

CAN WE PREDICT ABDOMINAL LEAK POINT PRESSURE IN WOMEN WITH STRESS URINARY INCONTINENCE? A COMPARATIVE ANALYSIS OF TWO MODELS

Hypothesis / aims of study

The urodynamic study is useful in the proper classification of stress urinary incontinence in females. Even though it is invasive, costly and restricted to some institutions, it is frequently indicated based on the suspicion of intrinsic sphincter deficiency.(1-3) A clinical tool to identify women with a low pre-test probability of having a low ALPP could be helpful in rationalizing the use of urodynamics. Thus, we aimed to create a clinical classification rule to identify women with a high probability of genuine stress incontinence by means of two different methods: A) a regression model and B) a classification rule using recursive partitioning; and to compare their results.

Study design, materials and methods

We conducted an observational study to develop a classification rule. Women aged 18 and older presenting with stress urinary incontinence to the urodynamics section of our institution were invited to enrol. Clinical data was collected prospectively in a concurrent cohort. Two clinical prediction rules were generated. In Model A all variables that showed association to the outcome in bivariate analysis were selected to build a model of unconditional logistic regression. Model B was constructed through classification trees (recursive partitioning). The cohort was divided in two subsamples, one for obtaining the rule and another for internal validation. Regression diagnostics were performed, and measures of discrimination and fit were calculated.

Results

A total of 1600 women with urinary incontinence were included, 1200 for derivation and 400 for validation. Model A) variables that showed a significant association with an ALPP<60 cmH₂O in the bivariate model were: smoking status (p=0.041), severity of incontinence (p=0.07), age (p=0.053), menopause (p=0.012), ICIQ-QoL (p=0.013), ICIQ-frequency of leakage (p=0.011), ICIQ-perceived amount of leakage (p=0.014), ICIQ score (p=0.041), obesity (p=0.043), and urinary incontinence with Valsalva at examination (p=0.011). In the multivariate model, including possible interactions, only smoking, incontinence at examination, ICIQ-frequency and ICIQ-amount were found to be predictive of ALPP<60 cmH₂O. The model meets assumptions of adequate diagnosis, however its operational characteristics are conservative. When validation with the internal sample was conducted and operational characteristics were measured the model could not be validated (0.72 vs. 0.59). Model B) it is interesting to note that the analysis with CART classification and regression trees yielded the same variables as the logistic regression model. Urinary incontinence at examination was the best classifying variable. With this variable being present, the second best was the ICIQ-amount of leakage.

Interpretation of results

None of the models was able to achieve proper discrimination. Associated variables were identified, but no variable or combination of variables had enough discriminative power to define in whom urodynamics should be performed. Nonetheless, urinary incontinence at examination and ICIQ-amount of urinary leakage are clinically relevant in decision making.

Concluding message

Clinical prediction of abdominal leak point pressure as a measure of intrinsic sphincter deficiency could not be validated using two independent mechanisms. With our results we cannot conclude that clinical findings can replace the urodynamic study in the appraisal of stress urinary incontinence, and we consider they are both complementary.

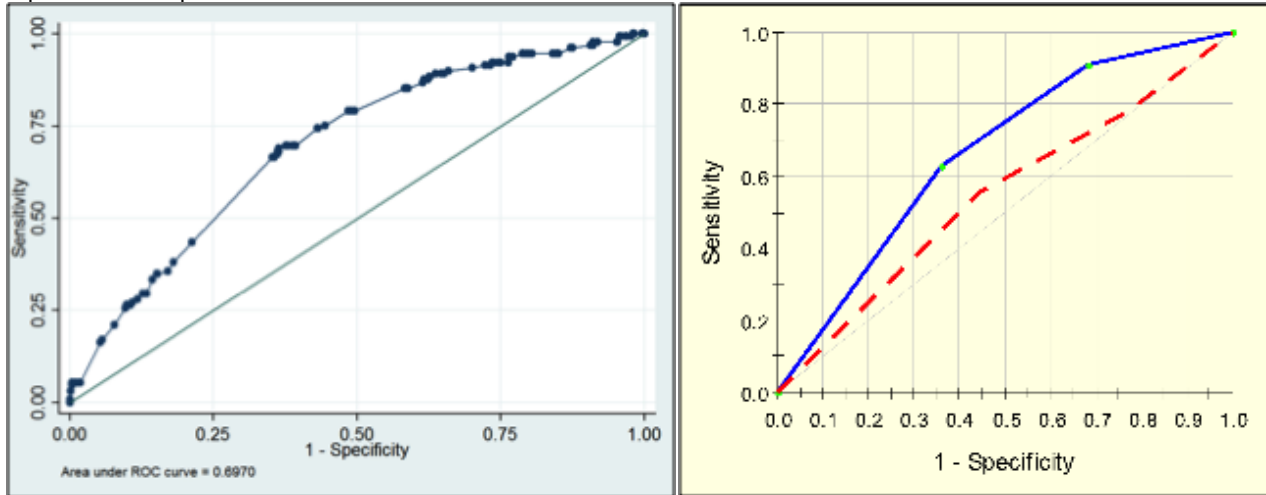
Table 1. Baseline characteristics according to ALPP

Variable	ALPP>60 cmH ₂ O	ALPP<60 cmH ₂ O
Age n(%)		
<49	428(41)	73(49.3)
50 - 69	505(48.3)	60(40.5)
>70	111(10.6)	15(10.1)
Anti-incontinence surgery n(%)	135(12.8)	23(15.3)
Number of vaginal deliveries mean±SD	2.5±1.8	2.6±1.6
Radiotherapy n(%)	8(0.76)	0
Hysterectomy n(%)	245(23.4)	29 (19.8)
Body mass index n(%)		
<24	333 (32.1)	59(39.8)
24-29.9	486(46.9)	66(44.5)
>29.9	217(20.9)	23(15.5)
ICIQ score	13.29±4.5	14.9±4.5
ICIQ QoL	7.4±2.5	8±2.3
Severity of incontinence		
Mild	120(11.4)	10(11.4)
Moderate	621(59.9)	88(59.2)
Severe	296(28.5)	49(33.5)

Table 2. Model B) reduced multivariate model

Variable	Odds ratio	Confidence interval 95%	p-value
Smoking status	1.645	0.982-2.756	0.058
Incontinence at examination	3.52	1.910-6.49	0.0001
ICIQ-frequency	0.344	0.003-0.371	0.006
ICIQ-amount	27.18	2.459-300.38	0.007

Figure 1. ROC curve for Model A) Logistic regression model (left) and for Model B) Recursive partitioning (right), blue curve represents the operative characteristics of the model and red curve the validation model



References

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3. McGuire EJ. Urodynamic findings in patients after failure of stress incontinence operations. *Prog Clin Biol Res.* 1981;78:351–60.

Disclosures

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