

A GUIDE ON RECORDING GOOD DATA AND USING UROREPORT

BACKGROUND

The most common problems associated with urodynamics recordings are badly artifactual baselines caused by patient movement and/or catheter movement by the urodynamicist immediately before or after a physiological pressure change. Neither can be avoided but the deleterious effect on the ability to present and interpret a good urodynamics recording can be completely overcome with a understanding of how the transducing systems work and with a little preplanning and communication with the patient and technician during the test.

An explanation to the patient before performing the test should, as well as explaining what and where catheters are to be placed, include an explanation for the need for the patient to assist during the test when and as instructed or else the whole test will be wasted. The type of patient co-operation is not demanding and is usually limited to being able to remain relaxed and still when asked and to be prepared to wait relaxed for 20 to 40 seconds after being readied for micturation but just before commencing micturation.

Rarely do urodynamicists have a full protocol prepared and open to review by all concerned during the test. This is a major shortcoming in clinical urodynamics measurement. The testing protocol will vary with test type and test laboratory but the following critical points will be relevant to all urodynamics testing laboratories. Sharing this with the patient, where appropriate, before starting the test can assist all.

Note - it is assumed there is a reasonable level of understanding of the test sequence and the objectives of the test itself by all involved. Additionally relevant basic user manuals for the type of equipment used should have been read and understood by the person operating the recording system.

WHY IS THIS NECESSARY?

Contrary to common opinion the interpreting clinician should not need to be present during the routine mechanics of the test to be able to report on it. The patient history taking and any physical examination undertaken during the patient visit should separately be considered as the clinicians responsibility.

A fixed set of protocols and a trained clinical technician with an understanding of physical measurement and with training by an appropriate clinician in the medical reasons for the test and the treatment paths should routinely produce easily interpretable data.

Most urodynamics clinicians do however play a leading part during the urodynamics test as they are otherwise unable to report on the final waveforms due to the levels of artifact and lack of events documentation. This generally makes an off-line interpretation impossible. An automated 'non human' software programme trying to interpret such recordings will have an even bigger problem. We feel that this is one of the reasons for the almost universal criticism by clinical staff of automated test reporting programmes. One needs to accept that the software programs cannot approach the human eye/brain combination in the pattern recognition needed to reject artifacts if they are allowed to be present in the recording.

A GUIDE ON HOW TO MAKE A TECHNICALLY GOOD RECORDING

- A) After catheterisation instruct the patient (whether either on a urogynaecology investigation chair or supine on an examination couch) to relax. Vent the pressure transducers to atmosphere and perform a zero baseline balance with the pressure transducer sensing area in a horizontal plane with the symphus pubis. Turn the stopcocks (taps) so that the transducers are connected to the patient catheters. There will generally then be an elevation of the baselines due to intra-abdominal hydrostatic pressures. The more obese the patient the higher the offset magnitude of the resting pressures. Connect the filling catheter and ready the filling pump if one is to be used.

- B) Monitor the recording channels and do not proceed until the pressure baselines are stable and movement free. Ask the patient to cough – solely to be able to check for adequate performance of the complete pressure recording system. Pves and Pabd should give almost identical cough pressure transients and the Pdet channel should show a minimal cough subtraction signal. If the Pdet is substantial there is a problem—usually air in one or both of the catheter / extension tubes / transducer plumbing. If a urethral pressure is also being recorded its pressure should also react to the same cough pressure transient although, depending upon the patients physiology, Pura may well exhibit up to a 75% under reading which will be associated with a negative Puc.
- C) Then after again checking for good stable baselines turn on the giving set (and pump if used) in one prompt movement. Jiggling the pressure line or the filling catheter is likely to produce artifact - so do it once and leave it alone. Many operators seem to hold the giving set (varying the load on the filling transducer and hence the baseline) whilst explaining to the patient what they are doing!
- D) At the end of filling promptly stop the flow with the giving set control or the pump (if used) and let 5 to 10 seconds of chart scrolling to occur before either stopping the chart (not needed) or the patient is moved to another position. If at any time a cough, or some other pressure measurement response is being monitored (such as a urethral profile and cough transmission measurement - always wait both before and after each stimulus for a return to a quiescent baseline state.
- E) When moving the patient to a standing position or to the voiding commode the pressure zero reference will again have to be re-established. The only way to do this and still be able to reference the complete test baselines back to the initial balance to atmospheric pressure is to adjust the transducer mounting assembly vertically on the IV pole until the transducer sensing sections are again at the height of the symphus pubis. If this is done correctly and the pressure catheters are all still located in the bladder the pressure recording values during micturition will all be correctly measured.

A point to remember is that whether due to allowing inadequate time to sample resting base lines or inadequate recording duration at any new waveform event, unless there is sufficient data in these states any analysis software will find it difficult to perform correctly.

If there are inexplicable pressure values they will most likely be caused by an inappropriate zero balance procedure, air bubble or non-continuous pressure coupling of one or both pressure lines or wrongly calibrated pressure channels. Other potential problems could be inappropriately selected stopcocks, an over pressurised rectal balloon, plumbing fittings inadequately tightened or wrongly connected transducer cables. There is no magic in science, one should be able to ultimately identify the source of the problem.

RECOMMENDED OPERATION OF UROREPORT

If your recorded patient data is of good quality with -

- artifact free baselines
- correctly zero referenced pressures (at all times)
- no duplication or conflicting event comments - the uroreport operation will mostly likely (over 85%) generally perform successfully.

If the recorded data contains areas of artifact or physiologically ambiguous data a combination of manual and automated (or even fully manual) measurement analysis may be appropriate. If you have doubts about the reliability with which the software programme may be able to analyse the recording, it is often faster to elect to make manual selection of the Measurement Events. As a **worst case** the number of manual measurements (each requiring a double mouse click on the correct point on the waveform) are;

Fill Phase: two values

Void Phase: Five values

Urethral Phase: Seven values

For a clinician understanding the urodynamics test details this takes under 20 seconds for both Fill and Void phase and 15 seconds for the Urethral phase.

Adopting this criterium will ensure the most reliable report generation.

Note: These instructions do not explain the operation of the manual measurement mini-window or the report setup windows. The user should refer to the body of the UroReport manual for detailed instructions.

DURING ACQUISITION OF THE PATIENT DATA:

Insertion of Patient Event Comments:

Patient Event Comments should be entered into the patient record during the patient recording at the appropriate time. The user may choose the predefined (I.C.S.) subjective patient event comments from the keyboard template list using the 'F' keys. These include 'First Desire to Void', 'Normal Desire' or 'Urgency', during the filling cystometrogram phase or 'Told to Void' in the voiding phase. Free text event comments using the keyboard and the 'return' key can also be inserted. *Measurement* (of the value at a waveform point of significance) *Event Comments* are **not** entered during patient data acquisition.

POST ACQUISITION ANALYSIS OF THE PATIENT RECORD:

Automatic Analysis of Measurement Event comments:

Select (highlight) the waveform area across the phase you wish to analyse. Ensure that this selection takes into account the need of the software to be able to locate pre-event resting baseline values and end point data values after the completion of an event such as flow or vesical filling volume. Using the Uromac tool button bar, select 'Analyse Patient-Data'. This operation will then insert a comment at the beginning and end of that selection (e.g. Begin Fill Selection and End Fill Selection). This is a flag for the software to know the section you have chosen as appropriate for analysis and for the analysed phase data to then be added to the UroReport.

Upon reviewing the waveform display you will see comment boxes and their associated vertical dotted lines under the points on the waveforms where the software has made auto measurements.

Ensure that you agree with the position of the measurement points in the record. If not you can edit each of the comments in this selected phase by reviewing the points sequentially in the manual analysis mini-window as detailed in the next section. If the software cannot auto-analyse the selected section it will also automatically place on the screen the manual analysis mini-window.

SEMI-AUTOMATIC ANALYSIS

If the Auto Analysis details were not considered to be correct carry out the following steps for each phase needing correction. The following example is for the filling CMG.

- Go to the waveform data on the chart which is required for analysis. Use the mouse to click/place the cursor at the end of the pre fill Vvoid baseline waveform. Operate the event key 'Start of Fill' (option & F1) on the keyboard, then move the cursor to the small plateau at the end of the Vfill phase. This is the volume of the saline infused into the patients bladder. Then place Click/place the cursor and operate the event key 'End of Fill' (Option & F2) on the keyboard. Again select the tool button bar 'Analyse Patient-Data'. Review Report and the corrected measured data should now be displayed.

MANUAL OR RE-ANALYSIS OF MEASUREMENT POINTS:

Make a selection of the phase under analysis and select the tool button bar button 'Analyse Phase'. If auto analysis is not possible as the waveform data is artifactual or there are conflicting Event Comment labels, a mini window (in this case for the Void phase) appears on the screen as follows:



Removing and reentering Event Measurement Comments:

If a measurement point(s) in the phase selection is not in the correct position, use the mini-window to clear and reenter it (by double clicking on the waveform) using the Prev, Skip, Clear buttons (see the full operational description in the UroReport manual). When viewing the mini-windows, note that where a solid dot precedes each Measurement Event Comment statement it indicates that its value has already been transferred (ie detected or measured) to the report. Also data previously transferred is indicated in the data record by a flashing bar beneath the comment box.

It is necessary to reselect the phase prior to correcting the measurement value locations by once again selecting the area encompassing the revised Measurement Event Comments, then select the 'Analyse Phase' button. Finally reanalyse the data by selecting ANALYSE from the UroReport menu or the toolbar.

In summary for Manual Analysis:

Step 1: Insert Patient Event comments after acquisition (if not done already)

Step 2: Insert Measurement Event Comments (ie select as required - Start of Fill / End of Fill / Start of Void / End of Void. As described above.

Step 3: Highlight the phase to be analysed.

Step 4: Select Analyse Phase.

Step 5: Review the comments using the mini-window, or PREVIEW the report results.

Repeat steps 2 to 5 if necessary until you are satisfied with the results.

Help

If the manual analysis miniwindow is not displayed on the screen follow these steps to bring it up;

- From Top Menu bar select Patient Report menu
- Select Report Set Up
- Select the phase under review (ie Fill/Void/Uempty/Ufull)
- Select TRANSFER

Remember – It is always good clinical practice for the user to inspect both the record and the report before accepting the report results.

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