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Leveraging data, the next big advance for quality improvement in colorectal cancer

George J Chang, MD, MS

Professor of Surgical Oncology, Professor of Health Services Research, The University of Texas, MD Anderson Cancer Center, 1400 Pressler Street, Houston, TX 77230-1402, gchang@mdanderson.org

The characterization of the total mesorectal excision (TME) technique for rectal cancer is one of the most important modern advances in the surgical management of rectal cancer.¹ The TME technique emphasizes the complete clearance of the mesorectum along with its lymph nodes and sharp dissection along embryologic tissue planes resulting in a low risk for circumferential resection margin (CRM) positivity. Avoidance of CRM positivity during rectal cancer surgery is recognized as one of the most important determinants of local control, distant metastasis risk, and overall survival; and risk-adjusted rates of margin-positivity have been shown to have significant potential value for monitoring quality.^{2,3} Data from recently published randomized trials for rectal cancer have shown that the rates of CRM positivity can be anticipated to be approximately 8–12% in the hands of experienced surgeons.^{4,5}

In this issue of *Diseases of the Colon and Rectum*, Warriar and colleagues report their analysis of risk factors associated with CRM positivity after rectal cancer surgery from the Binational Colorectal Cancer Registry (BCCA) of the Colorectal Surgical Society of Australia and New Zealand (CSSANZ).⁶ The authors found that among a total of 3,367 rectal cancer patients registered between 2007 and 2016, the overall rate of CRM positivity was 7.75%. Using hierarchical regression analysis, the investigators identified several risk factors that were associated with CRM positivity: urgent cases, open surgical approach, need for abdominoperineal resection, tumor location <8 cm from the anal verge, T3–4 classification, and N+ classification. Notably, the investigators did not identify significant differences in outcomes between urban and rural sites.

These findings can be compared to a recent U.S. report from the National Cancer Data Base (NCDB), that observed a 17.2% rate of CRM positivity among 16,619 patients treated between 2010–2011.⁷ The NCDB collects incidence and basic treatment data on all colorectal cancer cases treated within hospitals accredited by the Commission on Cancer for their cancer programs and represents approximately 70% of all cancers diagnosed within the U.S. A key difference between the NCDB and BCCA is that the NCDB reports data on every case diagnosed or treated at each accredited hospital and the data reporting is mandatory, rather than voluntary. However, the BCCA findings compare favorably to the rates of CRM positivity observed in the recently reported phase III randomized trials of laparoscopic to open resection for locally advanced rectal cancer in the US and Australia.^{4,5}

Data registries are among the most powerful tools for quality improvement. Registries can play an important role in clinical research by providing important real-world diagnosis, treatment, and outcomes data for observational studies. Furthermore, registries can facilitate rapid audit and feedback for real-time quality improvement. However, the utility of data registries and the effectiveness of the research conducted with them is dependent upon the quality and completeness of the data within them. High quality data registries have standardized data definitions and collection methods, adequately represent the subject patient population, have a high level of data completeness with centralized data compilation, and provide integrated tools for data and outcomes reporting with transparent policies and reporting processes.⁸

For analysis of CRM, the utility of the evaluating the rate of CRM positivity as a quality metric is dependent upon the completeness of reporting and the availability of quantitative individual patient data regarding the CRM and the patient and tumor factors for proper risk adjustment.² The BCCA is a voluntary clinical quality registry established in 2007 and currently housing approximately 15,000 episodes of patients undergoing colorectal cancer resection with over 200 registered contributors. The present study is an analysis of all consecutive rectal cancer cases within the registry through 2016. The number of newly diagnosed cases of colorectal cancer within Australia and New Zealand is estimated to be approximately 19,000 per year. If it is assumed that approximately one-third of these are rectal cancers and that a little over one-half of the patients will be eligible for curative resection, it is conservatively estimated that there would be more than 10 times the number of cases identified during the 9 years of study; so, it is a bit curious that the authors report that the database represent approximately 60% of all rectal cancer cases performed in Australasia.

Because the BCCA is a voluntary registry, there is potential for significant underreporting of high-risk cases or those with adverse outcomes following surgery. However, the BCCA is in its relative nascency and there are many examples of robust voluntary clinical quality registries including the National Bowel Audit in the UK (<https://www.acpgbi.org.uk/research/bowel-cancer/>) and the Society of Thoracic Surgeons⁹ database which are powerful tools for outcomes monitoring and risk-adjusted performance reports for comparison of institutional outcomes against national benchmarks and for voluntary public reporting. Already the BCCA has undergone upgrades now yielding a data completion rate for each case of 79% and further enhancements are surely anticipated.

Australasian surgeons who have contributed their time and effort to enter cases into the BCCA should find the admirably low rate of CRM positivity within the BCCA gratifying. It should also serve as a call to encourage all surgeons to enter their complete data of all colorectal cancer resections performed and develop a transparent process for clinical auditing and continuous data collection process improvement in order to create robust, clinical data that can be used for risk-adjusted comparisons.

Ongoing advances in the science of data analytics will allow us to harness big data and leverage it to not only improve our understanding of the impact of our treatment on disease to inform our daily practice in order to provide the highest quality care to our patients.

However, the ability to leverage this data is dependent upon it being complete and its integrity reliable. Hopefully the low 7.75% rate of CRM positivity is reflective of admirable outcomes within routine practice and there can be much to learn about how to improve the rate of CRM positivity elsewhere around the world. But what is certain is that the BCCA is a great effort that should encourage surgeons around the world to continue to work towards the collection and analysis of high quality data.

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