The Structure and Management of a Urodynamic Database (#168)

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AIMS

The proper storage and management of data is an essential requirement for clinical services and research. Our department has operated a database for symptomatic, urodynamic and diagnostic data since 1985, beginning with a DOS based system and now under Windows. To date it contains the records of 32,637 urodynamic tests (8,289 male, 24,348 female) made since then, with additional records of over 30,000 free uroflowmetry tests. It is to our knowledge the largest of its kind in the world, and this is the first description in the literature of such a database.

We present here the structure of the database, with an aim to enable departments to set up similar systems. Closer harmonisation of database structures will enable easier collaboration and review of data across centres. We also share systems for screening out anomalies and errors in the data, aiming to assist others in management of data quality.

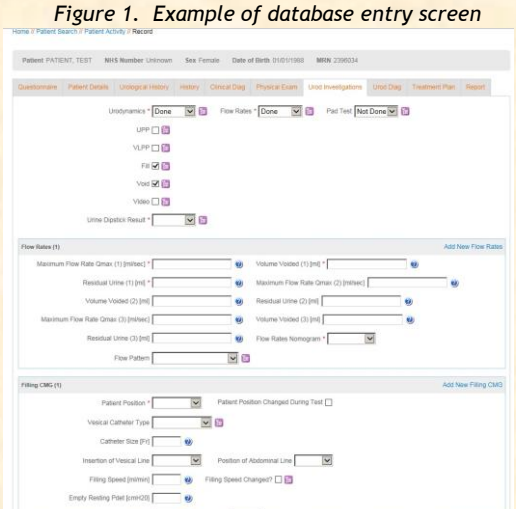
METHODS

The structure of the database is described in terms of data sections and tests recorded. The screening tests are listed with guidelines on plausible data ranges.

Table 1. The structure of the urodynamic database

Page title	Subject areas	Data fields
Patient details	Patient data	hospital number, age, height, weight, BMI, smoking
	Test details	Date, test type, investigator name
	Referrer details	Name, referral type
Questionnaire	ICIQ- M / FLUTS	Gender specific symptom questions since 2013
Urological History	Bladder diary (ICIQ-BD since 2013)	Frequency (day/night), Fluid volumes (input/output, average/maximum)
	LUTS	Symptom check boxes, duration
History	Medical History	Check boxes for medical conditions, haematuria, UTIs, retention, surgical history, parity
	Bowel function	Control, frequency and symptoms (selected from menu options)
	Current drug therapy	selected from menu options
Clinical Diagnosis	Initial diagnoses from symptoms	Bladder and urethra during both filling and voiding
Physical Examination	Male	Prostate, incontinence, anal, neurological
	Female	Vaginal, prolapse, anal, incontinence, neurological
Urodynamic Investigation	Urine dipstick	Selected from menu options
	Pad weight	Number of pads and 24 hr pad weights
	Uroflowmetry	Q_{max}, voided and residual volumes, flow and voiding times, flow pattern
	UPP	MUP, MUCP, squeeze increment, length
	Filling	Position, test settings, sensations, volumes, DO heights, leakage, resting pressures, compliance
	Valsalva	VLPP
	Voiding	Q_{max}, pressures at Q_{max}, volumes voided and residual, flow and voiding times, BOOI, BCI
	Video urodynamics	Anatomical features, X-ray dose
Diagnoses	Test summary	Symptoms reproduced?
	Diagnoses	Filling/voiding, detrusor/urethra
Treatment Plan	Action plan	Tests / referrals required
	Information given	Health education leaflets given to patient
Report	History & examination	Free text
	Urodynamic findings	Free text & suggestions for management

Figure 1. Example of database entry screen



RESULTS

The database is a proprietary system developed by our hospital's Information Management and Technology department. Data entry includes demographic, history and symptom details. Summaries of the bladder diary, physical examination, urodynamic test details and results, and the suggested treatment plan are also recorded, followed by text reports of both history and findings. This structure is summarised in Table 1. Data entry of symptom and history is made during patient interview and the test itself, making data entry efficient. Once test data is entered (see Figure 1), the database can then generate a test report in the form of a letter for referrer and patient.

Data checks are made in the form of consistency checks (e.g. male data for male patients only), plausibility (e.g. daily micturitions < 40) and field content (e.g. text 'G3 P2 A1' is not allowed in the numeric 'Parity' field). These checks are summarised in Table 2. In this way, most typographical mistakes and barriers to automatic analysis are removed.

INTERPRETATION

Other departments are able to use this structure to ensure all relevant and useful data is recorded. Similar structures for data storage will allow greater ease of data sharing for multicentre reviews.

With or without a database in place, the screening checks presented here can be used to remove anomalous data from records. Remaining outlying data can then be checked and validated against original trace data or patient notes if required.

CONCLUSIONS

The publication of this database design and data screening checks will promote quality and compatibility of data across urodynamic centres, benefitting both research and patient clinical services.

Table 2. Screening and plausibility tests for urodynamic database

Field tested	Plausible value
Age	>17, <100
Date of test	< current year end
Height	>100, <250 cm
Weight	>40, <200 kg
BMI	<55
Questionnaire bother fields	0 to 10
No of voids / day	<40
Pads per day / night	<18, <10
Parity	<20
Flow rate	<100 ml/s
Volume voided	< 2000 ml
Post void residual	< 3000 ml
Bladder / infused volume	< 3000 ml
Filling speed	< 150 ml/min
Pressure values	< 500 cmH2O
Male fields	Not used for female patients
Female fields	Not used for male patients
Flow time, Time to Qmax	< 300, < voiding time
BOOI, BCI	< 200