**Title:** *Readmissions, Mortality and HRRP: The bane of a cardiac surgeon’s existence!***Authors:** *Abdullah Nasif, MD1 / Saqib Masroor, MD1  
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**Manuscript:** *Association of the Hospital Readmission Reduction Program with Readmission and Mortality Outcomes after Coronary Artery Bypass Graft Surgery.***Disclosure:** *None***Word Count:** *1139*

Since Hospital Readmission Reduction Program (HRRP) was established in 2012, Center for Medicare and Medicaid services (CMS) has been using 30-day unplanned readmission and same hospital readmission as quality measures.1 Hospitals with high readmission rates are penalized by reducing their Medicare reimbursements. This has pushed hospitals to come up with strategies to reduce avoidable readmissions.2 The program uses the excess readmission ratio (ERR) to assess hospital performance. ERR is calculated by comparing the hospital’s readmission rate to the expected readmission rate for each of the conditions included in the program. However, the value of HRRP is still being debated. For example, Gupta et al found that for heart failure (HF) patients, while 30-day risk-standardized readmission rates decreased after HRRP was implemented, the 30-mortality rates actually rose during the same period.3 This raised a concern that reducing readmissions could be preventing those patients from getting the necessary care that they needed, thereby increasing mortality.4 In fact, a recent study by Khan et al, has shown that HF-specific as well as all-cause readmissions of HF patients actually increased from 2010-2017 during the HRRP in all, except low-volume, hospitals.5

Be that as it may, in 2014 the Centers for Medicare & Medicaid Services (CMS) added the coronary artery bypass graft (CABG) surgery to the HRRP as a 30-day risk-standardized unplanned readmission measure.6 As of 2021, the conditions and procedures in HRRP include: Acute Myocardial Infarction (AMI), Chronic Obstructive Pulmonary Disease (COPD), Heart Failure (HF), Pneumonia, Coronary Artery Bypass Graft (CABG) Surgery and Elective Primary Total Hip Arthroplasty and/or Total Knee Arthroplasty (THA/TKA).1 Once CABG was included in the list, the same concerns were raised for this group of patients also. Does HRRP lower CABG readmissions rate? And if so, is lower readmission rate associated with a higher mortality rate?

In this issue of the Journal of Cardiac Surgery, Ramaswamy A et al, examined the impact of HRRP on CABG outcomes using the Nationwide Readmissions Database (NRD). It is a retrospective cohort study between 2010 and 2015 for patients undergoing “isolated” CABG.7 The study population was divided into three separate time periods: pre-HRRP, HRRP onset, and CABG inclusion period. They found that rates of patients readmitted within 30 days following CABG decreased from 16.6% in 2010 to 13.4% in 2015. There was no associated increase in 30-day mortality with this trend. They concluded that 30-day readmission rates following isolated CABG continued to decline in line with previously observed trends without leading to a clinically significant rise in 30-day in-hospital mortality.7

This study did not answer the question “did the implementation of HRRP decrease the readmission rate?” The trend of readmissions was already moving in a downward direction, even before the implementation of HRRP. In fact, the drop in the readmission rate was found to be the same before and after HRRP was implemented.

The good news, however, is that unlike HF patients, readmissions in CABG patients were not associated with increased 30-day mortality. It seems that those programs do make a difference. By forcing hospitals to look closely at the root causes of readmissions, there has been an improvement in the quality of care provided by hospitals around the U.S.

But is 30-day mortality an adequate measure of success? In fact, there is some evidence that in gastrointestinal cancer surgeries, 30-day mortality only captures around 38-53% of the surgery-related mortalities, while 120 to 150-day mortality is able to capture more than 90% of them.8 Therefore, it may be more useful to look at a longer-term mortality, such as 120-day mortality, to see if measures for reducing readmissions are causing an inadvertent increase in surgery related mortality. The reason CABG patients may behave differently than HF patients in terms of readmission and mortality, is that coronary artery bypass actually reverses the problem of myocardial ischemia, thereby obviating the need for close attention to patients’ condition on a daily basis. Treatment of HF patients on the other hand consists of managing an unsolved chronic problem that requires ongoing close attention to the patient’s pathophysiology on a day-to-day basis which can be hard to do from a distance.

U.S. Healthcare Utilization Project’s (HCUP) maintains a family of healthcare databases developed through a Federal-State-Industry partnership and sponsored by the Agency for Healthcare Research and Quality (AHRQ). One of those databases is the Nationwide Readmissions Database (NRD), which is a unique and powerful database designed to support various types of analyses of national readmission rates.9 The NRD is commonly used in clinical research investigating quality of care. It addresses a large gap in healthcare data, which is the lack of nationally representative information on hospital readmissions for all ages. It includes 28 geographically dispersed States and accounts for 60 percent of the total U.S. resident population and 59 percent of all U.S. hospitalizations.10

However, just like other administrative databases, there are certain limitations associated with using NRD. For instance, the NRD considers each year as a separate sample. Therefore, users cannot track the same patient in between years. In this study, Ramaswamy A et al had to exclude patients whose index hospitalization was in December of any of the study years, as these patients’ 30-day readmission may have been outside of the NRD database (e.g., in January of the following year).6 Patients who were hospitalized in one state and readmitted or transferred to a hospital in another state cannot be tracked in the NRD, because each state uses a different unique patient identifier in their State Inpatient Databases (SID). Another issue with NRD is that it is unable to capture death that occurred outside the healthcare network (e.g., patient’s home) since it is not reported by the database. Cause and effect relationships cannot be established from these investigations, because of the observational nature of these retrospective cohort studies. Furthermore, race and ethnicity are not reported in the NRD and therefore their influence on readmissions cannot be evaluated.11 All these issues are real and formidable, but the large amount of data, easily available at a relatively low cost to researchers, makes it a very attractive tool for examining health care quality.

In conclusion, this study is not able to build a link between the HRRP, readmission, and mortality for reasons mentioned above. While 30-day mortality may not have worsened by the downward trend in readmissions, a more inclusive 90 or 120-day mortality may be more useful for future studies to look into. Overall, it makes sense to use unnecessary readmissions as a surrogate for quality, for patients such as CABG, hip arthroplasty and knee arthroplasty patients, whose underlying problem has been ‘fixed’ to a significant extent and should not therefore require continued ‘fine-tuning’, such as a that required by a HF or COPD patient for managing their chronic condition. Reducing readmissions for CABG patients is definitely a goal worth striving for, and should not be associated with increased mortality.

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