African Urology 2021;1(1):25-28
https://doi.org/10.36303/AUJ.2021.1.1.0003

AFRICAN UROLOGY
ISSN 2710-2750 EISSN 2710-2750

ORIGINAL RESEARCH

Renal cancer: First look at a potential South African urological cancer registry

R Rugakingira,[1] J John,[2] E Singh,[3,4] WC Chen,[3,5] HT Wu,[6] J Lazarus[7]

[1] *Department of Urology, Benjamin Mkapa Hospital, Tanzania*
[2] *Division of Urology, Department of Surgery, Frere Hospital and Walter Sisulu University (East London), South Africa*
[3] *National Cancer Registry, National Health Laboratory Service, South Africa*
[4] *School of Public Health, Faculty of Health Sciences, University of the Witwatersrand, South Africa*
[5] *Sydney Brenner Institute for Molecular Bioscience, Faculty of Health Sciences, University of the Witwatersrand, South Africa*
[6] *Division of Anatomical Pathology, Groote Schuur Hospital and National Health Laboratory Service and University of Cape Town, South Africa*
[7] *Division of Urology, Department of Surgery, Groote Schuur Hospital and University of Cape Town, South Africa*

Corresponding author, email: andyremmy@hotmail.com

Purpose: The National Cancer Registry (NCR) of South Africa is the largest repository of cancer data in South Africa. While the NCR collects essential demographic data, vital clinical and tumour data are not captured. For these reasons, the authors propose the establishment of a prospective South African urological cancer registry. To spark interest in this proposal, we retrospectively analysed renal cancer histopathology reports submitted to the NCR.

Materials and methods: This was a retrospective audit of all renal cancer histopathological reports submitted to the NCR over two years. Descriptive statistics were explored and are presented as means and standard deviations for continuous variables and proportions for categorical variables.

Results: Eight hundred and one reports were submitted to the NCR from 22 laboratories. The mean age of the sample was 59 (± 4 years). Males accounted for 60% and females 40%. The population group for the majority of patients (50%) were classified as White, 28% were Black Africans, 14% were Coloured, and 6% were Asian/Indian. Clear cell renal cell carcinoma (ccRCC) accounted for the majority of cases (79%). Papillary RCC and chromophobe RCC accounted for 18% and 1.6%, respectively. American Joint Committee on Cancer pathological tumour staging showed more localised pT1 and pT2 tumours, 38.5% and 27.9%, respectively. Locally advanced, i.e. pT3 and pT4, formed 22.8% and 3.7% of all cases, respectively. Histological proof of metastatic disease was present in 7.1% of patients. World Health Organization/International Society of Urological Pathology histological tumour grading for clear cell RCC showed 16.8%, 43.4%, 28.7% and 11.1% for grades 1, 2, 3 and 4, respectively.

Conclusion: Urological cancers may be well underdiagnosed and misrepresented by the statistics published by the NCR. Establishing a prospective South African urological cancer registry will help qualify the burden of urological cancers more accurately and improve national resource allocation.

Keywords: The National Cancer Registry, renal cell cancer

Introduction

Cancers represent a significant public health problem associated with substantial patient morbidity and mortality. An estimated 19.3 million new cancer cases and almost 10.0 million cancer deaths occurred globally in 2020.[1] Exponential population growth, the ageing population and the increasing prevalence of the leading cancer risk factors have been responsible for the growing cancer incidence and mortality.[1] Recognising the need to attend to this cancer crisis as a matter of urgency, on 30 May 2017, the 70th World Health Assembly proposed that the growing burden of cancer was of concern and that countries were required to increase attention on, and funding of cancer activities. One vital strategy to help with cancer control is through the establishment of national cancer registries. The National Cancer Registry (NCR) of South Africa is the largest cancer surveillance organisation in South Africa, with over one million cancer records in its repository. Established in 1986, it is a pathology-based cancer surveillance system.[2] The NCR data has made significant contributions to the knowledge of the country's overall cancer burden and further highlights cancers of particular interest in our population.

While the work done by the NCR is admirable, it is not without its shortcomings.[2,3] Many private laboratories withheld information from the registry for fear of consequences arising from disclosing information that might be private and confidential.[4] The South African National Department of Health introduced new regulations in 2011, in terms of the National Health Act, Regulation 380 (Act No. 61 of 2003), that mandates all cancers to be reported to the NCR within three months of diagnosis.[5] While the NCR collects essential demographic data, vital clinical and tumour data used in our fight against cancer are not captured. For these reasons, the authors propose the establishment of a prospective South African Urological Cancer Registry. To spark interest in this proposal, we retrospectively analysed renal cancer histopathology reports submitted to the NCR over two years, with the view to demonstrating the critical clinical and pathological information that can be garnered.

Materials and methods

This was a retrospective audit of all renal cancer histopathological reports of renal biopsy, partial, and radical nephrectomy specimens analysed by pathologists in 22 South African public and private laboratories. Descriptive statistics were explored and are presented as means and standard deviations for continuous variables and proportions for categorical variables. All analyses were conducted using Statistical Package for the Social Sciences (SPSS, Version 25). Ethics approval was granted by the University of Cape Town Human Research Ethics Committee (R005/2020). Appropriate permissions were sought from the public and private laboratories to use their data.

Results

During the study period (1 January 2016 to 31 December 2017), 801 renal cancer histopathology reports were submitted to the NCR from 22 laboratories across South Africa. Private and public laboratories accounted for 83% and 17% of submitted reports, respectively. The mean age of the sample was 59 (± 4 years). Males accounted for 60% (n = 475) and females 40% (n = 325). The gender of one patient was missing. The population group for the majority of patients (50%) were classified as White, 28% were Black Africans, 14% were Coloured, and 6% were Asian/Indian (classification of population group as defined by Statistics South Africa).[6] The ethnic classification was missing in 2% of the cases (Figure 1).

On histology, 633 patients (79%) had clear cell renal cell carcinoma (ccRCC), 144 (18%) had papillary RCC (pRCC), 13 (1.6%) had chromophobe RCC (chrRCC), and 11 (1.4%) had other rarer histology (Figure 2). American Joint Committee on Cancer (AJCC) pathological tumour staging showed more localised pT1 and pT2 tumours, 38.5% and 27.9%, respectively. Locally advanced, i.e. pT3 and pT4, formed 22.8% and 3.7% of all cases, respectively. Histological proof of metastatic disease was present in 7.1% of patients. World Health Organization/International Society of Urological Pathology (WHO/ISUP) histological tumour grading for ccRCC showed 16.8%, 43.4%, 28.7% and 11.1% for grades 1, 2, 3 and 4 respectively (Figure 3).

Discussion

As the world battles against a deadly COVID-19 pandemic, the burden of other diseases continues to grow. Epidemiologists have predicted a substantial increase in cancer incidence, with the developing world projected to account for up to 60% of all new cases.[7] In South Africa, the projected increase is even more significant. Bray et al., in *The Lancet Oncology*, projected a 78% absolute increase in cancer incidence from 2008 in medium Human Development Index (HDI) regions by 2030.[8] Physicians, public health practitioners, epidemiologists, researchers, and lawmakers all play a vital role in reducing the burden of disease on society. All these stakeholders rely heavily on cancer data to focus their efforts appropriately.

Cancer registries become the critical source of this data, serving to establish priorities while at the same time providing necessary data to foresee future needs.[9] While the NCR collects important demographic data (age, gender, ethnicity, geographical location,

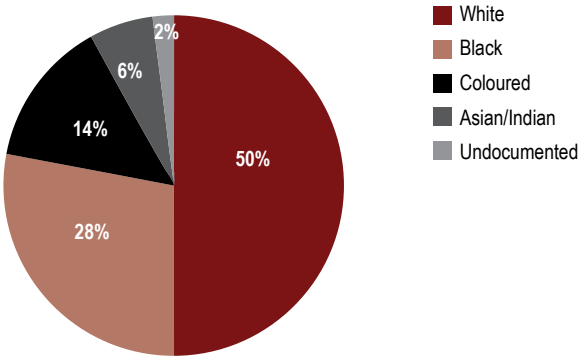

Figure 1: Ethnic distribution of the study population

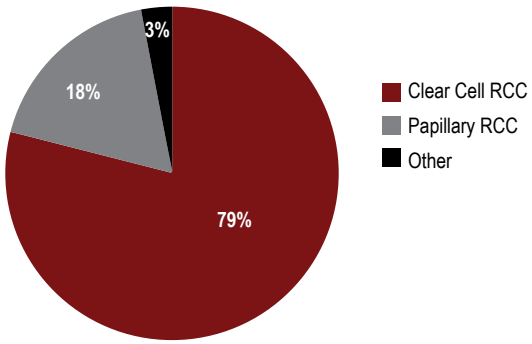

Figure 2: Distribution of the histological subtypes of renal cell carcinoma

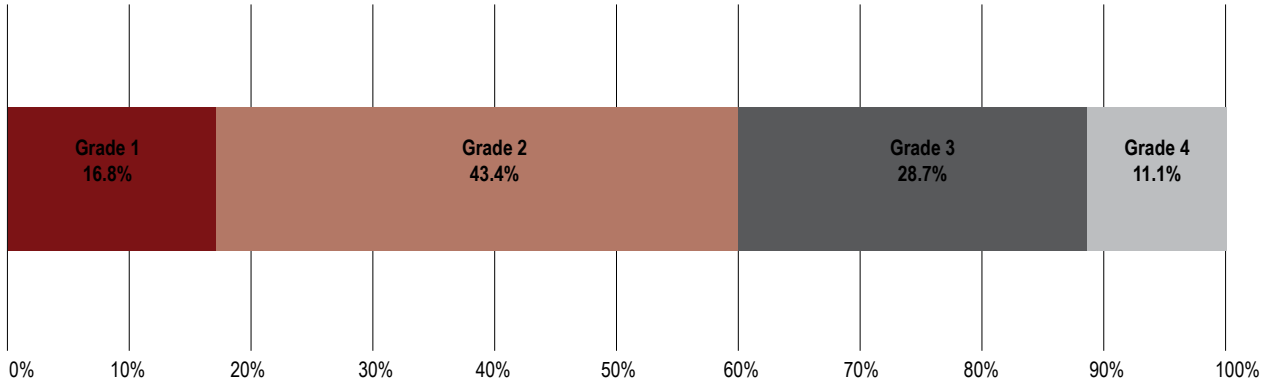

Figure 3: Distribution of the World Health Organization/International Society of Urological Pathology (WHO/ISUP) histological tumour grading

tumour site and morphology) from pathology reports, vital clinical (patient presentation, risk factors, family history) and tumour data (tumour stage and grade) are not captured. Furthermore, clinically diagnosed cases based on biochemical (tumour markers) and radiological findings are also not captured.

In contrast, a clinical registry such as the South African Paediatric Tumour Registry, an initiative of the South African Children's Cancer Study Group (SACCSG), captures the histological subtype, localisation and stages of malignancies and their treatment outcomes in children presenting to paediatric oncology services.[10] For these reasons, the authors propose establishing a prospective South African Urological Cancer Registry that collects clinical, histological and demographic information.

Globally, 403 000 new kidney cancer cases are diagnosed annually, accounting for 2.2% of all newly diagnosed cancers worldwide.[11] During our two-year study period, most of our patients were male, which is similar to global trends where men account for about two-thirds of international kidney cancer cases and deaths.[8] The increased rates of modifiable risk factors such as smoking and hypertension in men may account for this disparity.[11,12] Patel and colleagues in the *Journal of Urology* reported that active smoking was independently associated with a significant increase of both ccRCC (OR 2.2, $p < 0.05$) and pRCC (OR 2.4, $p < 0.05$) but not chrRCC.[13] Public health efforts aimed at reducing the burden of smoking and other modifiable risk factors can form the backbone of the prevention efforts to campaign against this aggressive cancer.

In our study, one-half of the RCCs were diagnosed amongst the White population. This distribution of renal cancer by ethnic group does not correlate with international trends in renal cancer incidence. For example, in the USA, African Americans have a greater risk of and poorer survival from RCC than White Americans.[14] Furthermore, the pattern reported is contrary to the demographic profile of South Africa, where 80.7% of the population are Black African.[15] Disparities in health access may account for the fewer cancers diagnosed and reported in Black South Africans. In 2018, 72.9% of the White population belonged to a medical insurance scheme, compared to only 9.9% of the Black African population.[16] Consequently, fewer Black South Africans accessed diagnosis in private healthcare laboratories, where most RCCs were reported. Furthermore, in certain provinces in SA, private laboratories are contracted to perform a significant portion of pathology services for the public hospitals, which may also account for the disparity.

The histological subtype of RCCs is of utmost importance considering the significant prognostic and therapeutic implications. In our analysis, the predominant histological subtypes were clear cell RCC (79%) and papillary RCC (18%), similar to other series.[17] Apart from the histological subtype, two other critical prognostic indicators include the clinical stage of the primary lesion and the Fuhrman or WHO/ISUP grade of the lesion. Due to increased awareness and better access to services, there has been a stage migration in most developed countries over the last decade, with more patients presenting with an earlier stage.[18] Our study shows a significant number of patients still present with unfavourable TNM stage and nuclear grade (Figure 3) with subsequent poorer prognosis. More work needs to be done to identify and treat patients earlier to downstage disease. A recent review by Usher-Smith et al. acknowledged the limitations for screening the population for RCC. RCC does not meet all the criteria for screening, and the overall cost-effectiveness of such a programme is unclear.[19] Despite this, the National Health Service (NHS) in the United Kingdom (UK) started the "*be clear on cancer: blood in your pee*" campaign to urge the population to seek timely medical attention.[20] Considering that by the time there is "*blood in your pee*", it may be too late, an alternative screening protocol needs to be formulated. A potential feasible strategy would be to screen the high-risk population. More research is needed to define this subgroup of patients and identify what screening modalities should be employed.[19]

We acknowledge limitations in our study. Since this was a retrospective analysis of histopathological data submitted to the NCR, the information that we could extract from the pathology report was limited. We could not assess the impact of comorbidities, chronic illness and obesity on patterns of disease management. Nor could we determine disease management and patient outcome – both variables fall outside the NCR's mandate.

Our proposal to establish a prospective South African urological cancer registry has several advantages. In-depth clinical, social, economic and risk factor data could be captured to focus cancer prevention efforts. In addition to increasing advocacy for urological cancer service provision and promoting improved data quality, it will also build research capacity across the country. This initiative would also allow us to evaluate the role of HIV, so endemic in our population, in the diagnosis, management and prognosis in urological cancer patients. Furthermore, this database could, in future, have a biobanking capability.

Conclusion

Urological cancers may be well underdiagnosed, and the true burden of diseases are not being represented by the statistics published by the NCR. With the much anticipated and criticised yet inevitable National Health Insurance on the horizon, it is pertinent for the country to quantify the burden of cancer through a urological cancer registry for national resource allocation to guide cancer policy development and monitor and evaluate cancer interventions.

Acknowledgement

The authors would like to thank the National Health Laboratory Service, Pathcare, Lancet Laboratories and Ampath for their support with data for this paper.

Conflict of interest

The authors declare there is no conflict of interest.

Funding source

The authors received no financial support for the research, authorship and/or publication of this article.

Ethical approval

Ethical approval was obtained from the University of Cape Town Faculty of Health Sciences Human Research Ethics Committee (HREC REF R005/2020).

ORCID

J John https://orcid.org/0000-0002-6139-810X
E Singh https://orcid.org/0000-0003-1259-2122
WC Chen https://orcid.org/0000-0002-3248-4906
HT Wu https://orcid.org/0000-0003-3353-8109
J Lazarus https://orcid.org/0000-0003-2417-8332

References

1. Sung H, Ferlay J, Siegel RL, et al. Global Cancer Statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2021;71(3):209-49. https://doi.org/10.3322/caac.21660.
2. Singh E, Sengayi M, Urban M, et al. The South African National Cancer Registry: An update. Lancet Oncol. 2014;15(9):E363. https://doi.org/10.1016/S1470-2045(14)70310-9.
3. Furlow B. Mining pollution: a legacy of contamination. Lancet Oncol. 2014;15(6):558. https://doi.org/10.1016/S1470-2045(14)70157-3.
4. Singh E, Underwood JM, Nattey C, et al. South African National Cancer Registry: Effect of withheld data from private health systems on cancer incidence estimates. S Afr Med J. 2015;105(2):107-9. https://doi.org/10.7196%2FSAMJ.8858.
5. National Health Act (Act No 61 of 2003): regulations relating to cancer registration. No R 380. Republic of South Africa; 2011.
6. Statistics South Africa. Concepts & definitions for Statistics South Africa – Version 3 2010 [Internet]. Pretoria; 2010. Available from: http://www.statssa.gov.za/standardisation/Concepts_and_Definitions_ StatsSAV3.pdf.
7. Wales S. Access to cancer treatment – Checkpoint documentary [Internet]. Oxfam; 2014. Available from: https://www.ciaonet.org/attachments/27387/uploads.
8. Bray F, Ferlay J, Soerjomataram I, et al. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2018;68(6):394-424. https://doi.org/10.3322/caac.21492.
9. Leal YA, Fernández-Garrote LM, Mohar-Betancourt A, Meneses-García A. The importance of registries in cancer control. Salud Publica Mex. 2016;58(2):309-16. https://doi.org/10.21149/spm.v58i2.7802.
10. Stefan DC, Stones DK. The South African Paediatric Tumour registry - 25 years of activity. S Afr Med J. 2012;102(7):605-6. https://doi.org/10.7196/SAMJ.5719.
11. Everett B, Zajacova A. Gender differences in hypertension and hypertension awareness among young adults. Biodemography Soc Biol. 2015;61(1):1-17. https://doi.org/10.1080/19485565.2014.929488.
12. Agaku IT, King BA, Dube SR. Morbidity and mortality weekly report current cigarette smoking among adults — United States, 2005–2012. 50th anniversary of the first Surgeon General's report on smoking and health. MMWR Morb Mortal Wkly Rep. 2014;63(2):2005-12.
13. Patel NH, Attwood KM, Hanzly M, et al. Comparative analysis of smoking as a risk factor among renal cell carcinoma histological subtypes. J Urol. 2015;194(3):640-6. https://doi.org/10.1016/j.juro.2015.03.125.
14. Padala SA, Barsouk A, Thandra KC, et al. Epidemiology of renal cell carcinoma. World J Oncol. 2020;11(3):79-87. https://doi.org/10.14740/wjon1279.
15. Statistics South Africa Statistical Release P0302. Mid-year population estimates 2019. 2019.
16. Statistics South Africa Statistical Release P0318. General Household Survey 2018. 2018.
17. Muglia VF, Prando A. Renal cell carcinoma: histological classification and correlation with imaging findings. Radiol Bras. 2015;48(3):166-74. https://doi.org/10.1590/0100-3984.2013.1927.
18. Patel HD, Gupta M, Joice GA, et al. Clinical stage migration and survival for renal cell carcinoma in the United States. Eur Urol Oncol. 2019;2(4):343-8. https://doi.org/10.1016/j.euo.2018.08.023.
19. Usher-Smith J, Simmons RK, Rossi SH, Stewart GD. Current evidence on screening for renal cancer. Nat Rev Urol. 2020;17:637-42. https://doi.org/10.1038/s41585-020-0363-3.
20. Vasudev NS, Wilson M, Stewart GD, et al. Challenges of early renal cancer detection: Symptom patterns and incidental diagnosis rate in a multicentre prospective UK cohort of patients presenting with suspected renal cancer. BMJ Open. 2020;10(5):e035938. https://doi.org/10.1136/bmjopen-2019-035938.