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Novel uroflow stop test at time of catheter removal is a strong predictor of early urinary continence recovery following robotic-assisted radical prostatectomy

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Aims: To study whether the ability to completely stop urinary flow during voiding at time of catheter removal, measured objectively using uroflometry can predict early recovery of urine continence following robotic-assisted radical prostatectomy (RARP).

Materials & Methods: In this prospective study,108 patients with a minimum of 2 years follow-up operated by a single surgeon (AEH) were subjected to an uroflowmetry at the time of urethral catheter removal following RARP.Normal Saline (150 ml) was instilled intravesically prior to catheter removal and patients were instructed to attempt to stop urine flow during voiding in uroflowmeter.Two groups were studied, group one with positive Stop Test (n=80) and group two with negative Stop Test (n=28). Covariates included age, BMI, IPSS score, PSA, tumor stage, prostate volume, nerve sparing status and estimated blood loss.

Results: Basic characteristics were not statistically different between both groups.Early continence recovery was significantly higher in group one.Pad-free continence rates in group one and two at 1, 3, 6, 12, 18 and 24 months were 62% vs. 7% (p<0.001), 85% vs. 28% (p<0.001), 93% vs. 67% (p 0.001), 93% vs. 82% (p 0.079), 97% vs. 82% (p 0.006) and 97% vs. 85% (p 0.023) respectively. UroflowStopTest was the only independent predictor of early urine continence recovery on univariate and multivariate regression analysis [OR 2.87 (95%CI 1.34-4.38, p=<0.001)].

Conclusion: Novel use of uroflowmetry at time of urethral catheter removal is a simple, non-invasive study with independent ability to predict early continence recovery following RARP.

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Modeling of gap junctions and investigation of their influence in determining syncytial behavior

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Intercellular coupling via gap junctions allows rapid propagation of action potentials by providing relatively low resistance electrical pathways between cells. This can lead to synchronous activation of a group of cells in a tissue. They can also act as pathways for chemical communication between cells through the flow of second messengers such as IP3 and Ca2+. For a long time, gap junctions have been treated as purely passive resistive structures. But studies have since shown conclusively that these are voltage-gated and possess a selectivity mechanism. This introduces a further dimension of variability into the analysis of the complex electrical activity in syncytial tissues. We developed models of gap junctions which took into consideration their trans-junctional voltage dependence as well as their gating kinetics. Two approaches for model development were employed considering the gap junction as a whole and taking hemi-channels as the basic building blocks and subsequently combining them to form the complete gap junction. For our study we selected gap junctions consisting of Cx40, Cx43 and Cx45. They show marked differences in their biophysical properties and have been reported to be present in the bladder. These models of gap junctions were incorporated in our earlier published model of the bladder smooth muscle syncytium and the emergent electrical properties both passive and active were analyzed. From the studies, we find that it is important to identify the gap junction subtypes as the syncytial response cannot be determined solely from the number of such gap junction channels.

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