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Words of Wisdom

Re: Partial Nephrectomy versus Radical Nephrectomy in Patients with Small Renal Tumors—Is There a Difference in Mortality and Cardiovascular Outcomes?
Huang WC, Elkin EB, Levey AS, et al

J Urol 2009;181:55–62

Experts' summary:

Huang and coworkers examined whether radical nephrectomy (RN) is associated with an increase in cardiovascular events and mortality compared with partial nephrectomy (PN). The study sample was obtained from Surveillance, Epidemiology, and End Results (SEER), a consortium of population-based cancer registries that includes approximately 26% of the US population. The primary end points of the analysis were cardiovascular events, cardiovascular deaths, and all-cause mortality after renal surgery. The study cohort included nearly 3000 patients with definitive surgery for a renal tumor of ≤4 cm diagnosed between 1995 and 2002.

Of these patients, 18.6% underwent PN and 81.4% underwent RN. A total of 609 patients had at least one cardiovascular event after surgery, including 84 (15.1%) in the PN group and 525 (21.6%) in the RN group. Of the 892 deaths, 173 were attributable to cardiovascular causes. In the PN and RN groups, 27 (4.9%) and 146 patients (6.0%), respectively, died of cardiovascular causes. When adjusting for preoperative demographic and comorbid variables, RN was associated with 1.4 times more cardiovascular events after surgery ($p < 0.05$). However, RN was not significantly associated with time to first cardiovascular event (hazard ratio [HR]: 1.21; $p = 0.10$) or with cardiovascular death (HR: 0.95; $p = 0.84$).

Experts' comments:

The interest in PN for small localized renal tumors has increased in the last decade because it ensures maximal parenchymal preservation along with oncological efficacy. Several recent studies showed that for tumors <7 cm, PN provides excellent cancer-specific survival and recurrence-free survival rates, equivalent to those achieved with RN [1–3]. In contrast, RN invariably leads to a substantial decrease in the number of glomeruli, and the functional kidney loss is particularly relevant if RN is performed for pT1 tumors. The susceptibility to renal failure is determined, in large part, by glomerular number: People with fewer nephrons, whether through reduced endowment or excessive loss such as after RN, have a higher rate of glomerulosclerosis and fewer nephrons to lose before their renal excretory function becomes terminally compromised [4–7].

A recent publication confirmed that RN represents a detrimental factor for the development of chronic kidney disease (CKD), with a 3-yr probability of freedom from new onset of stage 3 CKD being 80% after PN and 35% after RN ($p < 0.001$); corresponding values for stage 4 CKD were 95% and 64% ($p < 0.001$), respectively [8]. The limited amount of functional renal tissue removed by PN causes no or only mild adaptive hyperfunction that is mainly related to the duration of ischemia, while a substantial ablation of renal mass such as after RN can cause adaptive hyperfunction and hypertrophy leading to a statistically significant increase in renal failure rate [4,8–10].

In the present paper, the authors take a step forward, trying to evaluate if RN adversely influences nononcological outcomes through the development of CKD and its association with cardiovascular disease. They found that as a consequence of substantial kidney function loss, RN is associated with 1.4 times more cardiovascular events after surgery than PN. RN was not significantly associated with time to first cardiovascular event (HR: 1.21; $p = 0.10$) or with cardiovascular death (HR: 0.95; $p = 0.84$), but preexisting renal disease was shown to significantly predict type of surgery. This finding could have potentially mitigated the power of the results reported and could explain this lack of correlation.

The maximal preservation of renal tissue in patients undergoing surgery for renal tumors is of the utmost importance for several reasons: The glomerulosclerosis rate is inversely correlated with the total number of glomeruli; aging is associated with a significant decline in glomerular number; many conditions such as hypertension, stone disease, and diabetes can further affect the kidneys; and tumors can recur elsewhere in the kidney, such as contralateral renal cell carcinoma (RCC) [2,3].

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As experience with PN and the efficacy of the hemostatic agents increase, the indications for the conservative management of RCC are expanding. In our department, PN is performed in 90% and 50% of single sporadic tumors of <4 cm and 4–7 cm, respectively; thus, the number of PNs performed has exceeded the number of RNs since 2002 [2].

In conclusion, RN is not the best treatment for most clinically T1 kidney tumors because it puts patients at risk of CKD and cardiovascular disease. PN minimizes these risks, which is a further reason to expand its indications.

Conflicts of interest: The authors have nothing to disclose.

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Re: Surgical Treatments for Men with Benign Prostatic Enlargement: Cost Effectiveness Study

Armstrong N, Vale L, Deverill M, et al; BPE Study Group

BMJ 2009;338:b1288

Expert's summary:

This key paper ties together clinical outcomes in urology with health economics. The methodology involves source clinical effectiveness data from systematic reviews previously conducted by the group; treatment cost calculations from the UK National Health Service (NHS; except for microwave thermotherapy, which is virtually obsolete in the United Kingdom and for which cost was calculated from US manufacturers' data); and equipment capital costs obtained from commercial manufacturers.

A Markov model was constructed describing the sequence of events and main health states that men might find themselves in after the defined treatment strategies. Effects were measured by quality-adjusted life years (QALYs) and costs (in British pounds) at 2006 prices discounted at 3.5%. Monte Carlo simulation allowed selection of values for each parameter (95% confidence intervals from the meta-analysis) within the model according to individual dataset, NHS cost ranges, and expert opinion. Distribution shapes were chosen according to standard practice before these values were used in the modelling. The perspective was that of the NHS, with treatments occurring in appropriately equipped units and delivered by procedure-competent specialist urologists. The cycle length was set at 3 mo to allow benefit to occur and short-term adverse events to resolve. A 10-yr time horizon was chosen as the period over which the population would be likely to seek active treatment, the current technologies would remain relevant, and the simulation of the purchase of new equipment as required would be possible. The model was run by entering 10 successive annual cohorts of 25 000 men (the number receiving treatment each year in the NHS) in England. By choosing a multiple cohort design, the effects of applying sequences of escalating treatment and of progressively fewer members of a cohort needing additional surgery were also taken into account. Six health states—treatment, remission, no remission, remission with incontinence, no remission with incontinence, and death—were defined. A small possible drawback was that urethral and bladder neck strictures were considered to have resolved in 3 mo.

The authors suggested that for urodynamically obstructed men, monopolar electrovaporisation as a primary treatment provided the most cost-effective strategy for surgical treatment of symptomatic benign prostatic enlargement at a willingness-to-pay threshold of £5000 per QALY gained. This strategy was sequentially followed by either holmium laser enucleation (HoLEP) or transurethral resection (TURP), repeated if necessary on failure or relapse, with a probability of 0.85 at a willingness-to-pay threshold of £20,000 per QALY gained. Given uncertainty about the