

COMPARISON OF CONVENTIONAL AND AMBULATORY URODYNAMIC FINDINGS IN PATIENTS WITH SPINAL CORD INJURY

Hypothesis / aims of study

Life-long urologic follow up is mandatory for all spinal cord injury (SCI) patients. The principal purpose is to prevent upper urinary tract deterioration because of low compliance bladders or high bladder pressures (> 40 cm H₂O) during a substantial period of the day. Normally conventional cystometrography (CMG) is performed to have a proper impression of bladder behaviour. However, CMG is done during a short period of time in a retrograde fashion. Ambulatory measurement (AM) has a registration of up to 24 hours with natural bladder filling. It therefore is a more reliable reflection of bladder behaviour during the day. In this study CMG was compared to AM in order to investigate whether CMG gives a representative reflection of the longer and more physiological ambulatory measurement.

Study design, materials and methods

16 SCI patients were investigated by both AM and CMG. The two recordings were analysed for various urodynamic parameters. Detrusor pressure rises (DPR) were defined as episodes of detrusor overactivity with an amplitude of ≥ 15 cm H₂O to rule out artefacts. They were studied for duration and amplitude. Pressure amplitudes over 40 cm H₂O were labelled as high DPR.

Results

The incidence of detrusor overactivity (DO) was 75% during CMG and 100% during AM. High DPR was present in 56% during CMG and 94% during AM. The absolute maximum detrusor pressure and the maximum amplitude of the DPR were significantly higher in CMG as compared to AM. However, the duration of DPR and high DPR was shorter during AM (table).

	CMG	AM	Significance
Incidence DPR (%)	75	100	P < 0,05 *
Incidence DPR > 40 cm H ₂ O (%)	56	94	P = 0,01 *
Absolute max. Pdet (cm H ₂ O)	54	116	P < 0,01 *
Mean Pdet amplitude (cm H ₂ O)	37	49	P = 0,33
Max. Pdet amplitude (cm H ₂ O)	46	102	P < 0,01 *
Mean DPR duration (sec)	68	68	P = 0,61
% time duration of DPR	21,8	3,4	P < 0,01 *
% time duration of DPR > 40 cm H ₂ O	6,0	0,7	P = 0,14
Frequency DPR/hour	17,5	2,5	P < 0,01 *

Interpretation of results

It is accepted that an intravesical pressure of more than 40 cm H₂O is associated with decreased upper tract emptying (McGuire 1981). However, the time duration as a percentage of total filling time or storage phase of these high pressures is not defined. Therefore, it is not known whether a few daily episodes of a high detrusor pressure of short duration, that occurs for instance during voiding, is also prone to be an important risk factor. Probably, the duration of the pressure elevations is more important to evoke upper urinary tract damage.

Our study shows that the incidence of (high) DPR during conventional CMG is lower compared to the incidence of (high) DPR during Ambulatory Monitoring and that AM shows higher maximal detrusor pressures. However, the time duration as a percentage of the total investigation time of high DPR is much shorter during the ambulatory measurement as compared to conventional CMG and possibly too short to evoke upper urinary tract damage. Because of these differences between the measurements, one could question whether therapy changes should be based on CMG measurement only.

Concluding message

CMG is not a representative reflection of the height and duration of bladder pressures during a complete 24-hour day. Detrusor pressure is lower during CMG but the time duration of DPR is substantially shorter during AM. Therefore, follow-up and treatment of SCI patients based on CMG only should be done with care and the use of AM to document and control urological management in SCI patients should be done more frequently.

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<i>What were the subjects in the study?</i>	HUMAN
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<i>Specify Name of Ethics Committee</i>	CMO Radboud University Nijmegen Medical Centre, the Netherlands CMO St Maartenskliniek Nijmegen, The Netherlands
<i>Was the Declaration of Helsinki followed?</i>	Yes
<i>Was informed consent obtained from the patients?</i>	Yes