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**Review Article**

# Challenges and Limitations during Management of Surgical Patients via Telemedicine during COVID-19 Pandemic

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## Abstract

COVID 19 disease was declared as a pandemic by the World Health Organization (WHO) in March 2020. Telemedicine facilities become a spine for health care system in developing countries for managing communicable disease as well as surgical patients. Most of the hospitals have newer experience with these organized telemedicine facilities. This comprehensive review has done with a search engine on PubMed, Google scholar with keywords like telemedicine in India, telemedicine in COVID 19, COVID 19, telemedicine guidelines, telemedicine consultation and chronic disease. In Indian scenarios, this newer modality of treatment for surgical patients has fewer limitations due to slower adaptability and lack of psychological support. The health care system required proper training for the improvement of this virtual model of consultation and examination. A hybrid form of management can bridge between telemedicine and physical consultation to provide good and adequate surgical care. A multispecialty virtual meeting may provide adequate and satisfactory telemedicine consultation for high-risk, comorbid, palliative surgical patients. Fewer limitations are needs to reconsider for a safe, assessable, adequate and convenient virtual platform like lack of good hospitality infrastructures, proper guidelines, medical education, clinical training and adaptability. Surgical and oncological society guidelines may help to triage and smooth management of COVID and Non-COVID patients. Triage of surgical patients in telemedicine OPD has a positive impact on the overall prognosis of patients with an acceptable risk of disease.

**Keywords:** COVID-19, Chronic, Disease, Diabetes, India, Lockdown, Pandemic, Telemedicine.



## INTRODUCTION

Coronavirus disease pandemic has started in Wuhan city, China in December 2019. In India, this pandemic has come in February 2020 followed by twice an episode of peak wave. All countries are following the protocol of lockdown to prevent human lives as well as the spreading of this acutely communicable disease [1]. Health care facility in all centers has entered in telemedicine, a newer modality of treatment, especially in developing countries. Telemedicine facility has the ability to provide virtual management for all medical as well as surgical patients [2–4]. However, all patients who have a chronic ulcer or surgical site infection must require intermittent physical consultation in between telemedicine OPD. Most tertiary care health centers are running both telemedicine and physical OPD with due precautions for elective patients. However, emergency or semi-elective patients are managing physically in the different setup of hospitals.

## METHODOLOGY

We have collected all review information with previous works of literature published in the COVID 19 era during the last 18 months regarding challenges and limitations for telemedicine OPD. This comprehensive review has done with a search engine on PubMed, Google scholar with keywords like telemedicine in India, telemedicine in COVID 19, COVID 19, telemedicine guidelines, telemedicine consultation, chronic disease, lockdown.

### Telemedicine & COVID-19

World Health Organization (WHO) has defined telemedicine as "the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for the diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for

the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities [5]." Non-communicable chronic diseases may affect the survival and prognosis of elderly patients in absence of appropriate medical consultation during lockdown like diabetes mellitus (DM), cardiac disease, hypertension, kidney disease. Most government health care sectors have no appropriate, satisfactory infrastructure facility to maintain proper social distancing. Also, they have a lack of internet base data transfer and conference facilities in India to maintain proper telecommunication with satisfaction, except tertiary care centers [6-8]. However, all patients are trying to adapt due to accessibility, good technologies of smartphones with a virtual presence on WhatsApp and similar platforms [9, 10].

All health care providers must follow telemedicine guidelines, provided by WHO, Ministry of Health and Family Welfare (MOHF), medical council and renowned societies. The patient's privacy, the confidentiality of records, consent and smoothening of audio or video conversation is a very important aspect of this newer modality of communication.

**Role of telemedicine in various surgical conditions**

**(1) Diabetic foot infection**

All age groups of patients may affect by diabetes mellitus (DM). This Coronavirus disease 2019 (COVID 19) may have adverse features in the form of respiratory complications in DM patients. Current drug treatment of COVID 19 may have an adverse effect on known case diabetic patients [11, 12]. Diabetic foot disease is a neglected disease in all social-economic status patients, who have a history of chronic DM. These patients required strict blood sugar monitoring and aggressive medical as well as surgical management to prevent lower limb loss [7, 13].

**Table-1: Summarizing the potential effects of drugs/treatment options being used in the management of COVID-19 on glucose and lipid profiles [11].**

| | |
|---|---|
| 1 | Corticosteroids→→Anti-inflammatory, blocks cytokine storm →→Hyperglycemia →→Dyslipidemia (increase in TC, LDL, TG) |
| 2 | Lopinavir/Ritonavir →→Protease inhibitors, blocks viral cellular entry→→Lipodystrophy, Hyperglycemia→→Dyslipidemia (increase in TC, TG) |
| 3 | Darunavir/Cobicistat→→Protease inhibitors, blocks viral cellular entry→→Lipodystrophy, Hyperglycemia→→Dyslipidemia (increase in TC, TG) |
| 4 | Remdesivir →→Adenosine analogue, inhibits viral Replication →→Increased blood glucose →→Increased blood lipids seen in 6% of patients in remdesivir |
| 5 | Chloroquine/ Hydroxychloroquine →→Increases host cell endosomal pH, prevents viral entry and immunomodulatory →→Improves glucose profile and HbA1c in people with T2DM →→Improves lipid profile in people with T2DM (reduced TC, LDL, TG, variable effect on HDL) |
| 6 | Azithromycin→→ Macrolide antibiotic used with hydroxychloroquine, known to have invitro activity against Zika and Ebola virus, prevents severe respiratory tract infection in patients suffering from viral disease →→Risk of dysglycemia in people with diabetes mellitus →→No robust data, Being an enzyme inhibitor, may prolong half-life of statins |
| 7 | Convalescent plasma→→ Provides anti-SARS-CoV-2 antibodies→→probably no effects over hyperglycemia probably →→no effects over hyperlipedemia |
| 8 | Tocilizumab →→ Monoclonal antibody against IL-6, blocks cytokine storm→→Improves glucose profile and reduces HbA1c in people with rheumatoid arthritis and diabetes mellitus →→Alters lipid profile in people with rheumatoid arthritis (increase in TC, HDL, TG, no change in LDL) |
| | COVID-19: Novel coronavirus disease; TC: Total cholesterol; LDL: Low-density lipoprotein; TG: Triglycerides; HDL: High-density lipoproteins; T2DM: Type 2 diabetes mellitus; IL-6: Interleukin-6; SARS-CoV-2: Severe acute respiratory syndrome coronavirus 2. |

**2. Venous disorders**

COVID 19 patients have a higher probability of venous thromboembolism (VTE) and coagulopathy, hence synergistic life-threatening complications may affect the normal course of venous disorders. Those COVID-infected unstable patients must require a physical examination, higher imaging's and observation in the intensive care unit to prevent morbidity or mortality. [14-16]. Endothelial inflammation has triggered activation of procoagulant pathways and it leads to produce cytokines, coagulation factor activation in the liver. Elevated levels of D-dimer more than 1.5 µg/mL could be a reliable indicator for the diagnosis of thrombosis [14]. All patients with complicated varicosity in lower limbs are more prone to develops venous ulcers. A definitive surgery and care of local wounds can improve further limb threatening. The patients can not be examined on telemedicine consultation, which is very important for definitive diagnosis and adequate management. For example Doppler imaging has a significant role in deep vein thrombosis screening.

### 3. Breast cancer patients

The incidence of breast malignancy has not affected due to COVID 19, but management would be affected due to lockdown, hence few guidelines are proposed by oncological societies. European Society for Medical Oncology (ESMO) has recommended a guideline for intervention provided by all health care systems, who are dealing with cancer patients under defined three levels of treatment priorities (Table 2) [17].

**Table-2: ESMO guidelines for prioritization of intervention for breast cancer patients. [17]**

| **High priority (Physical consultation needed for examination )** | **Intermediate priority (May transfer to intermittent telemedicine consultation)** | **Low priority (Can be managed by tele-medicine consultation)** |
|---|---|---|
| Unstable postoperative complications like hematoma, surgical site infections. | Patients with uneventful postoperative period. | Established diagnosis with no issues with current management |
| Breast cancer with pregnancy | Newly diagnosed invasive breast cancer | Survivorship follow-up |
| Newly diagnosed invasive breast cancer who are prioritized by tumour board due to complicated tumour biology | | Family history of breast malignancy due to genetic mutation( BRCA carriers) |
| | | High risk of relapse |
| | | Psychological supports |

Early breast cancer patients may have an inconclusive diagnosis in biopsy due to inadequate sampling or techniques, advised through telemedicine OPD without physical examination. Hence, clinicians on first consultations should physically examine all breast lump patients under known risk factors. However, the first visits may not feasible for every breast lump patient during this pandemic lockdown due to strict government guidelines. ESMO recommended few guidelines for diagnostic investigations and imagings for breast lump patients (Table 3) [18].

**Table-3: ESMO guidelines for prioritization of diagnostic investigations and imaging's for breast lump patients [18]**

| **High priority** (Physical consultation required ) | **Intermediate priority** (May transfer to intermittent telemedicine consultation for validation) | **Low priority** (Can be advised by tele-medicine consultation) |
|---|---|---|
| Breast lump diagnosed during self-examination | Additional diagnostic or imaging's for BIRADS 4 grade in mammogram | Screening programme with mammography |
| Clinical features suggestive of malignancy | 2D-Echo before chemotherapy | Follow-up schedules for BIRADS 3 patients |
| Abnormal mammogram | Diagnostic intervention like image guided biopsy | Known case of early breast cancer for follow-up scan |
| Pathology assessment | Initial metastatic workup | |
| Asymptomatic metastatic relapse | | Follow-up workup for metastatic patients |

BIRADS- Breast Imaging-Reporting and Data System

### 4. Infective and malignant disease of gastro-intestinal tract

Patient's presenting with acute GI symptoms like recurrent vomiting, abdominal distention, bleeding per rectum, painful defecation needs detailed history and physical examination to rule out any malignancy or infective pathology. In chronic GI conditions like gastritis, uncomplicated mild pancreatitis & cholecystitis, appendicitis, piles, fissures, fistula and colitis, patient may be followed in virtual platform of consultation.

Few essential examinations and diagnostic procedures may help in definitive diagnosis like per-rectal examinations, proctoscopy and endoscopy. Chemotherapy protocol could be delayed for early malignancy in a days but patients counseling and satisfaction is essential to prevent psychological morbidity. Patient with diagnosis of liver abscess, splenomegaly, portal hypertension and subacute intestinal obstruction patients can be prioritized for intervention according to progression and severity of the disease [19, 20]. However, all GI malignancies in the acute or relapse phase should be managed in the emergency department with a physical presence.

### 5. General surgery patients

Many guidelines recommended for the selection of surgical patients in this COVID era. All guidelines following the priority of management according to triage and acute phase [21, 22] High-priority patients require surgery immediately to prevent life-threatening conditions like perforation peritonitis, necrotizing fasciitis, rupture liver abscess. Moderate priority patients have not a life-threatening condition but delaying beyond six weeks may affect overall outcomes like early malignancy, gallstones pancreatitis, diabetic foot's ulcer and dry gangrene. Low priority patients are those who are stable and can wait for surgeries till control of this pandemic like gall stones,

uncomplicated hernias, benign breast lump, lipoma and varicose veins. Telemedicine OPD consultations should have surgical disease prioritization according to these consensus guidelines. All high-priority patients are the candidates for emergency surgery or urgent interventions, hence physical consultation should be enforced. Moderate priority patients should be candidates for hybrid consultation within the month and low priority patients for telemedicine only until the pandemic acute phase is over [23, 24].

**6. Trauma patients**

All trauma patients are being managed via physical presence in emergency departments except few green triage category patients. These patients may be considered for follow-up in telemedicine OPD after discharge according to a clinical conditions like rib fractures, grade 1-3 solid organ injury, soft tissue injury, un-displaced closed fractures of long bones and minor head injury patients. However, all patients require to follow record with X-rays, imaging's and a few important hematological, biochemical and microbial investigations for clinical progress.

**Surgical training and medical education**

Medical students and residents are now turning toward this newer modality of clinical training. Although, they will adapt faster but they must know about limitations and triage systems on this virtual platform. Now they are presenting clinical cases very well with efficiency on video-based online platforms like Google Meet, Zoom meeting. However, surgical training may be affected due to the shutdown of elective surgeries in the COVID era.

**Benefits & limitations for telemedicine**

This paper summarizes the knowledge about COVID-19 and provides recommendations for the diagnosis and treatment of surgical diseases through telemedicine facilities according to priority. Also highlights the limitations and challenges for telemedicine consultation and benefits of patients during the course of the pandemic (Table 4 ) [25].

**Table-4: Benefits & limitations for telemedicine consultation during the course of the COVID 19 pandemic**

| Benefits | ←←Patients Clinicians→→ | Limitations |
|---|---|---|
| Time saving | | Technological issues |
| Easy accessibility | | Lack of physical examination |
| Social distancing | | Missed diagnosis |
| Triage | | Patient literacy |
| First aid | | Medicolegal issues |
| Refill prescriptions | TELE-MEDICINE | Prescription errors |
| Cost effective | | Prescription honor by chemist |
| Reduces overcrowding | | Confidentiality |
| Health education | | |

## CONCLUSION

The health care system required proper training for the improvement of this virtual platform of telemedicine consultation and video-based examination. A hybrid form of management can bridge between telemedicine and physical consultation to provide good and adequate surgical care. A multispecialty virtual meeting may also help in adequate and satisfactory telemedicine consultation for high-risk, comorbid, palliative surgical patients. Fewer limitations are needs to reconsider for a safe, assessable, adequate and convenient virtual platform like lack of good hospitality infrastructures, proper guidelines, medical education, online clinical training and adaptability. Triage of surgical patients in telemedicine OPD has a positive impact on the overall prognosis of patients with an acceptable risk of disease.

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