



# Association between perioperative morbidity and mortality after radical cystectomy: an opportunity to understand the complication snowball effect

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Radical cystectomy (RC) is currently the standard treatment for muscle invasive bladder cancer (1). Perioperative complications after RC have been reported in upwards of 60% of patients (2,3). Perioperative mortality is similarly concerning, with overall rates estimated between 1–3% (3,4). As patients age, the 90-day perioperative mortality rate has been shown to increase to 5%, 7%, and 11% in patients 65, 75, and 80 years or greater, respectively (5). While many studies have assessed the incidence of and predictors for complications and mortality for RC, there is a paucity of reports that examine the direct association between complications and mortality (6,7). Therefore, this topic is of importance for further investigation.

We read with great interest the study by Mossanen *et al.* that assessed the association between 90-day complications and mortality for patients with bladder cancer who underwent RC (8). The authors utilized the Premier Hospital Database to examine 57,553 weighted cases between 2005 and 2013 in the United States. Multivariable analysis revealed that increasing numbers of complications during the index hospitalization were associated with increasing odds of postoperative mortality, with an inflection point after the occurrence of 4 complications. Interestingly, complications resulting in readmission had a stronger association with mortality than those that occurred during the index hospitalization.

The authors appropriately refer to the axiom “complications beget complications” as they contextualize

the studies aims to quantify the “snowball effect” of perioperative morbidity. We would highlight two implications of these results. First, these data support the need for early recognition and management of complications to avoid additional complications and potential risks of increased mortality. Second, the increased impact of complications at readmission highlight a potential downside of highly centralized care. While numerous reports have demonstrated perioperative and oncologic benefits from receipt of surgery, especially RC, from high volume surgeons and centers, some recent data that has shown that increasing travel and distance from a patient’s surgical center and home can specifically worsen 90-day mortality (9). As Mossanen *et al.* opine, the heightened impact of complications at readmission compared to index hospitalization may be secondary to delays in prompt management.

While we applaud the novelty of these findings, there is reason to pause when using a claims-based database with less than desired granularity. Importantly, there is lack of information regarding the specific type or grade of complication. It is intuitive that a high-grade complication requiring intervention would pose quite a different effect on the perioperative course and mortality compared to a low-grade complication. Also, while statistical analyses control for several available confounders, some critical baseline characteristics are unavailable, including pathologic stage and the administration of perioperative chemotherapy.

Some of these variables may be implicated in the risk of developing complications and perioperative mortality. Finally, while the 90-day mortality rate in this study is consistent with prior literature, it is likely that some deaths are not captured during index and readmission hospitalization events in this administrative dataset.

In summary, this article draws attention to the important concept of the “snowball effect” of perioperative complications that are ultimately associated with mortality. While there are clear limitations with the use of this dataset, hopefully this study will serve as a foundation for future work to investigate the association between complications and mortality for RC, ultimately to improve both of these outcomes.

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### Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

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