

# #183 INTUBATED FLOW IN MEN MUST BE COMPARED TO FREE FLOW TO AVOID OVERESTIMATING THE DIAGNOSIS OF BLADDER OUTLET OBSTRUCTION.

Françoise VALENTINI<sup>1</sup>, Peter ROSIER<sup>2</sup>, Philippe ZIMMERN<sup>3</sup>, Pierre NELSON<sup>1</sup>

<sup>1</sup>Hôpital Rothschild, Paris, France <sup>2</sup>University Medical Center Utrecht, Utrecht, The Netherlands

<sup>3</sup>UTSouthwestern Dallas TX

## Hypothesis / aims of study

## Results

The gold standard for evaluation of bladder outlet obstruction (BOO) in men is the AG number (AG) renamed the bladder outlet obstruction index (BOOI) [1] which is deduced from intubated flow (IF).

During urodynamic study (free uroflow (FF) before cystometry and IF), it is frequently observed a reduced maximum flow rate ( $Q_{max}$ ) during IF. Geometric obstructive effect of catheter is not sufficient to explain the phenomenon and mechanical properties of detrusor are unchanged. It has been demonstrated in women that that behavior may be the consequence of a urethral reflex [2]. The phenomenon was found widely dependent of the ratio  $Q_{max,FF}/Q_{max,IF}$  and a cut-off value of  $Q_{max,FF} > 1.5 * Q_{max,IF}$  had been chosen, sufficiently large, to be a significant difference.

**The consequence of such phenomenon was an overestimation of outflow obstruction.**

**Our hypothesis** was that a similar phenomenon could occur in men.

Recently, nomograms based on free uroflows (FF) have been carried out using the VBN mathematical model of micturition, to develop an amended AG (**corr-AG**) allowing to evaluate BOO when  $Q_{max,FF} > Q_{max,IF}$ ; in that first study, the cut-off value for  $Q_{max,FF}/Q_{max,IF}$  was  $> 1.5$  [3].

**Is that cut-off value optimized?**

**Our purpose** was, for the first time, to evaluate the category migration in AG nomogram in a large male population suspected of BOO, performing a FF before an IF with  $Q_{max,FF}/Q_{max,IF}$  higher than 1.0.

- Exclusion criterion was voided volume  $< 90$  mL; 370 files were included, 262 had  $Q_{max,FF}/Q_{max,IF} > 1.0$ .
- Increment for  $Q_{max,FF}/Q_{max,IF}$  was 0.1. To have populations of comparable size, interval groupings were performed leading to 3 main intervals (1.0  $\rightarrow$  1.2, 1.2  $\rightarrow$  1.5 and  $> 1.5$ )
- The more important information was identification of an overestimation of obstruction; files potentially leading to unnecessary therapeutic action were categorized as obstructed (O) in ICS nomogram. Number of files migrating from O (with AG) to E or NO (with corr-AG) is described in the table.

$Q_{max,FF}/Q_{max,IF}$	1.0 $\rightarrow$ 1.1	1.1 $\rightarrow$ 1.2	1.2 $\rightarrow$ 1.3	1.3 $\rightarrow$ 1.4	1.4 $\rightarrow$ 1.5	$> 1.5$
Nbr of UD studies	41	31	26	25	25	114
Change of category Nbr (%)	9 (12.5%)		28 (36.8%)			60 (52%)
Change O $\rightarrow$ E or NO Nbr (%)	4 (5.5%)		10 (13.5%)			25 (21.9%)

The **role of urethral catheter** during IF has been widely documented but possibility of inducing a urethral reflex has been less studied [2]. Occurrence of such a reflex can induce a decrease in  $Q_{max}$  and thus an overestimation of BOO. This last phenomenon may be investigated using data of FF.

A **corr-AG** is computed from data of FF (measured  $Q_{max}$  and a computed  $p_{det, Q_{max,FF}}$ ) performed before IF [3]. Our purpose was to optimize the cut-off value of the ratio  $Q_{max,FF}/Q_{max,IF}$  from which it will have to be considered.

From the results of this study, it appears that a **ratio  $\leq 1.2$  is without significance**, from 1.2 to 1.5 FF must be repeated far from IF, and for a **ratio higher than 1.5, BOO using usual classification is likely (21.9%) to be overestimated**.

Note that the migration from equivocal to non-obstructed is not negligible since the intermediate values of the ratio

## Study design, materials and methods

**Population** comprised 441 files of men, aged  $> 45$  years, suspected of BOO; each file comprised a FF followed by an IF (urethral catheter 8F).

The **VBN model** was applied for computations allowing a link between data of FF and IF.

The geometric effect of urethral catheter during IF was taken into account.

**BOO evaluation obtained from IF and AG was compared with corr-AG.** Cut-off values for AG: non-obstructed NO ( $< 20$ ), equivocal E ( $\geq 20$  and  $\leq 40$ ) and obstructed O ( $> 40$  cm H<sub>2</sub>O) were the same applied for corr-AG.

**Cut-off values for  $Q_{max,FF}/Q_{max,IF}$**  were tested with increment of 0.1 in the range 1.0 to 1.5.

## Conclusion

**When  $Q_{max,FF}$  is higher than  $Q_{max,IF}$**  (FF performed before IF), this large scale study of urodynamic tracings in men suspected of BOO confirms **that overestimation of BOO can occur as soon as the ratio  $Q_{max,FF}/Q_{max,IF}$  is higher 1.2**; and in fact such overestimation of the diagnosis of BOO must be **strongly considered when  $Q_{max,FF}/Q_{max,IF}$  is greater than 1.5**.

## References

1- Abrams P. Bladder outlet obstruction index, bladder contractility index and bladder voiding efficiency: three simple indices to define bladder voiding function. BJU Int 1999; 84:14-15; 2- Valentini FA, et al., Decreased maximum flow rate during intubated flow is not only due to the urethral catheter in situ. Int Urogynecol J 2013; 24: 461-7. doi 10.1007/s00192-012-1856-2; 3- Valentini FA, et al, Are nomograms based on free uroflows helpful to evaluate urethral obstruction in men? NAU 2017 Aug 2. doi: 10.1002/nau.23385