Radical cystectomy complications and perioperative mortality- Editorial

Alex Hampson[1], Amy Vincent[1,2], Nikhil Vasdev[1,3**]

1) Department of Urology and Surgery, Lister Hospital, East and North Herts NHS Trust, Stevenage, SG1 4AB
2) Barts and the London School of Medicine and Dentistry, Garrod Building, London, E1 2A
3) School of Life and Medical Sciences, University of Hertfordshire AL10 9AB

**** Corresponding author:**

Dr Nikhil Vasdev

Consultant Urological Surgeon

Department of Urology,

Lister Hospital (East and North Herts NHS Trust),

Stevenage,

SG1 4AB, UK

Email- nikhil.vasdev@nhs.net

Editorial

Bladder cancer is the second most prevalent urological cancer with 25% of cases being muscle invasive which requires radical therapy as per NICE guidance(1). Radical therapy often involves robotic cystectomy (RC), which is an incredibly complex operation with common post-operative complications and significant mortality rates(1,2). It is suspected to have a 30-day mortality of between 1-3%, with this going up to 10% in the over 80 age group(2,3) and a 90-day post-operative complication rate of 50-60%(4).

This complex procedure and it's complication rates contribute to a myriad of factors that result bladder cancer being the most expensive cancers, per patient, to care for and to treat(2,4). We congratulate the authors on producing this substantial paper investigating how the post-operative complications are associated with overall mortality(5). Logic dictates that the more complications a patient experiences, the worse the post-operative outcome and, ultimately, the higher the risk of mortality. This paper has succeeded in providing quantifiable data, not only on the overall correlation but by providing adjusted odds ratios based upon the nature of the complication.

Whilst a 90-day prospective study would have been more ideal, we recognise this would have been much harder to perform and would have resulted in a much smaller cohort size. This retrospective study will therefore suffer from selection bias and unmeasured confounders as the authors have identified. It should also be noted that these results may not extrapolate to a global population due to data only being collected from a private healthcare system. The coding of clinical diagnosis is often overestimated due to funding that is received due to the

funding that comes with diagnosis and treatments. Despite these biases, this is still the largest set of data investigating the association of robotic cystectomy complications and mortality.

The analysis of the data found that there was a “threshold” limit for the number of complications post-operative patients could experience; patients experiencing >3 complications had a drastic increase in mortality (OR 76.6, $p<0.05$)(5). While all post-operative patients have close monitoring and enhanced recovery pathways, and any patients with post-operative complications will be repeatedly assessed, in an ideal world, patients who have experienced 3 complications would have increased monitoring (HDU/ITU).

The breakdown of complications by physiological system was unsurprising, with pulmonary (OR 6.5, $p<0.001$), cardiac (OR 4.4, $p<0.001$), and renal (OR 2.6, $p<0.001$) complications being most associated with increased mortality(5). Although this information does provide some guidance into specific monitoring methods for high risk patients, such as; capnography, continuous blood pressure, and renal function monitoring.

While additional demographic and operational information was gathered, the only information collected pertaining to medical health was the Charlson Comorbidity Index which meant the authors were unable to ascertain any correlation between the nature of the complications experienced and any pre-disposing condition of that physiological system. Schulz et al(6) have recently published a report examining RC morbidity and mortality rates in relation to ASA grading and found that patients with ASA $\geq$3 suffered significantly more high-grade complications, required more peri-operative interventions, and had a higher mortality rate (7.6% vs. 3.2%; P = .002). Mossanen et al(5),{Citation} have taken some of these

factors into consideration using the Charlson Comorbidity Index but, unfortunately ASA grade, was not part of the data collected.

Due to the nature of the database collection method, the authors were unable to determine other important confounders such as smoking status, exercise tolerance, and the severity/specific details of the complications experienced. Sathianathen et al(7) showed in October 2018, that smokers were almost twice as likely to suffer from Clavien III-V complications following RC, with the most common complications being pneumonia, myocardial infarction, and wound dehiscence.

In our view, Mossanen et al have provided the urological community with not only quantifiable evidence to support the maxim of “more complication, worse outcome”, but they have also identified a vital threshold that can be used clinically to support post-operative patients. This guidance, when paired with clinical judgement, could result in additional monitoring and multi-disciplinary care in high risk patients, ultimately reducing RC mortality rates.

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