increase to 77 and 80%, respectively. We also know that when patients are treated with medication for OAB, adherence is not optimal. It seems clear that patients with OAB, whose symptoms can greatly affect their quality of life, may benefit from a specialized diagnosis and treatment if they are routinely referred to specialized healthcare units of Urology and/or Urodynamics. At 6 months of treatment, only 21% of the patients continue with it. It is legitimate to ask whether patients have some other

46,157,822 people

Population> 40 years 22,602,636
Population of 25-65 years 26,675,366

Figure 2  2008 Spanish population pyramid. The different cut-off points for the different epidemiological studies involve heterogeneous results.
illness, if treatment is not tolerated, or it is ineffective. So, it seems that the concept of OAB as a syndrome, treated empirically from primary care, includes many patients in whom we should go deeper in their study, not only in those who do not improve with anticholinergic therapy and are referred to Urodynamic Units.

A hotly debated issue is whether a single symptom, such as urinary urgency, can define a syndrome. The reality is that a symptom is a symptom, not a disease or a syndrome. The current classification of urinary urgency is very inaccurate, and the symptomatic complex of OAB as idiopathic and secondary is unclassifiable. If we investigate the cause which is considered secondary, it is no longer considered OAB and it is called as the base process (bladder neoplasia, lithiasis, obstructive BPH, prolapse, ...).

With regard to the OAB, another question is whether there have been changes in recent years. In fact, little has changed from the 1983 historic series by Hinman and McInerney20; 30% of patients undergoing prostate TUR have residual symptoms, and current references maintain the same, with different sources of energy, sometimes even with worse results. However, advances are made in the Guidelines (International Consultation on Incontinence [ICI]), and the use of specific tests and DM, ICQ-MLUTS is recommended to determine the etiological role of prostatic enlargement and LUTO in the development of LUTS. We advance by explaining that these symptoms are not always necessarily related to the BPH. The DO, nonobstructive hypoactivity, and bladder organic disease must be approached not only from the aspect of the obstruction, but also from the possibility of bladder dysfunction in males, adding the final separation of non-neurogenic LUTS.20

We present some interesting issues arising from this study that we must consider. First, using the 2002 terminology, and approaching the OAB from the point of view of primary care, there is an important group of cases (not by frequency, but by their different management) that would correspond to hyperactivity with another underlying or neurogenic disease, which are in a situation of vague diagnosis. They are not included as such, from the primary care level, because no research is performed on them, and the diagnosis is not easy.

On the other hand, the definition of symptomatic complex on OAB syndrome, being more precise, we think that in practice does not solve the problems of this terminology, as the same would apply, regardless of the name. We thought it necessary to review the concepts of OAB, LUTS, etc. in clinical practice guidelines, as a patient cannot be told that their process are “lower urinary tract symptoms”, and other more precise classification criteria must be established.

The sharp divergence of the existing administrative data highlights the severe limitations of the use of medical records alone to study the epidemiology of the OAB and urinary incontinence. The filling symptoms, so prevalent in women over 60, having an impact, must be evaluated to establish the connection between filling symptoms, OAB, and detrusor overactivity with the underlying process that causes them. The different level of healthcare (primary or specialized) does not serve as a justification to treat it in certain cases insufficiently explored patients.

Finally, we conclude that the majority of patients with DO have OAB syndrome. On the other hand, far fewer patients than expected who report symptoms (not syndrome) of OAB have overactivity, since many have another urological underlying disease or of another urological field.

There is no doubt that these are very different concepts and of very different frequency.

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Conflict of interest

Drs. L. Prieto, D. Castro, M. Esteban, J. Salinas, and M. Jimenez have no conflict of interest. A. Mora is an employee of the Medical Department of Astellas Inc.

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