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AUTOMATED ANALYSIS OF AMBULATORY URODYNAMIC MONITORING IN DETRUSOR OVER ACTIVITY

Aims of Study

Ambulatory Urodynamic Monitoring (AUM) is an established method of assessing bladder function with the advantage of natural filling. Patient mobility outside the urodynamic laboratory and extended duration of these studies are likely to improve urodynamic diagnosis (1). The provision of ICS standardisation guidelines (2) for the practice of AUM studies and commercially available computer analysis software are increasing the use of AUM urodynamic assessment. This study aims to assess automated analysis in a series of AUM studies.

Methods

57 AUM studies were performed on adult subjects by two urology nurse specialists. Dipstick urinalysis for urinary tract infection was performed prior to all AUM studies. After insertion of solid-state, microtipped transducers (Gaeltec) and connection to an AUM recording box the patients were allowed normal mobility in a designated area. Instructions in diary completion were given requesting patients to document every desire to void with suitable event entries i.e. urgency, and urge induced urinary leakage. Patients also pressed a symptom indicator on the recording box. Free access to fluids and a call button within 20 metres of the nurses were also provided. The nurses assessed the patient every thirty minutes for comfort, line position, fluid intake, dairy keeping and assisted with link ups to flow meter. On completion, traces were reviewed manually and all poor recording periods temporarily "hidden". The remaining hours of AUM were classified as suitable for analysis. Symptom indicators and voids from the patient diaries were cross- checked with each trace.

Automated analysis was performed using pre-set parameters (Galtec software). A rise in detrusor pressure of 5cm H2O was classified as an unstable detrusor contraction (UDC). A window of 150 seconds either side of an UDC allowed capture of any symptom indicators and categorised the UDC as symptomatic. UDCs recorded outside the pre-defined window were deemed asymtomatic. A second time window (150 seconds) either side of a void indicator ignored any UDCs. Review by an experienced clinician identified any errors or omissions in the automated analysis before final report.

Results

55 studies were reviewed. Two normal studies with no reported symptoms were excluded. 232 hours of AUM recording were analysed. The median study duration was 4 hours (range 2-5 hours)

Patients reported a total of 584 events. Of these 123 were recorded during an identified UDC. Application of the automated time frame of 150 seconds resulted in a further 171 events captured as being associated with a UDC.

Table 1. Patient event reporting associated with UDC**.**

Total	**Raw analysis**	**150 sec window**
584	123 (21%)	294 (50%)

After clinician review of the automated analysis UDC count was reduced from 729 to 624 (13%). Symptomatic and asymptomatic UDC reporting was reduced to 305 and 342 respectively.

Clinician review of automated analysis

	Auto–analysis	**Clinician review**	**Reduction in UDC**
Symptomatic UDC	318	305	3.1%
Asymptomatic UDC	411	342	20%
Total	729	647	13%

Conclusions

The results of this study indicate that in a group of patients with detrusor overactivity, not all unstable detrusor contractions provoke symptoms.

The importance of detailed diary completion by patients is crucial for reliable analysis of AUM. It is therefore, essential for patients to receive thorough explanations and encouragement throughout the study by experienced personnel. Failure to document relevant events will result in an over estimation of asymptomatic detrusor contractions. Application of time windows in automated analysis was beneficial in allowing for the variation in diary completion by patients.

Automated analysis of AUM allows for detailed reporting in the in both research and clinical settings. The results of this study however, suggest that the reliability of automated analysis may depend upon fastidious, manual cleaning of the data prior to and following analysis.

References

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(2) Waalwijik van Doorn et al Urodyn. 2000; 19:113-125