Achieving the achievable in muscle-invasive bladder cancer

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Patient outcomes reported from clinical trials and case series from centres of excellence define the benchmark for what is achievable among patients with muscle-invasive bladder cancer (MIBC). However, because patients, medical care and health systems can be very different in routine clinical practice there is often a gap between efficacy (i.e., results observed in trials) and effectiveness (i.e., results observed in the general population).[1,2] Population-based studies are important to identify gaps in care and areas for improvement so that clinicians and patients might move towards "achieving the achievable."[3] Multiple population-based studies and a meta-analysis have consistently demonstrated an inverse relationship between hospital cystectomy volume and postoperative mortality.[4-8] However critical questions remain unanswered including: what factors are responsible for the observed volume effect?; how much of the observed effect relates to hospital volume versus individual surgeon volume?; and how should volume be defined, classified and analyzed? Furthermore, beyond operative mortality and complications there is considerably less literature describing the relationship between cystectomy volume and long-term survival.[9]

In the paper by Bianchi and colleagues published in this issue of *CUAJ*, the authors have evaluated the impact of hospital academic affiliation on short term radical cystectomy outcomes.[10] Using records from the Health Care Utilization Project Nationwide Inpatient Sample the authors explore postoperative complications and mortality across hospitals in the United States. The unadjusted results suggest greater complication rates, length of stay (LOS), and post-operative mortality in patients who have surgery at non-academic hospitals. However, in the multivariate analysis the there is no difference in LOS and post-operative mortality and a statistically significant but clinically modest increase in complications. A more fundamental question is how to disentangle the relationship between hospital volume, academic status, and outcome? While most previous studies have analyzed volume as either a continuous variable or a categorical variable using tertiles/quartiles, Bianchi and colleagues dichotomize annual hospital caseload as greater than 15 or less than 15 cystectomies per year.[10] The cut-point is very high relative to other studies where "high volume" hospitals are usually defined as those that perform >5 to 10 cystectomies per year.[4-8] In dichotomizing this outcome and using such a high threshold, Bianchi and colleagues are left with only 12% (n = 1515) of their study population in the high volume group and all of these cases had surgery at academic hospitals. Accordingly it is very likely that any potential volume effect has been lost in the statistics. The authors suggest that patients treated at academic hospitals are slightly younger, have less comorbidity, and are more likely to have private health insurance.[10] Despite adjusted analyses there remains the potential for unmeasured confounding.

Higher volume hospitals might have higher volume surgeons with better surgical technique, improved perioperative care and more multidisciplinary co-management. It is less straightforward to conceptualize or measure how academic status in itself might be associated with outcome independent of hospital volume. This highlights the importance in any volume-outcomes research to sequentially control for covariates that might partially explain any observed association between volume and outcome. This is critical because it can provide insight into the reasons ***why*** higher volume hospitals (or academic hospitals) have better outcomes and thereby creates a model to improve outcomes at low- and medium-volume centres. The alternative is to consolidate all care at high-volume hospitals which may not be feasible, practical, or desirable and needs to be balanced against the very real risk of reduced access to care. This issue has been nicely explored by Elting and colleagues in their study of all cystectomy cases in Texas during 1999-2001.[5] Although unadjusted postoperative mortality was lower in high-vol-

ume hospitals they discovered that much of the association was explained by differences in the nurse-to-patient ratio such that good outcomes could also be achieved in lower volume hospitals with higher staffing ratios.

Management of MIBC is complex and best managed by a multidisciplinary team. In addition to maximizing the effectiveness of cystectomy in routine clinical practice, efforts are required to improve uptake of perioperative chemotherapy and ensure that patients who are not candidates for cystectomy are considered for radical radiotherapy which also offers the chance of long term survival. It is imperative to understand how quality and processes of care can be maximized to close the efficacy-effectiveness gap and improve patient outcomes.

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