


Surgery of COVID-19-infected Patients in Africa: A Scoping Review

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Received: 17 Mar 2021; Revised: 16 Jul 2021; Accepted: 26 Jul 2021; Available online: 06 Sept 2021

Abstract

Objective: The aim of this scoping review was to highlight the nature and scope of research and publications about surgery in COVID-19-infected patients in Africa in order to inform guidelines applicable in Africa. **Methods:** We considered peer-reviewed and gray literature from PubMed, Google Scholar, and World Health Organization COVID-19 online databases published from February 1, 2020, to February 28, 2021, about surgery for/in COVID-19-infected patients. The review is reported using the Preferred Reporting Items for Systematic Reviews and Meta-analysis extension for Scoping Reviews. **Results:** Of 530 studies screened, only 11 (2.08%) were found eligible, including 4 cohort studies, 3 cross-sectional studies, 2 letters to the editor, 1 case series, and 1 review. The key emphasis areas by the eligible studies were vaccination, testing prior to surgery, clinical guidelines to reduce complications related to COVID-19 among infected patients, and protection of the surgical team.

Conclusion: There is a dearth of studies on surgery in COVID-19-infected patients in Africa. There is an urgent need for more reports and publications from the African experiences so as to inform contextualized guidelines for surgical care in low-resource settings during the COVID-19 pandemic.

Keywords: Surgery, COVID-19 pandemic, Infected patients, Africa

Ann Afr Surg. 2021; 18(4): 200-207

DOI: <http://dx.doi.org/10.4314/aas.v18i4.3>

Conflict of interest: None

Funding: Safe Surgery in War Zone DRC. The funder had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

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Introduction

More than a year since the first cases were reported in Wuhan, China, on December 31, 2019, the world continues to battle with the highly infectious coronavirus pandemic and its new variants (1). As of July 13, 2021, more than 100 million cases were confirmed worldwide (more than 4 million cases were

confirmed in Africa), of which some patients have undergone surgeries while infected with COVID-19 (2). There is an increased demand on health systems especially regarding existing resources, including staff and supplies. Pandemic preparedness has become a priority in response to the many outbreaks and epidemics reported globally, including severe acute

respiratory syndrome (SARS), Middle East respiratory syndrome, H1N1 swine flu, and Ebola (3), with publication of guidelines for prevention, control, and treatment. In high-income countries (HICs), such efforts have prioritized resource procurement and allocation, including vaccine procurement policies, distribution of medicaments, and emergency health response (4).

The presence of guidelines for the management of COVID-19-infected patients in HICs (5) has positively impacted the health systems (6); however, not much has been reported about COVID-19-infected patients undergoing surgery, special management considerations made, and recommendations in low-resource settings, particularly in Africa. Furthermore, despite the repeated Ebola outbreaks in Africa, very little has been published about surgery among infected patients (7).

Review objective

The purpose of this scoping review was to highlight the nature and scope of research and publications about surgery in COVID-19-infected patients in Africa in order to inform guidelines applicable in low-resource settings like sub-Saharan Africa. The guiding question was: “What are the known guidelines, special considerations, and outcomes of surgery among COVID-19-infected patients in Africa?”

Methodology

This scoping review was conducted and is reported according to the Preferred Reporting Items for Systematic Reviews and Meta-analysis extension for Scoping Reviews (8). We do not have a registered protocol.

Eligibility criteria

We considered all peer-reviewed articles and gray literature on surgery among COVID-19-infected patients, published in English and French and those published in other languages but with a well-structured English abstract with no restrictions on country of origin or type of population included in the study. We targeted surgical studies reported in Africa and focused on guidelines, protocols, letters to the editors, case reports, and reviews of surgery in COVID-19-infected patients,

prevention of nosocomial transmission, surgical case prioritization and scheduling, perioperative care and surgical team support and training, and outcome of surgery.

Search methods for identification of studies

We developed a comprehensive search strategy for peer-reviewed studies and gray literature. We systematically searched the following databases for eligible articles published from February 1, 2020, to February 28, 2021: the PubMed, Google Scholar, and World Health Organization COVID-19 database. We screened the reference lists of all the included articles for potentially eligible additional articles. The search strategy and search terms were drafted with the assistance of the university librarian, and the keywords used included “surgery of COVID-19-infected patients,” “surgery and COVID-19 in Africa,” and “COVID19 and surgical cases in Africa.” The abstracts and later full texts of potentially eligible studies were assessed using the pre-specified eligibility criteria and excluding all studies not responding to the eligibility criteria, with irrelevant contents, and those that were duplicated (Figure 1). The authors (FKS and PK) compared lists of included studies, and the authors (FKS, RS, JS, SMK, SFM and PK) resolved discrepancies by discussion and consensus.

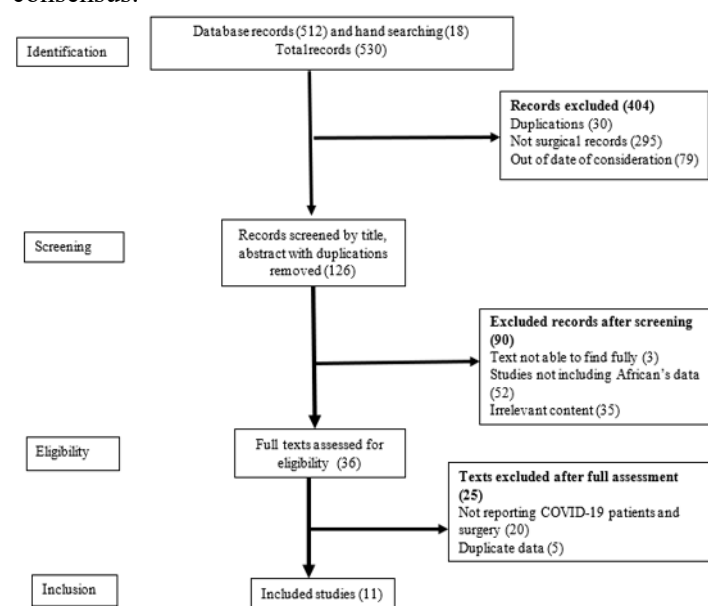


Figure 1. Flowchart of the study identification and selection process.

Data collection and analysis

The information relevant to the following categories was extracted: patient management and relevant issues, guidelines, protocols, surgical case prioritization and scheduling, and in-patient safety for surgery and any other information about safe surgical care during the pandemic. All data required to complete this scoping review were available within published articles selected. Since this is a scoping review and not a systematic review, we did not assess the risk of bias for the included studies. Data from the studies identified from the databases searching about surgery and COVID-19-infected patients in Africa were synthesized narratively and are displayed in Table 1.

Results of the search and summary of the findings

Identification of potential studies

From the literature and database search, 530 studies were selected, but only 36 studies (6.8%) were found eligible for this scoping review. Additional articles were excluded after full-text assessment for the reasons mentioned in the flowchart (Figure 1). Ultimately, 11 articles (2.08%) were included in our final data extraction, quality appraisal, and narrative account stages.

Characteristics of the included studies

The 11 included studies were as follows: 4 cohort studies, 3 cross sectional studies, 2 letters to editor, 1 case series, and 1 review (Table 1). From the 11 studies, three were directly coming from Africa with South Africa being the leading country and the remaining eight were from global collaboration surgical team (Figure 2). The case reported were from elective, emergency, and/or day-care surgeries. The participants on these studies were ranged between 4 (minimal) to 140,582 (maximum) (Table 1).

Summary of the findings

One study that reported about children with clinical appendicitis who had positive COVID-19 PCR results at admission should be screened for multisystem inflammatory syndrome, as there is a great association (9). Safe perioperative surgery was the key message in

preventing the transmission of COVID-19 among patients and healthcare workers and vice versa. The safety of surgery was reported in terms of vaccination, test prior to surgery, guidelines to follow among asymptomatic and symptomatic COVID-19 patients such as nasal swab prior to surgery for all elective cases, prioritized vaccination for patients who will undergo electives surgeries, appropriate use of personal protective equipment (PPE) while carrying out any surgery, and delaying of electives surgeries for at least 7 weeks for COVID-19 infected patients (10-18) to reduce complications (postoperative pulmonary complications) related to COVID-19 (19); mortality has been observed among patients undergoing surgery while being symptomatic or asymptomatic (18, 19) (Table 1).

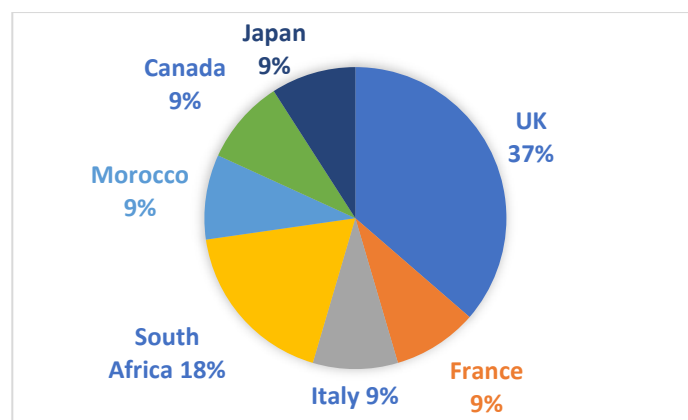


Figure 2. Data distribution by first author's country.

Discussion

The current COVID-19 pandemic has affected the surgical discipline in several ways, including redistribution of resources, cancellation of elective surgeries, and suspension or downscaling of training programs (20, 21), all of which have a negative impact on the surgical output and contribute to an increase in unmet surgical need in the post-COVID-19 era. In HICs, reports have been published about surgery on infected patients (6). However, in the case of Africa, which has confirmed cases in all states, little has been published on surgery among COVID-19-infected patients. We assume that surgeons might be working on suspected cases and/or confirmed cases of COVID-19 (22) but have not systematically documented their approaches and experiences.

Table 1. Characteristics of the included studies and findings

| Reference | Country of the first author | Design | Type of surgery | Number of participants | Summary |
|-----------|--------------------------------------|------------------------|---|------------------------|--|
| 9 | South Africa | Letter to the editor | Not applicable | Not applicable | Association among acute appendicitis, COVID-19, and multisystem inflammatory syndrome in children |
| 10 | Morocco | Letter to the editor | Not applicable | Not applicable | At emergency: Patients with suspected CT images are transferred to the COVID-19-dedicated operating room from emergency Transfer: COVID-19 patients wear face mask during transfer from emergency to COVID-19 room Staff accompanying the patient wear personal protective equipment (PPE in accordance with World Health Organization guideline Anesthesia: Teamwork in the theater Monitoring of the patient Application of high-efficiency hydrophobic facemask prior induction Remove the patient's facial mask and apply preoxygenating mask for 5 minutes Drug administration via ventilator Surgery: Surgeons wear PPE and will be allowed in operating room once patient is connected to the ventilator Post-surgery RT-PCR results are taken, and the patient is transferred to specific ICU depending on the result (ICU COVID-19 or surgical ICU) |
| 11 | South Africa | Case series | Emergency | 4 | Emergency bronchoscopy procedures on COVID-19-infected patients or patients with unknown infection status can be safely performed using modified full-face snorkel masks. |
| 12 | International collaboration (Canada) | Cross-sectional online | Not applicable | 325 | The etiology of reported cases within the otolaryngology community seems to stem equally from clinical activity and community spread; therefore, great care should be taken to protect the surgical team before, during, and after surgery. |
| 13 | International collaboration (Italy) | Cross-sectional online | Emergency, elective, and day-care surgery | 1173 | An insufficient preoperative screening of COVID-19 in the current surgical practice was found. Suggestion of more intensive screening programs will be necessary particularly in severely affected countries/institutions |
| 14 | International collaboration (Japan) | Cross-section | Not applicable | 483 | Use of appropriate PPE allows application on endoscopic procedure as they reduce risk of COVID-19 transmission between COVID-19 patients and operators |

| | | | | | |
|----|--------------------------------------|--------------|--|----------------|---|
| | | al online | | | |
| 15 | International collaboration (UK) | Cohort study | Elective and day-care surgery | 141,582 | Preoperative nasopharyngeal swab testing was beneficial before major surgery and in high SARS-CoV-2 risk areas. However, no proven benefit of swab testing before minor surgery in low-risk areas was observed. |
| 16 | International collaboration (UK) | Cohort study | Elective and day-care surgery | 141,582 | Number needed to vaccinate (NNVs) were more favorable in surgical patients than in the general population. The most favorable NNVs were in patients aged 70 years or older needing cancer surgery or non-cancer surgery. Patients needing elective surgery should be prioritized ahead of the general population. |
| 17 | International collaboration (France) | Review | Not applicable | Not applicable | Tracheostomy represents a high risk of contracting COVID-19 due to constant exposure to droplets and aerosol leakage that is infected with SARS-CoV-2 during the surgical procedure. Full PPE is mandatory, and the creation of a COVID-19 airway team is essential. |
| 18 | International collaboration (UK) | Cohort study | Emergency and elective | 140,231 | Pre-operative SARS-CoV-2 diagnosis was associated with early postoperative mortality in patients having surgery. After a ≥ 7 -week delay in undertaking surgery following SARS-CoV-2 infection, patients with ongoing symptoms had higher mortality than patients whose symptoms had resolved or who had been asymptomatic. Where possible, surgery should be delayed for at least 7 weeks following SARS-CoV-2 infection. Patients with ongoing symptoms ≥ 7 weeks from diagnosis may benefit from further delay. |
| 19 | International collaboration (UK) | Cohort study | Emergency, elective and day-care surgery | 1128 | Postoperative pulmonary complications occur in patients with perioperative SARS-CoV-2 infection and are associated with high mortality. Thresholds for surgery during the COVID-19 pandemic should be higher than that during normal practice, particularly in men aged 70 years and older. Consideration should be given for postponing non-urgent procedures and promoting non-operative treatment to delay or avoid the need for surgery. |

At the start of the COVID-19 pandemic, the College of Surgeons of East, Central and Southern Africa published general guidelines on surgical practice during the pandemic period to avoid the infection of the surgical team (22). However, there is no report as to whether the guidelines were effective, and if so, what lessons have

been learned? This scoping review has found that from 11 included studies, only 3 reported findings from two different countries in Africa and the remaining 8 were international collaborations. This gives us a clear picture of what is on ground in terms of research in the surgical field during COVID-19 in Africa.

It is estimated that 4% to 19% of all confirmed COVID-19 cases in HICs are healthcare workers, and this has been linked to lack of optimal PPE (23). In low-income countries, due to the low testing capacity and scarcity of PPEs, surgical teams are at high risk of contracting COVID-19 during procedures done in outpatient clinics and operative theaters on non-tested infected patients (22, 24). It was reported that use of PPEs could help healthcare workers avoid contracting COVID-19 while performing different surgical procedures (14).

Many health workers have succumbed to COVID-19 on the continent partly due to inadequate protection and exposure during the delivery of healthcare to infected patients (25).

The risk of COVID-19 transmission through aerosols and droplets is an important consideration for surgical personnel (17). The safety of healthcare workers is paramount in order to provide adequate medical services for infected patients. Training should be provided immediately to healthcare workers to sharpen their technical and clinical skills for perioperative management of patients (22, 24). Reports from international collaboration proved that teamwork will help reduce the transmission of COVID-19 among healthcare workers and that there is a need for a team leader to control the application of the protocol from patient admission to discharge through the theater period (10).

Three studies gave recommendations on how to carry out elective and emergency surgeries during this pandemic to avoid nosocomial infection between healthcare workers, between healthcare workers and patients, and between patients (7, 22, 26), with a key message that all patients planned for elective surgery during COVID-19 pandemic must have a negative swab 48 hours prior, been asymptomatic for 7 days, self-isolated for 14 days, and been assessed for COVID-19 before surgery (7, 21, 22, 26, 27). From the GlobalSurg Collaborative studies, vaccination should be prioritized for all patients planned for elective surgery prior to the general population (16) and that prior nasal swab should be performed for patients who will undergo major surgery (15).

The American College of Surgeons established triage criteria based on prevalence of the disease in the area as well as the availability of non-surgical alternatives (20). A draft of measures that must be taken to protect surgical team has already been published (20, 22), and use of PPE for all procedures involving a patient with confirmed or suspected COVID-19 infection have been recommended by the US Centers for Disease Control and Prevention and Public Health England (20, 21, 28). Mortality has been observed among patients undergoing surgery while being symptomatic or asymptomatic (18, 19). From this finding, the GlobalSurg Collaborative suggested that surgery should be delayed for at least 7 weeks following SARS-CoV-2 infection and that patients with ongoing symptoms ≥ 7 weeks from diagnosis may benefit from further delay (18).

Strengths and limitations

Although this scoping review applied a systematic and rigorous search strategy to retrieve several articles to answer our research questions and objectives, we may have omitted some relevant studies published in languages other than English and French. However, it is important to acknowledge that our scoping review is a snapshot at a particular point in time.

Conclusion

As the COVID-19 cases continue to wax and wane and as we prepare for the next phase or the next epidemic or pandemic, it is vital that we consider the safety of the surgical staff and patients while maintaining access to surgical care. This will only be possible if data and protocols related to surgery among infected patients during outbreaks are reported from both HICs and resource-limited settings to present context-specific surgical care guidelines. From this scoping review, we found that little is being published from the African continent by surgical researchers on COVID-19-infected patients undergoing surgery to inform the formulation of guidelines applicable to limited-resource settings like Africa. There is need for systematic documentation of African surgical experiences with COVID-19-infected patients to inform practice and guidelines formulation for the outbreaks to come.

Governmental and non-governmental organizations must work together to overcome the challenges to research in the surgery field and to implement the guidelines about surgery for the futures outbreaks. We continue to count on national and international collaborations in research to improve the management of surgical patients on the African continent through a synthesis of research evidence and to develop systematic reviews, policy briefs, health technology assessments, and guidelines for practice (29)

Authors' contributions

All authors designed the study, wrote the initial draft, contributed to this study, and read and approved the final manuscript.

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