

Resilience of elective cancer surgery systems during COVID-19 lockdowns: an international, multicentre, prospective cohort study



COVIDSurg Collaborative*

Abstract

Background Surgery is the main modality of cure for solid cancers and was prioritised to continue during SARS-CoV-2 outbreaks. This study aimed to identify areas for health system strengthening by comparing the delivery of elective cancer surgery during COVID-19 in periods of lockdown versus light restriction.

Methods In this international, multicentre, prospective cohort study, we enrolled patients with 15 cancer types who had a decision for surgery during the SARS-CoV-2 pandemic (between Jan 21, 2020 and April 14, 2020) to Aug 31, 2020. Any hospital worldwide providing elective cancer surgery was eligible. The primary outcome was the non-operation rate (proportion of patients who did not undergo planned surgery). Reasons for non-operation were classified as COVID-19 related (societal, operational, or personal) or unrelated. Average national Oxford COVID-19 Stringency Index scores were calculated for each patient during their wait for surgery and classified into light restrictions (index <20), moderate lockdowns (20–60), and full lockdowns (>60). Cox proportional-hazards regression models were used to explore associations between lockdowns and non-operation. This study was registered at [ClinicalTrials.gov](https://www.clinicaltrials.gov), NCT04384926.

Findings We enrolled 27 700 participants, of whom 20 006 patients (8526 men and 11 480 women) from 466 hospitals and 61 countries did not receive surgery after a minimum of 3-months' follow up (median 23 weeks [IQR 16–30]). All patients had a COVID-19-related reason for non-operation. Light restrictions were associated with a 0.6% reference non-operation rate, moderate lockdowns with a 5.5% rate (HR 0.81, 95% CI 0.77–0.84, $p < 0.0001$), and full lockdowns with a 15.0% rate (0.51, 0.50–0.53, $p < 0.0001$). In sensitivity analyses, including adjustment for SARS-CoV-2 case notification rates, moderate (0.84, 0.80–0.88; $p < 0.001$), and full lockdowns (0.57, 0.54–0.60; $p < 0.001$) remained independently associated with non-operation. Frail patients with advanced cancer, particularly those from low-income and middle-income countries and those requiring postoperative critical care, were more likely to not have an operation.

Interpretation Cancer surgery systems worldwide were affected by lockdowns, including in the UK, with one in seven patients not undergoing planned surgery. During current and future periods of societal restriction, the resilience of elective surgery systems requires strengthening, which could include protected elective surgical pathways and long-term investment in surge capacity for acute care during public health emergencies. In the UK, a whole-health system approach is required to mitigate against further harm for NHS patients.

Funding National Institute for Health Research (NIHR) Global Health Research Unit, Association of Coloproctology of Great Britain and Ireland, Bowel and Cancer Research, Bowel Disease Research Foundation, Association of Upper Gastrointestinal Surgeons, British Association of Surgical Oncology, British Gynaecological Cancer Society, Economic and Social Research Council, European Society of Coloproctology, Medtronic, NIHR Academy, Sarcoma UK, The Urology Foundation, Vascular Society for Great Britain and Ireland, and Yorkshire Cancer Research.

Copyright © 2021 Published by Elsevier Ltd. All rights reserved.

Contributors

The writing and the statistical analysis group contributed to writing, data interpretation, and revision of the manuscript. The writing group, operations committee, and dissemination committee contributed to study conception, protocol development, study delivery and management. The collaborators contributed to data collection and study governance across included sites. Detailed role descriptions of all contributing collaborating authors are shown in the appendix.

Declaration of interests

The views expressed in this publication are those of the authors and not necessarily those of the NIHR or the UK government. Prof Richard Sullivan receives funding from the Economic and Social Research Council. Mr James Glasbey and Mr Aneel Bhangu are funded by personal awards from the NIHR Academy. All other authors declare no competing interests.

Published Online
November 26, 2021

*Full list of collaborating authors provided in the appendix

NIHR Global Health Research Unit on Global Surgery, Institute of Translational Medicine, University of Birmingham, Birmingham, UK

Correspondence to:
Mr James Glasbey, NIHR Global Health Research Unit on Global Surgery, Institute of Translational Medicine, University of Birmingham, Birmingham, B15 2TH, UK
j.glasbey@bham.ac.uk

or
Mr Aneel Bhangu
NIHR Global Health Research Unit on Global Surgery, Institute of Translational Medicine, University of Birmingham, Birmingham, B15 2TH, UK
a.a.bhangu@bham.ac.uk

See Online for appendix