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PRE-OPERATIVE URODYNAMIC STUDIES: DO THEY HELP IN PREDICTING OUTCOMES?

Hypothesis / aims of study

Urodynamic Study (UDS) by multi-channel cystometry is increasingly being used routinely before surgery for female stress urinary incontinence (SUI).   However, there is limited evidence for the accuracy of cut-off values for UDS measures conventionally used to predict post-operative problems. Also, there is no consensus on the role of pre-operative UDS in women who present with "pure" SUI, despite the National Institute of Clinical Excellence (NICE) guidance (1) suggesting limited role. We aimed to evaluate UDS measures in terms of sensitive cut-off values for ability to predict post-operative voiding dysfunction, de novo urgency and persistent SUI. We also aimed to evaluate the ability of UDS to identify mixed Urinary Incontinence (mixed UI) pre-operatively when not reported by women with SUI.

Study design, materials and methods

In this retrospective study, 49 (n) women who had sub-urethral slings (TVT or TOT MONARC) performed as primary procedures between June 2005 and July 2007 were assessed. Women who had a past history of surgery for incontinence were excluded. Maximum flow rate (Qmax), maximum detrusor pressure (Max Pdet), bladder compliance, maximum cystometric capacity (MCC) and post-void residual volume (PVR) were evaluated for their diagnostic accuracy and predictive ability at different cut-off values. ROC (Receiver Operating Characteristic) curves as well as sensitivity/specificity values were derived for the above mentioned measures to assess predictive ability. Medcalc® software was used for data analysis.

Results

UDS had 90% sensitivity, 30% specificity, PPV 25%   and NPV 92% for identifying mixed UI pre-operatively when UDS was used as reference diagnosis. The subjective cure rate was 93.3% at first follow up (6 weeks to 10 months) and 74.4% at 2nd follow up (1 -2 years). 8% women experienced post-operative voiding dysfunction and 2% developed de novo urgency. Qmax <15mls/sec, Max Pdet<30cm H2O, PVR > 100mls and MCC < 400mls had better predictive ability for post-operative voiding dysfunction compared to other cut-offs for the same measures (**Table 1**). Qmax<15mls/sec was the best predictor of post-operative voiding dysfunction with ROC curve area 0.83 (CI: 0.69-0.92; P=0.009) (**Fig.1**). All the UDS measures (except MCC) had curve areas close to 0.5 for persistent post-operative SUI suggesting poor predictive ability (**Table 2**). Predictive ability of UDS measures for de novo urgency could not be assessed, as there was only one case of de novo urgency.

Interpretation of results

If the woman does not report mixed UI, the probability of finding mixed UI on UDS is small (8%). UDS offers little additional diagnostic value in terms of identifying mixed UI when the woman does not report it. However, it does help predict post-operative voiding dysfunction. Predictive ability of UDS measures changes with the cut-off values used. Most UDS measures have poor predictive ability for post-operative persistent SUI. Low bladder capacity has some association with post-operative SUI.

Concluding message

Role of pre-operative UDS remains controversial and one of the reasons is lack of sensitive cut-off values for UDS measures, making their interpretation difficult. To our knowledge, there are no other studies attempting to identify sensitive cut-offs for UDS measures from the perspective of predicting outcomes. However, the results of this study should be treated with caution as the sample size is small. Sufficiently powered prospective studies are necessary to identify sensitive cut-off values for UDS measures to improve overall predictive ability of UDS.

**Table 1**: Pre-operative UDS measures and post-operative voiding dysfunction

UDS Measure	Sensitivity %	Specificity %	ROC area	CI	P value
Qmax <15mls/sec	75	90.91	0.83	0.69 – 0.92	0.009
Qmax <12mls/sec	25	97.73	0.61	0.46 – 0.75	0.365
Qmax <10mls/sec	25	100	0.62	0.47 – 0.76	0.317
PVR >50mls	50	81.82	0.65	0.50 – 0.79	0.280
PVR >100mls	50	100	0.75	0.60 – 0.86	0.083
PVR >150mls	25	100	0.62	0.47 – 0.76	0.317
MCC <500mls	75	56.82	0.65	0.50 – 0.79	0.223
MCC <400mls	75	81.83	0.78	0.64 – 0.89	0.020
MCC <300mls	50	86.36	0.68	0.53 – 0.80	0.215
Max Pdet <30 cm H20	100	42.11	0.71	0.54 – 0.84	0.0001
Reduced compliance	50	80	0.65	0.50 – 0.78	0.309

Table 2: Pre-operative UDS measures and post-operative persistent SUI

UDS Measure	Sensitivity %	Specificity %	ROC area	CI	P value
Qmax <15mls/sec	15.56	100	0.578	0.42 – 0.72	0.004
Qmax <12mls/sec	4.44	100	0.52	0.37 – 0.67	0.152

Qmax <10mls/sec	2.22	100	0.51	0.36 – 0.66	0.317
PVR >50mls	80	50	0.65	0.49 – 0.78	0.551
PVR >100mls	4.44	100	0.52	0.37 – 0.67	0.152
PVR >150mls	2.17	100	0.51	0.36 – 0.65	0.317
MCC <500mls	46.67	100	0.73	0.58 – 0.85	0.0001
MCC <400mls	24.44	100	0.62	0.46 – 0.75	0.0002
MCC <300mls	17.78	100	0.58	0.43 – 0.73	0.002
Reduced compliance	78.26	50	0.64	0.49 – 0.77	0.574

Fig.1: ROC curve for Qmax <15mls/sec: The curve area close to top left corner of the graph suggests good predictive ability of the test.
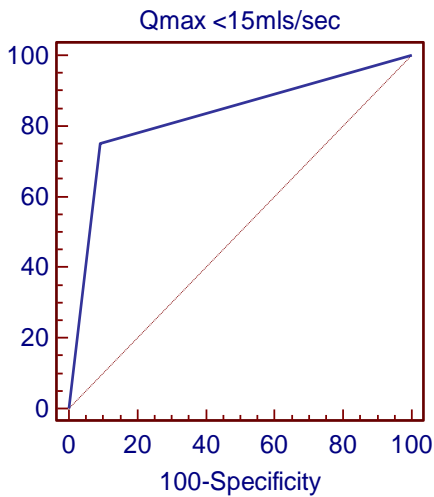
References
1.   National Institute of Clinical Excellence CG40 Management of urinary incontinence in women Oct 2006

Specify source of funding or grant	**None**
Is this a clinical trial?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**No**
This study did not require ethics committee approval because	**it was a database review and classified as service evaluation.**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**No**