Editorial

Exploring trends in advanced bladder cancer using the NCDB: turning data into information and information into insight

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Provenance: This is a Guest Editorial commissioned by Section Editor Xiao Li (Department of Urology, Jiangsu Cancer Hospital & Jiangsu Institute of Cancer Research & Nanjing Medical University Affiliated Cancer Hospital, Nanjing, China).

Comment on: Weiner AB, Keeter MK, Manjunath A, *et al.* Discrepancies in staging, treatment, and delays to treatment may explain disparities in bladder cancer outcomes: An update from the National Cancer Data Base (2004-2013). Urol Oncol 2018;36:237.e9-e17.

Submitted Jun 11, 2018. Accepted for publication Jun 20, 2018.
doi: 10.21037/tau.2018.06.15
View this article at: http://dx.doi.org/10.21037/tau.2018.06.15

The National Cancer Data Base (NCDB) is a joint venture by the American College of Surgeons Commission on Cancer (CoC) and the American Cancer Society and at present is the largest cancer registry in the world (1-3). To date, it has captured information on over 34 million cancer patients with the possibility of including 250 data points for each patient (1). In 2013, to facilitate cancer research, the NCDB dataset was made publically available, and since then we have seen a surge of publication with over 500 abstracts indexed in PubMed with publications in bladder cancer representing a small subset of this. This does pale to the number of publications using the Surveillance, Epidemiology and End Results (SEER) database with just under 10,000 publications of which 190 relate to bladder cancer (4).

There will always be inherent issues with any large population-based data sets, and the NCDB is no exception. Firstly, only centres that are accredited by the CoC can contribute to the NCDB and the NCDB has established criteria to ensure the data submitted meet specific quality benchmarks (1,3). Additionally, restrictions exist on publically available data from a few hospitals (e.g., Department of Defence facilities). At present only 30% of the hospitals in the US have CoC accreditation and the accreditation status can change, so data needs to be considered on a year by year basis (1). Cancer-specific outcomes are also not captured and therefore the only available result is overall survival. However, under the current framework of healthcare, predicting effectiveness of treatment in the real-world with cancer-specific or surrogate outcomes is challenging and better models are needed to compare real-world data to Phase III trial outcomes (5).

In a recent publication in *Urologic Oncology*: seminars and original investigation Weiner *et al.* used the NCDB to report on disparities in bladder cancer outcome in advanced stage disease addressing discrepancies in staging, treatment and delays to treatment (6). Bladder cancer is the 6th most common malignancy in the United States (US) (4). The majority are diagnosed with the early-stage disease with 24–28% presenting with stage III and IV disease (7). Management of bladder cancer is stage dependent with resectable disease (T2–T4a) treated with either surgery or bladder preservation multimodality therapy with equivalent outcomes (8,9). Cisplatin-based chemotherapy treatment

is the first line option for advanced and metastatic bladder cancer achieving a median survival of up to 14 months with performance status being a crucial prognostic factor for treatment decisions (10).

In this observational study, the authors identified 328,560 patients diagnosed between 2004–2013 to determine the association of covariates with diagnoses of advanced disease (stage III and IV). A total of 25,046 (7.6%) were identified with advanced disease of which 62.5% were stage IV and 37.9% metastatic. Nodal disease in this subset was only documented in 32.4% however given that this is an advanced stage cohort there was likely higher degree of clinical understating (11). On multivariate analyses for advanced disease, significance on covariates was seen with race (black patients), sex (female patients) and lower socioeconomic status (SES). These covariates were significantly associated with their secondary endpoint of overall survival. The same subgroup of patients identified was less likely to receive treatment associated with improved survival. Similarly, they found time to treatment delay (i.e., greater than 12 weeks from diagnosis) was seen within these vulnerable subgroups. Interestingly insurance type, distance from treatment centre and bladder cancer annual volume did not affect overall survival on multivariable analysis. This is contrary to other recently published data on radical treatment of bladder cancer that have also used the NCDB (12).

Although the NCDB does provide a wealth of information to gain insight into patterns of care on the US populations it is not without its shortcomings. It is unclear from this observational study the intent of treatment given that treatment with chemotherapy and surgery were both significant for overall survival. Since close to 40% of the patients in this study were metastatic at diagnosis any findings due to radical treatment of the primary tumour should be interpreted with a high degree of caution since we cannot make assumptions on the intent of treatment. Although timing data can be used to determine multimodal therapy, the accuracy of capturing information such as whether transurethral resection of bladder tumour (TURBT) is inputted as surgery or diagnostic and being able to distinguish concurrent from sequential chemotherapy and radiotherapy and the class of systemic agent are issues (1). The NCDB does not provide information on chemotherapy type or compliance to treatment which is particularly important for patients presenting with advanced disease. A major contributing factor to treatment receipt that cannot be accounted for is performance status and it is likely that the poor performance status patients were offered palliative radiotherapy over surgery for symptom control. The only outcome available to extract from the NCDB is overall survival and although it can be assumed that it is likely that these patients with advanced disease had succumbed to the disease or as a result of treatment-related mortality we cannot distinguish between the two.

The sociodemographic factors that have been teased out in this analysis are not unexpected. A number of studies have previously demonstrated that although the incidence of bladder cancer in women is lower than men, female patients suffer delays in diagnosis resulting in increased presentation with advanced disease (13,14). Similarly, health disparities concerning race and SES have also been previously reported in bladder cancer in the US population mainly through analysis of the SEER database (15,16). Additional confounding issues with observation data that may bias the results are the influence of unobserved covariates and incorrect coding when using an extensive national database. Other problems include not reporting on secondary treatment, the use of targeted therapy, enrolment onto clinical trials, palliative or supportive interventions. All these are crucial in advanced stage disease outcome.

Weiner *et al.* have provided valuable insights into health disparities that impact on diagnosis, treatment and delays to treatment in advanced bladder cancer. Despite the limitations of the NCDB, it can be used as a complementary resource to the gold standard of phase III clinical studies by health care providers in particular to study therapies and patterns of practice in sub-populations that are unlikely to enroll in clinical trials. However, it is crucial that the limitations of such big data analyses are acknowledged.

Acknowledgements

None.

Footnote

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

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Cite this article as: Thiruthaneeswaran N, Choudhury A. Exploring trends in advanced bladder cancer using the NCDB: turning data into information and information into insight. Transl Androl Urol 2018;7(4):754-756. doi: 10.21037/tau.2018.06.15

