policy makers in estimating health system performance. Forsmark et al showed that health costs were significantly higher for RALP compared to RRP. Their detailed analysis showed that operation time, robot purchase/maintenance, centre caseload, and surgeon experience are critical in reducing this cost difference. The results confirm a retrospective analysis of a representative US all-payer database in which costs were significantly higher for RALP compared to RRP, but were not significantly different among the highest-volume surgeons and hospitals [3]. Current evidence suggests that centralising surgical care in a few larger centres specialised in robotic surgery performed by very experienced surgeons can potentially optimise the quality of functional outcomes and increase the number of patients treated in the main facilities and treatment cost-effectiveness, leading to better utilisation of the equipment pool and new technologies and avoiding unnecessary duplication of infrastructure [4]. However, most larger centres are teaching hospitals and are involved in tutoring clinical fellows, which affects the time available for the high requirements of robotic surgery.

In our local context, the hub-and-spoke model was adopted in clinical practice in 2015. A single referral centre performs all robotic surgery for patients evaluated in the metropolitan area, including four district hospitals and the paediatric hospital. To obtain the most benefit from this collaboration, a modified hub-and-spoke system was adopted, in which not only patients but also previously trained surgeons move from the spokes to the hub. A twin robotic operating room is open 13 h/d from Monday to Saturday, with a median of six interventions (interquartile range 5–7) achieved per working day; a total of 1149 urological robotic procedures were performed in 2018 [5]. This system avoids the creation of A and B level surgeons, increases the inherent advantages of the standard system for patients, and increases the overall quality of the national health system.

Training of surgical fellows and surgeons from peripheral hospitals is possible with a very low impact on operating time and patient outcomes thanks to step-by-step tuition. This includes simulators and dry and wet laboratories in the first phase, followed by bedside assistance and modular training in robotic procedures.

The future promises a robotic revolution in urological surgery. Technologies will develop rapidly and it will be impossible to guarantee the highest quality technologies to every hospital. How can the robotic revolution be made available to the entire population? A modified hub-and-spoke model is the answer; this would lead to a higher surgical volume, meaning better patient outcomes, clinical research, and surgical training, as well as lower costs.

***Conflicts of interest:*** The authors have nothing to disclose.

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## Re: A Prospective Adaptive Utility Trial to Validate Performance of a Novel Urine Exosome Gene Expression Assay to Predict High-grade Prostate Cancer in Patients with Prostate-specific Antigen 2–10 ng/ml at Initial Biopsy

McKiernan J, Donovan MJ, Margolis E, et al.,

Eur Urol 2018;74:731–8

**Experts' summary:**

McKiernan et al report a prospective, multisite validation of the ExoDx Prostate IntelliScore (EPI) test, which is a urine-based three-gene exosome expression assay, using a cohort of 503 men aged >50 yr with prostate-specific antigen (PSA) of 2–10 ng/ml at initial prostate biopsy. The EPI test was superior to a standard of care (SOC) model (PSA level, age, race, and family history), with an area under the receiver operating characteristics curve (AUC) of 0.70 compared with 0.62 for the SOC model. Use of the prespecified cutoff point of 15.6 (defined in the previous study and recommended for the second utility phase) would avoid 20% of total biopsies at a cost of missing 7% of high-grade prostate cancers (PCs). The results of the study correspond well to the previous prospective data [1] and demonstrate that the EPI test is predictive of high-grade PC at initial biopsy and contributes to reducing unnecessary prostate biopsies.

**Experts' comments:**
Owing to the intra- and intertumoral genomic heterogeneity of primary PC [2], tumor biopsy may not necessarily represent the true character of a tumor. Liquid biopsy involves analysis of tumor-derived biomarkers isolated from the biological fluids of cancer patients. The potential of liquid biopsy is highlighted by studies indicating its ability to track the evolutionary dynamics and heterogeneity of tumors, and thus it is more likely to reflect the current state of a tumor [3].

Exosomes carry specific information obtained from their parental cells, and accumulating evidence shows their usefulness as a biomarker [4]. McKiernan et al developed a noninvasive detection test approved by the US Food and Drug Administration and reported its effectiveness in detection of high-grade PC in the clinical setting. Our group has focused on circulating miRNAs, which are protected by encapsulation in membrane-bound vesicles such as exosomes, and showed their potential in the diagnosis of PC [5]. Comprehensive analysis of all 2588 miRNAs was conducted, and serum miRNA profile patterns of 13 types of human cancers, including PC, were determined using a large sample ($n > 40\,000$). We subsequently developed a PC diagnostic model for men with suspected PC that has high sensitivity and specificity (AUC 0.95; sensitivity and specificity both 90%). Interestingly, the diagnostic index of our model was significantly higher in high-grade PC than in low-grade disease.

One of the most important subjects in urologic oncology is how to differentiate clinically significant from nonsignificant PC, that is, how to avoid overdiagnosis and thus overtreatment of tumors with lower biological potential, and undertreatment of more aggressive disease. The results of both studies indicate that liquid biopsies, such as analysis of exosomes or circulating miRNAs, can help not only in detecting PC but also in assessing its biological potential. Although further research and development are required, liquid biopsies could ultimately become key instruments for minimally invasive yet comprehensive analysis of PC phenotypes. These more recent innovative technologies could become an integral part of PC management in the near future.

***Conflicts of interest:*** The authors have nothing to disclose.

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## Re: Predictors of Long-term Bladder Management in Spinal Cord Injury Patients—Upper Extremity Function May Matter Most

Zlatev DV, Shem K, Elliott CS

Neurourol Urodyn 2018;37:1106–12

**Expert's summary:**
Zlatev et al. examine predictors for adoption of clean intermittent catheterization (CIC) by individuals with recent spinal cord injury (SCI) and then maintaining CIC for 1 yr after injury. At discharge from acute rehabilitation, 65% were performing CIC; statistically significant predictors of an indwelling catheter (IDC) included age (odds ratio [OR] 1.02 per year), obesity (OR 1.4), and female gender (OR 1.73), but the strongest predictor was poor upper extremity (UE) function (OR 5.2). Furthermore, among the 3328 individuals performing CIC at discharge, 18% abandoned CIC for IDC by 1 yr. Predictors of CIC abandonment included older age (OR 1.02) and poor UE function (OR 2.78).

**Expert's comments:**
For 3–6 months after SCI, patients are in acute rehabilitation, where nurses and therapists help them to regain independence. However, once discharged to home, many must manage their bladder independently. Although 50–60% of individuals perform CIC in rehabilitation, only 20% continue CIC in the long term [1]. Zlatev et al show that in yr 1, urethral CIC is easiest for thin, young men; almost everyone else elects for an IDC.

Factors that predict low CIC adoption rates but not abandonment (ie, female gender and obesity) give an early indication that CIC will not work well for these patients. A factor predictive of CIC dropout (ie, age and poor UE function) means that we underestimate the impact this factor will have on CIC ability when the patient transitions