

Frugal solutions for the operating room during the COVID-19 pandemic

Editor

The ongoing COVID-19 pandemic has placed tremendous strain on healthcare services and has called for the repurposing of available resources; resulting in forced suspension of elective surgery in most countries. Suggestions from surgeons working in the early epicentres of this pandemic in Asia and Europe led to the formulation of early recommendations for managing surgical patients during the crisis¹⁻³. Additionally, countries responded by altering their surgical services according to their own circumstances and contributed to emerging guidelines⁴. At the same time, many patients being deprived of elective surgical access prompted prescient surgeons to start making contingency plans for maintaining surgical care in an ongoing or post-pandemic phase^{5,6}.


An important step in this direction was taken by the Welsh Surgical Research Initiative (WSRI) Collaborative who conducted an international Delphi exercise to have a global consensus on safe operating room (OR) practices during the COVID-19 pandemic⁷. One of the contentious issues addressed in this landmark study was the risk of virus transmission *via* aerosol generated during general anaesthesia and surgical procedures⁸. Suggestions for dealing with this were 'operating rooms should be filtered and ventilated, ideally with negative pressure, for CV19 patients' and 'use of special automatic diathermy smoke evacuators'⁷.

Lack of equitable surgical services in low- and middle-income countries (LMICs) is well known⁹. The majority of ORs in LMICs are non-modular without laminar flow systems and work on stand-alone air conditioners. Upgrading these to the recommended level of filtration, ventilation and negative pressure may not be possible, due to economic constraints. We suggest the use of strong exhaust fans in ORs to create a temporary negative pressure room; a lesson learned from Severe Acute Respiratory Syndrome (SARS),

the first pandemic of the 21st century¹⁰. A simple duct system can be easily constructed, which connects to an exhaust and releases the air at least 3 meters above the roof. This idea can be adopted as an alternate solution.

Similarly, acquiring expensive devices such as specialized diathermy smoke evacuators (which cost around INR 1 000 000/£11 000) may not be possible for most small independent hospitals, which are the backbone of surgical services in smaller towns of LMICs. We suggest the use of indigenous low-cost heat and moisture exchanger (HME) smoke filters (approx INR 600-1200/£7-14) for laparoscopy¹¹ and incorporation (tying with rubber bands) of traditional suction cannula to a cautery hand piece (for open surgery) as simple frugal solutions.

The speed of transmission and severity of COVID-19 has prompted many frugal innovative responses; especially in LMICs¹². Our low cost ideas may not be ideal but have the potential to provide good enough healthcare in the best way possible under given constraints. 'Social distancing' has become a current buzz word; greater inclusion of the needs of LMICs in scientific discussions will avoid the impression of 'social distancing' between the global North and global South.

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- Spinelli A, Pellino G. COVID-19 pandemic: perspectives on an unfolding crisis. *Br J Surg* 2020; <https://doi.org/10.1002/bjs.11627> [Epub ahead of print].
- Di Marzo F, Sartelli M, Cennamo R, Toccafondi G, Coccolini F, La Torre G *et al.* Recommendations for general surgery activities in a pandemic scenario (SARS-CoV-2). *Br J Surg* 2020; <https://doi.org/10.1002/bjs.11652> [Epub ahead of print].
- Cai M, Wang G, Zhang L, Gao J, Xia Z, Zhang P *et al.* Performing abdominal surgery during the COVID-19 epidemic in Wuhan, China: a single-centred, retrospective, observational study. *Br J Surg* 2020; <https://doi.org/10.1002/bjs.11643>. [Epub ahead of print].
- COVIDSurg Collaborative. Global guidance for surgical care during the COVID-19 pandemic. *Br J Surg* 2020; <https://doi.org/10.1002/bjs.11646> [Epub ahead of print].
- Søreide K, Hallet J, Matthews JB, Schnitzbauer AA, Line PD, Lai PBS *et al.* Immediate and long-term impact of the COVID-19 pandemic on delivery of surgical services. *Br J Surg* 2020; <https://doi.org/10.1002/bjs.11670> [Epub ahead of print].
- Mayol J, Fernández Pérez C. Elective surgery after the pandemic: waves beyond the horizon. *Br J Surg* 2020; <https://doi.org/10.1002/bjs.11688> [Epub ahead of print].
- Welsh Surgical Research Initiative (WSRI) Collaborative. Surgery during the COVID-19 pandemic: operating room suggestions from an international Delphi process. *Br J Surg* 2020; <https://doi.org/10.1002/bjs.11747> [Epub ahead of print].
- Mowbray NG, Ansell J, Horwood J, Cornish J, Rizkallah P, Parker A *et al.* Safe management of surgical smoke in the age of COVID-19. *Br J Surg* 2020; <https://doi.org/10.1002/bjs.11679> [Epub ahead of print].
- Meara JG, Leather AJ, Hagander L, Alkire BC, Alonso N, Ameh EA *et al.* Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development. *Lancet* 2015; **386**: 569–624.
- Chow TT, Kwan A, Lin Z, Bai W. Conversion of operating theatre from positive to negative pressure environment. *J Hosp Infect* 2006; **64**: 371–378.
- Mintz Y, Arezzo A, Boni L, Chand M, Brodie R, Fingerhut A; and the Technology Committee of the European Association for Endoscopic Surgery. A Low-cost, Safe and

Effective Method for Smoke
Evacuation in Laparoscopic Surgery
for Suspected Coronavirus Patients.
Ann Surg 2020; <https://doi.org/10>

.1097/SLA.0000000000003965 [Epub
ahead of print].
12 Harris M, Bhatti Y, Buckley J,
Sharma D. Fast and frugal innovations

in response to the COVID19
pandemic. *Nature Medicine* 2020 May
11. <https://doi.org/10.1038/s41591-020-0889-1>.