



Monitoring the evolving impact of COVID-19 on institutional surgical services: imperative for quality improvement platforms

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Dear Editor

In response to the COVID-19 pandemic, a reduction in scheduled surgical care was widely recommended and implemented to preserve hospital resources and minimize disease transmission¹. However, the surgical community has expressed concern over morbidity from delayed care and has advocated for proactive data collection and monitoring to help mitigate the consequences of the pandemic on surgical patients². Existing surgical quality improvement platforms are a useful tool to achieve this imperative.

At our institution, electronic patient records pass through automated algorithms for deterministic linkage and repackaging into a data warehouse, which is updated in near real-time and supports resource planning and quality improvement³. On this basis, our vascular surgery division developed a novel quality improvement platform in 2018 that captures data on patients receiving vascular surgery services in the inpatient, operating room, and interventional radiology settings. With the onset of COVID, the platform has allowed us to assess and monitor the impact of the pandemic on institutional vascular surgery service volumes. In brief, on 15 March 2020, the Ministry of Health of Ontario, which manages the province's single-payer public health system, mandated a ramp-down in scheduled surgical procedures⁴. Relative to this date, total vascular inpatient admissions, scheduled (inpatient and same-day) interventions, and unscheduled intervention volumes were calculated over 4-week time periods from 18 February 2019 to 2 August 2020. Observed : expected (O : E) case count ratios were calculated for COVID time periods (5 4-week periods from 16 March 2020 to 2 August 2020), with expected case counts based on equivalent time periods in 2019. The effect of the pandemic on vascular

surgery service volumes has been rapid and significant, with trends in hospitalizations and scheduled interventions mirroring public health policy (Fig. 1 and Table 1). Scheduled interventions initially dropped to 14 (95 per cent c.i. 3 to 40) per cent of the expected number. With the province allowing the gradual resumption of scheduled surgical services from 19 May 2020, an increase was observed⁴. To date, a significant backlog remains, with total scheduled interventions from 16 March 2020 to 2 August 2020 at 43 (31 to 59 per cent) per cent of the 2019 level. Our division prioritizes scheduled conditions for surgery in keeping with Society for Vascular Surgery COVID-19 triage recommendations⁵, with the exception of the creation of haemodialysis access, which was halted temporarily. Scheduled open or hybrid operations for peripheral artery disease (O : E ratio 0.53, 95 per cent c.i. 0.32 to 0.82) and thoracic outlet syndrome decompression (O : E ratio 0.40, 0.19 to 0.73) have been reduced significantly. Above-ankle amputations (O : E ratio 0.92, 0.48 to 1.60), peripheral angioplasty for peripheral arterial disease (O : E ratio 0.85, 0.54 to 1.27) and aortic aneurysm repair (O : E ratio 0.61, 0.31 to 1.08) have been less affected. With respect to emergency surgical care, our institution is an urban tertiary teaching centre with vascular, cardiac, trauma, neuro, renal transplant, general, and orthopaedic surgery services utilizing the bulk of urgent operating room time. In the first few weeks of the pandemic, necessary COVID precautions reduced operating room efficiency and the only interventions performed were for immediately life- or limb-threatening conditions and those necessary to free up hospital beds. In keeping with this approach, we noted a rapid reduction in unscheduled vascular interventions; however, the decrease was transient, with volumes ramping back up before gradual resumption in scheduled surgical services was permitted (Fig. 1 and Table 1).

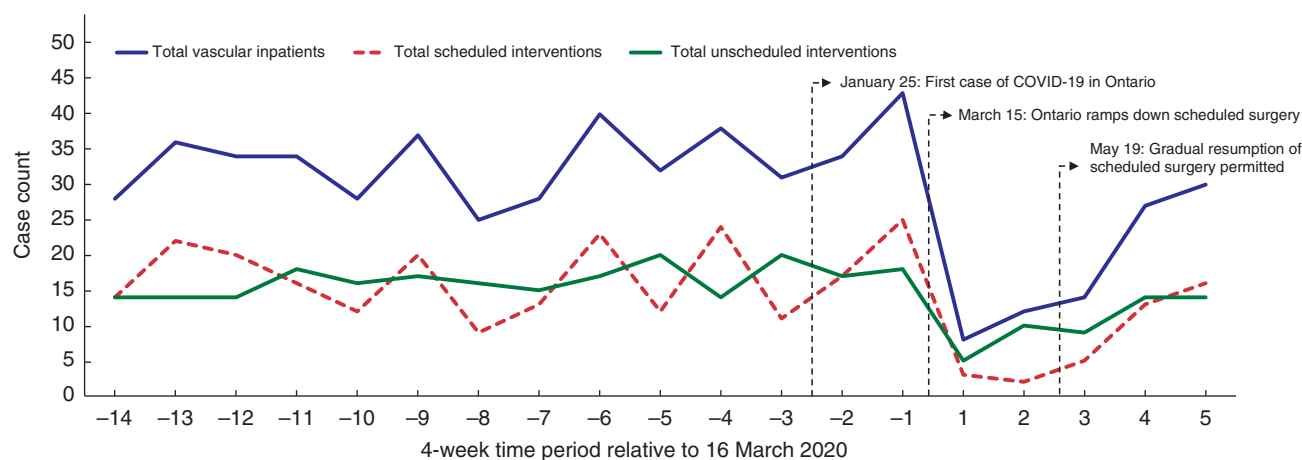


Fig. 1. Impact of the COVID-19 pandemic on vascular surgery service volumes

Table 1 Observed to expected case count ratios by COVID-19 time period

	Period 1 (16 March–12 April)	Period 2 (13 April–10 May)	Period 3 (11 May–7 June)	Period 4 (8 June–5 July)	Period 5 (6 July–2 August)
Total no. of vascular inpatients	0.22 (0.10, 0.43)	0.36 (0.19, 0.63)	0.41 (0.23, 0.69)	0.96 (0.64, 1.40)	0.81 (0.55, 1.16)
Total no. of scheduled interventions	0.14 (0.03, 0.40)	0.10 (0.01, 0.34)	0.28 (0.09, 0.63)	1.00 (0.53, 1.70)	0.84 (0.48, 1.36)
Total no. of unscheduled interventions	0.33 (0.11, 0.76)	0.77 (0.37, 1.40)	0.56 (0.26, 1.06)	0.98 (0.51, 1.56)	0.78 (0.43, 1.30)

Values in parentheses are 95 per cent confidence intervals.

Collecting and monitoring data on surgical service volumes, process measures, and outcomes are essential as we strive to minimize morbidity for our patients during the COVID-19 pandemic. Quality improvement platforms with appropriate scope and focus are useful tools to this end. Transparency with such data across all surgical specialties at an institutional level can also help inform more equitable allocation of scarce operating room resources, which are likely to remain constrained for the foreseeable future.

Disclosure. The authors declare no conflict of interest.

References

1. Søreide K, Hallet J, Matthews JB, Schnitzbauer AA, Line PD, Lai, P et al. Immediate and long-term impact of the COVID-19

pandemic on delivery of surgical services. *Br J Surg* 2020; DOI: 10.1002/bjs.11670

2. COVIDSurg Collaborative. Global guidance for surgical care during the COVID-19 pandemic. *Br J Surg* 2020; DOI: 10.1002/bjs.11646
3. Li Ka Shing Centre for Healthcare Analytics Research and Training. The Data. <https://www.chartdatascience.ca/the-data> (accessed 21 August 2020)
4. Canadian Institute for Health Information. COVID-19 Intervention Scan. <http://www.cihi.ca/en/covid-19-intervention-scan> (accessed 21 August 2020)
5. Society for Vascular Surgery. Vascular Conditions by Category, with Tier Class. <https://vascular.org/sites/default/files/Vascular%20surgery%20triage%20by%20Tier%20Class%203.24.20.pdf> (accessed 21 August 2020)