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Resilience of elective cancer surgery systems during COVID-19 lockdowns: International, prospective cohort study of planned surgery for 15 tumour types in 61 countries

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Background

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

Methods

This international, prospective cohort study enrolled patients with 15 cancer types who had a decision for surgery during the COVID-19 pandemic up to 31st August 2020. Average national Oxford COVID-19 Stringency Index scores were calculated for each patient during the period they were awaiting surgery, classified into light restrictions (index <20), moderate lockdowns (20-60), and full lockdowns (>60). The primary outcome was the non-operation rate (proportion of patients who did not undergo planned surgery). Cox proportional-hazards regression models were used to explore the associations between lockdowns and non-operation.

Results

From 20,006 patients (466 hospitals, 61 countries), 9.1% did not receive surgery after a minimum of 3-months' follow up (median:23 weeks, IQR:16 to 30 weeks). Light restrictions were associated with a 0.6% non-operation rate, moderate lockdowns 5.5% (adjusted hazard ratio:0.81, 95% confidence interval 0.77-0.84, $p<0.001$), and full lockdowns with a 15.0% rate (HR:0.51, 0.50-0.53). In sensitivity analyses, this effect was independent of local SARS-CoV-2 rates. Each additional week in lockdown led to a 9% reduction in the likelihood in a patient undergoing their cancer operation. Frail patients, those with advanced cancer, and those in lower-income settings were particularly vulnerable to lockdown effects. Surgery beyond 12-weeks from diagnosis increased during lockdowns (9.1% in light restrictions, 10.4% moderate lockdowns, 23.8% full lockdowns).

Conclusions

Cancer surgery systems worldwide were fragile to lockdowns, with one in seven patients not undergoing planned surgery and more preoperative delays. During current and future periods of societal restriction, the resilience of elective surgery systems requires strengthening, which may include ring-fenced surgical units and critical care capacity.

Clinical trial identification

NCT04384926.

Legal entity responsible for the study

COVIDSurg Collaborate, University of Birmingham, UK.

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Disclosure

All authors have declared no conflicts of interest.

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