The impact of cancer on the risk of hospitalisation for bleeding among acute coronary syndrome patients: an analysis of the Virtual Cardio-Oncology Research Initiative (VICORI) database

K.W. Ow¹, F. Tyrer², P.F. Van Den Berg³, J. Lai⁴, L. Paley⁴, M. Rutherford², P. Lambert², M. De Belder⁵, J. Deanfield⁶, M.D. Peake⁷, D. Adlam¹

¹University of Leicester, Department of Cardiovascular Sciences, Leicester, United Kingdom of Great Britain & Northern Ireland
²University of Leicester, Department of Population Health Sciences, Leicester, United Kingdom of Great Britain & Northern Ireland
³University Medical Centre Groningen, Department of Experimental Cardiology, Groningen, Netherlands (The)
⁴NHS England, National Disease Registration Service, London, United Kingdom of Great Britain & Northern Ireland
⁵NHS Arden and Greater East Midlands Commissioning Support Unit, National Institute for Cardiovascular Outcomes Research (NICOR), Leicester, United Kingdom of Great Britain & Northern Ireland
⁶University College London, Institute of Cardiovascular Science, London, United Kingdom of Great Britain & Northern Ireland
⁷University of Leicester, Leicester, United Kingdom of Great Britain & Northern Ireland

Funding Acknowledgements: Type of funding sources: Foundation. Main funding source(s): This study was jointly funded by Cancer Research UK (C53325/A21134) and the British Heart Foundation (SP/16/5/32415)

Introduction: Cardiovascular disease and cancer are common causes of morbidity and mortality. Significant advancements in treatment strategies for both disease entities have resulted in a growing population who live with both conditions. Myocardial infarction (MI) represents approximately 20% of all cardiovascular disease admissions in cancer patients and 10% of patients who present with an acute MI has cancer. Bleeding is a major concern in patients with cancer and an acute coronary syndrome (ACS). While dual antiplatelet therapy (DAPT) increases a patient’s bleeding risk, cancer patients are at a further increased risk. Cancer is a recognised risk factor associated with an increased bleeding risk after percutaneous coronary intervention (PCI), but blood dyscrasias, liver disease and multiple long-term conditions – all common to cancer patients – further exacerbate this risk. Prescribing DAPT post-ACS and post-PCI remains a challenge when balancing ischaemic and bleeding risks in this population. The VICORI database is the world’s first whole-country cardio-oncology research platform, linking data from the National Cancer Registration and Analysis Service, National Institute for Cardiovascular Outcomes Research and Hospital Episode Statistics [1].

Purpose: To investigate the risk of hospitalisation for bleeding among ACS patients stratified by presence or absence of cancer.

Methods: This is an observational cohort study using linked data from the VICORI programme. We explored the risk of hospitalisation for bleeding following an ACS, in patients with and without cancer, identified between 2006–2019. Patients were followed up for one year from the date of their ACS. We used inverse probability weighting based on propensity scores to produce a balanced cohort of patients with and without cancer. Subgroup analyses were performed on patients with ST and non-ST-elevation MI alongside coronary stenting.

Results: Of 608,771 patients presenting with ACS, 9861 (1.6%) had cancer and 598,910 (98.4%) did not have cancer. Prostate (n=1753, 17.8%), colorectal (n=1548, 15.7%), lung (n=1543, 15.7%) and breast (n=607, 6.2%) cancers were the most common types of primary cancers. Relating to PCI, cancer patients received stents in only 35.4% (n=3,489) of cases, while non-cancer patients received stents in 55.5% (n=332,566) of cases. Bleeding events were more prevalent in cancer patients compared to non-cancer patients (n=779, 7.9% vs n=28,016, 4.7%). The rate (hazard) of hospitalisation for bleeding in the first year following ACS was higher in patients with cancer than those without (HR:1.46, 95%CI 1.36-1.57).

Conclusion: In this large real-world observational study, cancer patients had an increased risk of hospitalisation for bleeding after ACS compared to those without. Further work is needed to identify people with cancer who are at a high-risk of bleeding, optimal therapies, and the risk:benefit ratio of bleeding versus subsequent cardiovascular events.
Incidence Rate of Bleeding in Patients

Hazard Ratios for Bleeding