7

Bray A[1], Harding C[2], Pickard R[3], Drinnan M[1]
1. *Medical Physics Department, Royal Victoria Infirmary, Newcastle upon Tyne, UK,* ***2.*** *Department of Urology, Freeman Hospital, Newcastle upon Tyne, UK,* ***3.*** *Institute of Cellular Medicine, Newcastle University, UK*

PERSONALISED UROFLOWMETRY PREDICTS OUTCOME FROM SURGERY

Hypothesis / aims of study

NICE have recently highlighted the importance of better predicting outcome from disobstructive surgery in clinical guideline 97. Given that men with urodynamically proven bladder outlet obstruction (BOO) experience better outcome, this could be achieved by increasing the diagnostic accuracy of clinical tests used during the workup to surgery.

An individual's average maximum flow rate (Q_{max}) from multiple measurements will have better diagnostic accuracy for BOO than a single value because the influence of outliers and unrepresentative measurements is reduced [1]. However, in general the value of Q_{max} is weakened by its dependence on bladder volume. Attempts to address this have been made by correcting Q_{max} for voided volume (V_{void}), or categorising the [Q_{max},V_{void}] pair using relationships derived from large groups of men [2]. However, given that the relationship differs for each man, this may not improve accuracy.

The aim of this study was to determine whether a personalised volume-corrected Q_{max} can better predict outcome from disobstructive surgery than an individual's mean Q_{max}, both measurements being derived from home uroflowmetry.

Study design, materials and methods

30 men scheduled for disobstructive surgery were recruited. They were provided with a home flowmeter to use for one week prior to surgery. Participants also completed an International Prostate Symptom Score (IPSS) questionnaire at this time and then again at least four months following surgery. The home flowmeter, developed and built in our department, obtains Q_{max}, V_{void}, date, time, duration and the full flow trace for all recorded voids. Subjective outcome from surgery was defined as percentage reduction in total IPSS score.

Correlation between outcome and mean Q_{max}

For each man, mean Q_{max} from all voids recorded at home was calculated and correlated with outcome using Spearman's rank.

Correlation between outcome and volume-corrected Q_{max}

For each man, a linear relationship between Q_{max} and V_{void} was derived according to least-squares fit. Using these equations, a set of 'volume-controlled' Q_{max} values for volumes from 0 to 500 ml at 5 ml intervals was calculated and then correlated with outcome using Spearman's rank.

Results

The mean age of the participants was 72 years (range 55 to 89 years) and the mean length of time between surgery and follow-up was 181 days (range 122 to 351 days).

Correlation between outcome and measures of Q_{max} (Table 1)

Both measures of maximum flow rate had a negative correlation with outcome, indicating that men with higher pre-surgery flow rates experienced poorer outcome, as expected.

Only volume-corrected Q_{max} correlated strongly, and significantly, with outcome. All sets of volume-corrected Q_{max} values for volumes from 70 to 500 ml correlated significantly with outcome. The best performance was achieved at 345 ml; these are the values shown in Table 1. Figure 1 shows symptomatic outcome versus volume-corrected Q_{max} at 345 ml.

	Correlation coefficient (±95 % CIs)	p value
Mean Q_{max}	–0.32 (–0.61 to 0.046)	0.09
Volume-corrected Q_{max}	–0.46 (–0.7 to –0.1)	**0.01**

Table 1. Spearman's rank correlation between outcome from surgery and two measures of maximum flow rate. ***Bold text*** *indicates statistical significance, defined as a p-value <0.05.*

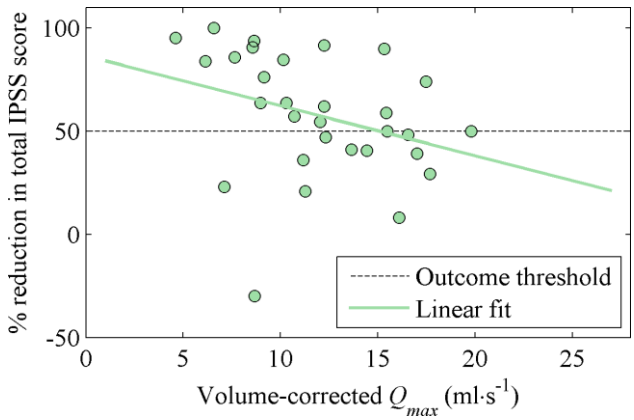

Figure 1. Symptomatic outcome versus volume-corrected Q_{max} at 345 ml.

Interpretation of results

Several studies have proposed the use of a volume-corrected Q_{max} or nomogram to determine whether Q_{max} is normal or abnormally low. Methods reported to date are disadvantaged by assuming a particular relationship between Q_{max} and V_{void} and applying this to a single value of Q_{max} and V_{void} for all men. One study found the relationship between Q_{max} and V_{void} in a group of men with LUTS to differ considerably between individuals, some even having a negative relationship [3].

A volume-corrected Q_{max} calculated individually for each man correlated significantly with symptomatic outcome, whereas mean Q_{max} did not. This may reflect the fact that men with predominant overactivity void with low flow rates due to low voided volumes, and men with predominant obstruction void with low flow rates even at larger volumes. This concept is illustrated using two patients' data in Figure 2.

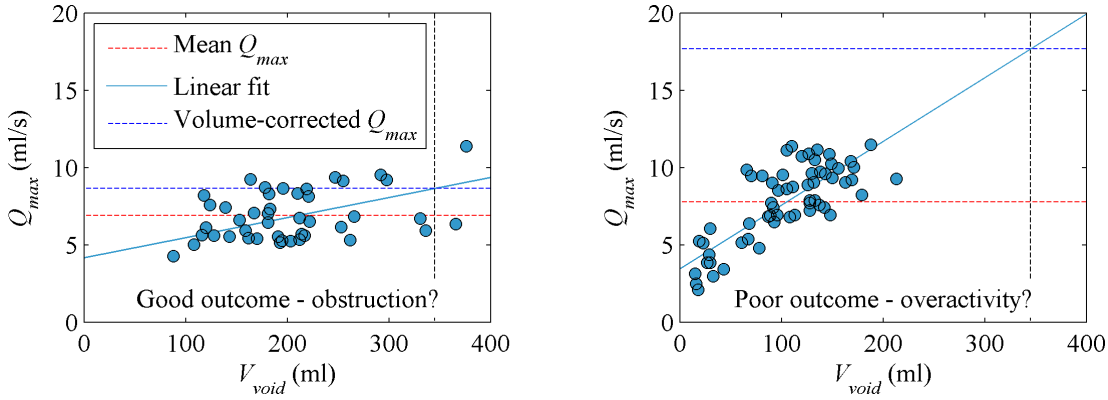

Figure 2. Both patients have similarly low mean Q_{max} (within 1 ml/s), but their volume-corrected Q_{max} values at 345 ml are 9 ml/s apart (9 and 18 ml/s).

Concluding message

A personalised, volume-corrected Q_{max} derived from home uroflowmetry appears to better predict symptomatic outcome from surgery than mean Q_{max}. These results should be verified in a larger group of patients.

References

1. Neurourol Urodyn (2012); 31: 7-12
2. Br J Urol (1989); 64: 30-38
3. Urology (2002); 59: 368-372

Disclosures

Funding: The Wellcome Trust **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Newcastle & North Tyneside 1 **Helsinki:** Yes **Informed Consent:** Yes