International Journal of Surgery Protocols 24 (2020) 17–20

Contents lists available at ScienceDirect

International Journal of Surgery Protocols

journal homepage: www.elsevier.com/locate/isjp

Current state and future perspectives of telemedicine use in surgery during the COVID-19 pandemic: A scoping review protocol

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ARTICLE INFO

Article history:
Received 21 September 2020
Accepted 15 October 2020
Available online 24 October 2020

Keywords:
Breast cancer
COVID-19
Endocrine therapy
SARS-Co-V-2
Surgery

ABSTRACT

Introduction: The biggest concerns in the current pandemic are enormous workload pressure, psychological distress, caregiver burnout, and, even worse, transmission of the virus among healthcare workers. One of the potentially beneficial tools in reducing the above-mentioned risks for overwhelming the healthcare system is telemedicine. Although the role of telemedicine and related interventions as a crisis management tool has increased, the current state of the implementation of telemedicine in surgery and surgical subspecialties has not been adequately evaluated.

Objective and significance: The objective of this review is to screen the literature, extract expert opinions, qualitative, and quantitative data on the current use and future directions in the implementation of telemedicine in surgery and surgical subspecialties during the COVID-19 pandemic. The findings would potentially help in understanding the challenges and future directions of telemedicine use in surgery.

Methods and analysis: The databases to be searched include PubMed, EMBASE, and MEDLINE (via Ovid). In addition, ClinicalTrials.gov and medRxiv.org will be searched for any ongoing and/or unpublished studies. The reference lists of articles included in the review will be screened to assess the sensitivity of the search. Literature search, quality assessment, followed by data extraction will be performed by two independent researchers. The findings of the data synthesis will be reported in diagrams, tables, and text. This review will consider reports that include expert opinions, qualitative and quantitative data on the implementation of telemedicine in surgery and surgical subspecialties (including patients with surgical disease of any age) during the COVID-19 pandemic. In addition, future perspectives reported based either on the evidence provided by the data or on expert opinions will be considered.

Ethics and dissemination: This study does not require an institutional review board approval given its summary design nature. Findings of this systematic review will be published in a peer-reviewed journal.

Systematic review registration number: PROSPERO does not currently accept registrations for scoping reviews, literature reviews or mapping reviews.

1. Introduction

Coronavirus disease 2019 (COVID-19) is a respiratory infectious disease caused by a novel strain of coronavirus, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first case of unknown pneumonia was reported in Wuhan City, Hubei Province of China on December 31, 2019. After only 71 days on March 11, 2020, the World Health Organization declared COVID-19 pandemic, the historically first pandemic caused by a coronavirus [1]. As of July 19, 2020, >14 million people worldwide have been infected, and the number of deaths was almost 600,000 [2]. The first case in the U.S. was reported on January 11, 2020 and as of July 19, 2020 the number of cases raised dramatically to almost 3.7 million and number of deaths to almost 139,659 [3]. The impact of the current COVID-19 pandemic is so significant that no war or catastrophe in recent history has affected the world as pervasively and profoundly. Despite the International Health Regulations including specific standards for detecting, reporting on, and responding to outbreaks developed by the World Health Assembly [4,5] and major investments made by international donors in an effort to improve preparedness through refined standards and funding for building health capacity [6], the COVID-19 pandemic caught us unprepared and already caused major morbidity and mortality as well as high risks for economic, social, and political disruption.

The biggest concerns in the current pandemic are enormous amount of workload pressure, psychological distress, caregiver

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https://doi.org/10.1016/j.isjp.2020.10.002
2468-3574/

burnout, and, even worse, transmission of the virus among healthcare workers. As of May 8, 2020, 90,000 healthcare workers have been infected with severe COVID-19 illness and great number of deaths of healthcare providers have been reported in multiple countries [7]. One of the potentially beneficial tools in reducing the above-mentioned risks for overwhelming the healthcare system is telemedicine.

Since its first implementation at Massachusetts General Hospital in 1967, telemedicine has considerably advanced owing to technological developments. Telemedicine has consistently shown its effectiveness in extreme conditions, such as crises, disasters, remote areas or limited-resource countries [8–11]. Moreover, Latifi and Doarn have recently stated that the biggest benefit of the COVID-19 pandemic was perhaps the establishment of a new virtual world health order [12]. The healthcare workers on the front lines of the fight against the COVID-19 pandemic *per se* are also the victims of an extreme condition. The biggest advantage of telemedicine in the current crisis is its ability to continue providing health services at a physical distance. First of all, this would allow partially relieving enormous workload pressure from the workers in hospitals. Secondly, it would allow SARS-CoV-2 positive asymptomatic clinicians in quarantine to continue providing healthcare services. Last and not least, it would allow continuing care of other clinical conditions unrelated to COVID-19, such as cancer and transplant care [13]. In fact, cancer care would be a major field of telehealth implementation for two reasons: 1) interruptions in systemic medical therapy may negatively affect survival; 2) cancer patients undergoing systemic medical therapy are often immunocompromised given the nature of therapy and albeit they may be at a significant risk of contracting the virus, developing severe respiratory failure, or death in case of frequent hospital visits. Another major surgical field, where the role of telemedicine may be central, is transplant surgery as this is a highly regulated field, in which decisions to cancel or postpone surgery may be quite difficult. The current pandemic has imposed the following challenges: 1) introducing immunosuppression into patients in the midst of a pandemic may lead to severe disease and death; 2) the risk versus benefit ratio of postponing transplant versus proceeding; 3) rationing of healthcare resources [14].

The role of telemedicine and related interventions during crisis such as this one increases [15]. However, the current state of its implementation has not been well evaluated. Moreover, no evidence-based summary design studies have been published in the literature. Therefore, we aimed to evaluate the current body of evidence with regard to the current state of implementation of telemedicine in surgery and surgical subspecialties as well as the future perspectives reported in the literature.

2. Objectives and significance

We propose a scoping review evaluating the current state of telemedicine use in surgery as well as its future perspectives. The findings would potentially help in understanding the challenges and future directions of telemedicine use in surgery. A preliminary search of PROSPERO, MEDLINE, and the Cochrane Database of Systematic Reviews was conducted and no current or underway scoping reviews on the topic were identified. The objective of this review is to screen the literature, extract expert opinions, qualitative, and quantitative data on the current use and future directions in the implementation of telemedicine in surgery and surgical subspecialties during the COVID-19 pandemic. We aim at summarizing the current body of evidence, evaluating the outcomes of telemedicine use in comparison with standard care, and identifying challenges and potential solutions in the use of telemedicine. In this regard, we will seek providing responses to the following questions:

1) What is the current state of perioperative telemedicine use in surgery and subspecialties?
2) Are the outcomes of the use of telemedicine reported in comparison with standard care? If yes, is telemedicine associated with improved outcomes?
3) What are the challenges in the implementation of telemedicine?
4) What are the future perspectives in the widespread implementation of telemedicine?

3. Methods

The proposed systematic review will be conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) extension for scoping reviews (PRISMA-ScR) [16]. This protocol was developed prospectively and complies with the PRISMA for Systematic Review Protocols (PRISMA-P) guidelines [17].

3.1. Eligibility criteria and hypothesis

This review will consider reports that include expert opinions, editorials, qualitative and quantitative data on the implementation of telemedicine in surgery and surgical subspecialties (including patients with surgical disease of any age) during the COVID-19 pandemic. The concept behind this proposal for a scoping review stems from the challenges faced during the current COVID-19 pandemic, especially in epidemic epicenters. These challenges include and are not limited to workload pressure, psychological distress, caregiver burnout, and transmission of the virus among healthcare workers. We hypothesize that telemedicine is implemented more actively over the course of the pandemic. Moreover, we hypothesize that telemedicine provides similar perioperative outcomes in patients undergoing surgery. This review will consider records that represent descriptive and comparative analysis of the outcomes of the perioperative implementation of telemedicine. We will also review expert opinions to summarize the future perspectives of the place of telemedicine in surgery and surgical subspecialties. We will summarize the body of evidence considering cultural and economic factors and geographic location.

3.2. Search strategy

The search strategy will aim to locate both published and unpublished primary studies, reviews and text and opinion papers. An initial limited literature search of PubMed was performed to identify the terms to be used in the process of the scoping review. PubMed was searched using the following three MeSH terms combined with the Boolean operator AND: ‘covid’, ‘telemedicine’, and ‘surgery’. The preliminary search revealed 1,844 records when MeSH terms were searched and 224 records when all fields were searched (Supplement 1). Moving forward, the search strategy including all identified keywords and index terms, will be adapted for each included data source. The sensitivity of the search strategy will be tested by reviewing the references of the included studies.

3.3. Data sources

The databases to be searched include PubMed, EMBASE, and MEDLINE (via Ovid). In addition, ClinicalTrials.gov will be searched for any ongoing studies. Sources of unpublished studies and gray literature to be searched include medRxiv.org.

3.4. Study selection

Following the search, all identified records will be collated and uploaded into Zotero 5.0 (Center for History and New Media at George Mason University, VA, USA) and duplicates removed. Identified records will be screened using a cascade system. Titles and abstracts will then be screened by two independent reviewers (MG and AP) with the assistance of the third reviewer (LAL) for assessment against the inclusion criteria for the review. The full text of selected citations will be assessed in detail against the inclusion criteria by two independent reviewers. Reasons for exclusion of full text papers that do not meet the inclusion criteria will be recorded and reported in the scoping review. Any disagreements that arise between the reviewers at each stage of the selection process will be resolved through discussion with the senior author (RL). The results of the search will be reported in full in the final scoping review and presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram [18].

3.5. Data extraction

Data will be extracted from papers included in the scoping review by two independent reviewers (MG and AP) using a data extraction tool developed by the reviewers, assisted by LAL. The data extracted will include specific details about the authors, publication, country, study design, sample size, comparator, outcomes, challenges, conclusions, and suggested future directions relevant to the review question. A draft extraction tool is provided (Supplement 2). The draft data extraction tool will be modified and revised as necessary during the process of extracting data from each included paper. Modifications will be detailed in the full scoping review. Any disagreements that arise between the reviewers will be resolved through discussion, or with a third reviewer. Authors of papers will be contacted to request missing or additional data, where required.

3.6. Data presentation

The extracted data will be presented in diagrammatic and tabular form in a manner that aligns with the objective of this scoping review. A narrative summary will accompany the tabulated and charted results and will describe how the results relate to the reviews' objective and questions.

4. Ethics and dissemination

This study does not require an institutional review board approval given its summary design nature. Findings of this systematic review will be published in a peer-reviewed journal.

5. Limitations

We anticipate that this review will be subject to several limitations. First of all, this scoping review will attempt to summarize mostly qualitative data from expert opinions and descriptive studies. Another limitation may be a heterogeneity in the telemedicine use across different surgical specialties as well as hospitals and geographic locations.

Ethical Approval

Research studies involving patients require ethical approval. Please state whether approval has been given, name the relevant ethics committee and the state the reference number for their judgment.

Consent

Not applicable given the summary design of the study.

Funding

None.

CRediT authorship contribution statement

Mahir Gachabayov: Methodology. **Lulejeta A. Latifi:** Investigation. **Afshin Parsikia:** Methodology. **Rifat Latifi:** Methodology.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.isjp.2020.10.002.

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