



# E-consensus on telemedicine in colorectal surgery: a RAND/UCLA-modified study

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## Abstract

Coronavirus disease 2019 (COVID-19) is revolutionizing healthcare delivery. The aim of the study was to reach consensus among experts on the possible applications of telemedicine in colorectal surgery. A group of 48 clinical practice recommendations (CPRs) was developed by a clinical guidance group based on coalescence of evidence and expert opinion. The Telemedicine in Colorectal Surgery Italian Working Group included 54 colorectal surgeons affiliated to the Italian Society of Colo-Rectal Surgery (SICCR) who were involved in the evaluation of the appropriateness of each CPR, based on published RAND/UCLA methodology, in two rounds. Stakeholders' median age was 44.5 (IQR 36–60) years, and 44 (81%) were males. Agreement was obtained on the applicability of telemonitoring and telemedicine for multidisciplinary pre-operative evaluation. The panel voted against the use of telemedicine for a first consultation. 15/48 statements deemed uncertain on round 1 and were re-elaborated and assessed by 51/54 (94%) panelists on round 2. Consensus was achieved in all but one statement concerning the cost of a teleconsultation. There was strong agreement on the usefulness of teleconsultation during follow-up of patients with diverticular disease after an in-person visit. This e-consensus provides the boundaries of telemedicine in colorectal surgery in Italy. Standardization of infrastructures and costs remains to be better elucidated.

**Keywords** COVID-19 · Telemedicine · Teleconsultation · Telehealth · RAND/UCLA · Colorectal

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## Introduction

The Coronavirus Disease 2019 (COVID-19) marked the start of a new era in many fields of medicine. Thousands of studies on COVID-19 epidemiology, diagnosis, treatment, control and impact on health resources have stormed the last year medical literature [1].

A recent survey of 1051 colorectal surgery divisions from 84 countries highlighted global changes in diagnostic and therapeutic colorectal cancer practices [2]. More than two thirds of respondents (71%) reported delays in endoscopy, radiology, surgery, histopathology, or prolonged chemoradiation therapy-to-surgery intervals. The worldwide suspended in-person elective clinical activities promoted a further increase in the use of internet and social media, yet well-known powerful tools to increase engagement and participation of patients with colorectal diseases [3].

Telemedicine (or telehealth) is the distribution of remote clinical services, including diagnosis, monitoring, and prescribing therapies by means of health-related services using information and communications technology [4].

In line with a recent consensus exercise defining the role of telemedicine in proctology [5], the aim of the present study was to reach a consensus on its application in the colorectal field for screening purposes, diagnosis, follow-up, and surgical decision-making.

## Methods

A literature search was performed using PubMed and evidence-based medicine reviews between January 1990 and September 2020. The search strategy included the following combination of terms: (colorectal) and (telemedicine or telehealth or teleconsultation).

After balancing clinical experience and common understanding of the evidence, group discussion led to shared judgments about recommendations for using telemedicine in colorectal practice. In the absence of data from Oxford level I–IV studies, the guided development group, composed of the steering committee and external advisors (see Acknowledgement section), produced a final list of clinical practice recommendations (CPRs). The group was responsible for the selection of the different topics to be incorporated, and items were finalized after discussion through e-mails and teleconferences.

Fifty-four experts (Telemedicine in Colorectal Surgery Italian Working Group, nominated by the Italian Society of Colorectal Surgery) on the basis of both previously published research and clinical experience in the field of colorectal practice, were invited to join the e-consensus. The consensus methodology was derived from the RAND/UCLA appropriateness method [6], an established approach previously used in the coloproctology field [5, 7].

Forty-eight CPRs were presented electronically using an online platform (“Online Surveys,” formerly Bristol Online Survey, developed by the University of Bristol) under 3 subheadings: “feasibility and pros/cons of telemedicine in colorectal surgery” ( $n = 14$  statements), “clinical application of telemedicine in colorectal surgery” ( $n = 13$  statements), and “legal and technical issues of a teleconsultation” ( $n = 21$  statements). For each item, the consensus panelists were asked, “Does this recommendation lead to an expected health benefit (e.g., improved patient experience and functional capacity) that exceeds the expected negative consequences of its introduction (e.g., increased morbidity, anxiety, or denial of an investigation or treatment)?”.

The responses to each recommendation used a linear analog scale from 1 to 9 to assess views on the benefit-to-harm ratio. Using this scale, a score of 1–3 indicated that they expected the harm of introducing the recommendation to greatly outweigh the expected benefits, and a score of 7–9 that the expected benefits to greatly outweigh the expected harm. A middle rating of 4–6 could mean either that the harm and benefits were considered approximately

equal or that the panelist was unable to make a judgment for the recommendation.

Responses were analyzed in accordance with the first phase of the RAND/UCLA guidance, with each recommendation classified as “appropriate,” “uncertain,” or “inappropriate,” according to the panelists’ median score and the level of disagreement. Indications with median scores in the range of 1–3 were classified as inappropriate, those in the range of 4–6 as uncertain, and those in the range of 7–9 as appropriate. “Disagreement” implied a lack of consensus because of polarization (defined as a  $> 17$  rating of the indication in each extreme for a sample of 53–55 panelists) [6]. All indications rated “with disagreement,” whatever the median, were classified as uncertain.

A second round of consensus was conducted to reduce variation using the same methodology. Only statements rated “uncertain” (i.e., panel median of 4–6 or any median with disagreement) were reviewed and resubmitted for voting.

Interrater agreement in each round of consensus was calculated by the Kappa statistic, which was interpreted according to the suggestions by Landis and Koch: Poor (Kappa, 0.01–0.20), slight (0.21–0.40), fair (0.41–0.60), moderate (0.61–0.80), and substantial (0.81–1.00) [8].

## Results

Fifty-four invited colorectal surgeons (male–female ratio, 4.4; median age, 44.5 [interquartile range limits, IQRL, 36–60]), members of the Italian Society of Colorectal Surgery (SICCR), agreed to join the first round of this e-consensus (response rate 100%). Overall agreement was poor (Kappa, 0.12; Suppl. Table 1).

### Feasibility and pros/cons of telemedicine in colorectal surgery

Eleven out of 14 (79%) proposed statements resulted appropriate. The percentage of agreement was  $\geq 75\%$  for 4 statements and 55–74% for 7 statements (Table 1).

The statements yielding the highest level of agreement assessed the applicability of telemonitoring (i.e., decision-making parameters and findings sent by patients to the surgeon for a prompt reassessment).

Two statements were deemed inappropriate. These concerned the exclusive use of the telemedicine during the pandemic and the possibility to perform a remote first consultation. One statement assessing the performance of post-surgical consultation remotely resulted uncertain.

**Table 1** Round 1—Clinical practice recommendations

Subheadings and clinical practice recommendations	Median score	Score distribution (N)			Decision
		≤3	4–6	≥7	
<i>Feasibility and pros/cons of telemedicine in colorectal surgery</i>					
1. The teleconsultation between the colorectal surgeon and the doctor who examined the patient is applicable in colorectal surgery	8	3	13	38	Appropriate
2. Telemonitoring (decision-making parameters sent by the patient to the surgeon for a rapid reevaluation) is applicable in colorectal surgery	8	2	8	44	Appropriate
3. Telemedicine and its potentials are only suitable during the COVID-19 pandemic	3	31	10	13	Inappropriate
4. At least 3–5 years of clinical experience in colorectal surgery is required to perform remote teleconsultations	8	6	13	35	Appropriate
5. A training on how to use the platforms and computer systems to support telemedicine is essential, regardless of the clinical experience of the colorectal surgeon	8	2	12	40	Appropriate
6. A training on how to perform a teleconsultation is needed, regardless of the clinical experience of the colorectal surgeon	7	3	18	33	Appropriate
7. Only a colorectal surgeon should perform a teleconsultation in the field of colorectal surgery	8	4	6	44	Appropriate
8. The first colorectal consultation can be performed via remote support	3	31	14	9	Inappropriate
9. Further consultations in colorectal surgery (excluding post-operative follow-up) can be performed via remote support	7	6	17	31	Appropriate
10. Post-surgical colorectal consultations can be performed via remote support	4.5	21	16	17	Uncertain
11. Telemedicine can ease the management of patients with colorectal diseases requiring surgery during the pandemic	7	7	11	36	Appropriate
12. Telemedicine, combined with conventional outpatient activity, can lead to a reduction in waiting times	8	5	12	37	Appropriate
13. A pre-interview via teleconsultation is useful before the conventional consultation	8	3	9	42	Appropriate
14. Telemedicine allows to reduce distances between geographically distant areas	9	0	3	41	Appropriate
<i>Clinical application of telemedicine in colorectal surgery</i>					
15. Teleconsultation in colorectal surgery is applicable for the diagnosis and subsequent management of oncological diseases	5	18	17	19	Uncertain
16. Teleconsultation in colorectal surgery is applicable for the diagnosis and subsequent management of diverticular disease	6	15	16	23	Uncertain
17. Teleconsultation in colorectal surgery is applicable for the diagnosis and subsequent management of inflammatory bowel diseases	5.5	16	15	23	Uncertain
18. Teleconsultation is applicable in the management of patients with colostomy/ileostomy	6.5	13	14	27	Appropriate
19. Teleconsultation could increase the number of missed or wrong diagnoses for benign diseases in colorectal surgery	7	11	11	32	Appropriate
20. Teleconsultation could increase the number of missed or wrong diagnoses for malignant diseases in colorectal surgery	7	12	12	30	Appropriate
21. Teleconsultation is useful to stratify patients according to the level of urgency and decide whether they should undergo a conventional outpatient consultation	8	2	5	47	Appropriate
22. The medical history collected during a teleconsultation is comparable to that collected during a conventional consultation	8	3	6	45	Appropriate
23. Telemedicine is a useful tool to perform pre-operative assessment	8	5	6	43	Appropriate
24. Telemedicine is a useful tool for multidisciplinary pre-operative evaluation of colorectal cancer patients (teleconference between surgeon, oncologist, radiologist, radiotherapist, specialist nurse, etc.)	8	0	6	48	Appropriate
25. Telemedicine is a useful tool for pre-operative anesthesiologic evaluation of patients undergoing colorectal surgery	7	10	15	29	Appropriate
26. Teleconsultation can be a useful tool to obtain the informed consent before surgery	7	13	5	36	Appropriate
27. Surgery can be planned after a teleconsultation	4	22	16	16	Uncertain
<i>Legal and technical issues of a teleconsultation</i>					
28. Teleconsultation has the same value of a conventional consultation and should, therefore, be regularly remunerated	7.5	5	11	38	Appropriate
29. Teleconsultation should have the same cost of a conventional consultation	5	18	20	16	Uncertain

**Table 1** (continued)

Subheadings and clinical practice recommendations	Median score	Score distribution ( <i>N</i> )			Decision
		≤3	4–6	≥7	
30. The number of patients lost to scheduled outpatient control after a teleconsultation can be worrying	7	8	14	32	Appropriate
31. Appropriate informed consent should be obtained by patients before the teleconsultation	8.5	4	5	45	Appropriate
32. Outpatient evaluation is always needed after a teleconsultation	7.5	7	12	35	Appropriate
33. Outpatient evaluation is always needed after a teleconsultation and before surgery	9	3	3	48	Appropriate
34. The intervening period between two teleconsultations should be shorter than that between two conventional consultations	7	8	14	32	Appropriate
35. Performing a teleconsultation by a video support is recommended (e.g., video call is superior to voice call)	9	0	4	50	Appropriate
36. Social media can be used for video calls (e.g., Apple Facetime, Facebook Messenger or Whatsapp, Zoom, Google Hangouts video, Skype)	5	18	19	17	Uncertain
37. The use of dedicated platforms for video calls (not including social media) is needed	8	5	9	40	Appropriate
38. Telemedicine requires the use of dedicated platforms allowing to share imaging files (CT scan, MRI, etc.)	9	0	6	48	Appropriate
39. A “key-contact” person should be identified as a facilitator when the patient is not able to use the platforms needed for a teleconsultation	8	1	3	50	Appropriate
40. In case of technical issues during a video call, teleconsultation can be completed by a phone call	6.5	10	17	27	Uncertain
41. After a teleconsultation, prescriptions and advices should be sent by e-mail with an attached report similar to that issued after a conventional consultation	8	3	6	45	Appropriate
42. The use of a wide screen (laptop or PC-monitor) should be preferred to a smartphone screen during the teleconsultation	8	3	8	43	Appropriate
43. The use of a Full-HD or 4 K vision screen is recommended during the teleconsultation	7	13	13	28	Appropriate
44. Upon patient’s consent, it is recommended to record the teleconsultation	8	5	7	42	Appropriate
45. Photos/videos sent by the patient during a teleconsultation are helpful to the colorectal surgeon	8.5	1	3	50	Appropriate
46. All tertiary centers of colorectal surgery should have a teleconsultation system	8	3	2	49	Appropriate
47. A teleconsultation should carry the same professional responsibilities and insurance policy of a conventional consultation	8	3	9	42	Appropriate
48. Telemedicine sessions, supported by the preliminary clinical assessments, should not last more than 30 min	8	9	3	42	Appropriate

### Clinical application of telemedicine in colorectal surgery

Four statements were uncertain, with level of agreement ranging between 35 and 43% (Table 1). The uncertain statements explored the use of teleconsultation for diagnosis and decision-making in patients with oncological, diverticular and inflammatory bowel diseases (IBD).

All the other statements resulted appropriate with agreement yielding 75% and above for 4 statements and 50–74% for 5 statements.

The panel strongly agreed with the usefulness of the telemedicine for multidisciplinary pre-operative evaluation of colorectal cancer patients.

### Legal and technical issues of a teleconsultation

Eighteen statements resulted appropriate, while 3 were uncertain (Table 1). Level of agreement was ≥ 75% for 12 (57%) statements. The highest concerned the need of a video support allowing to share photos/videos during the teleconsultation and the need of a “key-contact” as a facilitator whenever the patient is unable to use electronic platforms.

The uncertain statement dealt with the cost of a teleconsultation as compared to a conventional visit, the use of social media as a tool for video calls, and the need of a phone call in the instance of technical problems during a teleconsultation.

## Second round

Fifty-one experts (response rate, 94%) took part to the second round. The median age was 43.5 years (IQR 35.7–60) and ten (20%) were females. Levels of agreement were similar to round 1 (Suppl. Table 1).

The fifteen statements resulting uncertain on round 1 were rephrased. Consensus was achieved in all but one statement (median, 4) concerning the cost of a teleconsultation, which should be 50% lower than a conventional visit (Table 2).

Further two statements exploring the cost of a teleconsultation and its potential to replace a conventional visit, were deemed inappropriate. A total of 13 statements were found appropriate, with the highest agreement (86%) obtained by the statement regarding the usefulness of the teleconsultation during follow-up of patients with diverticular disease after a conventional visit.

## Discussion

Besides its devastating sequelae, COVID-19 pandemic has led to several ground-breaking innovations to improve patient and provider safety. Telemedicine is certainly one of them. As expressed by Watson, the integration of telemedicine into everyday clinical practice is similar to the transition from open to laparoscopic surgery, which made surgeons ‘pioneers in health care cultural change’ [9].

According to our panel, telemedicine can ease the management of colorectal diseases and its usefulness is likely to continue beyond the pandemic, with the potential to reduce waiting times in health services.

The panel voted against the use of telemedicine as first colorectal consultation or in the surgical decision-making process. Indeed, an outpatient evaluation was deemed appropriate to plan the correct surgical treatment according to the experts. In a previous consensus exercise defining the role of telemedicine in proctology [5], the majority of respondents (35/47 [74%]) recommended an in-person assessment to avoid cancer misdiagnosis. Indeed, the study highlighted poor acceptability of telemedicine as first-line

**Table 2** Round 2—Clinical practice recommendations

Clinical practice recommendations	Median score	Score distribution (N)			Decision
		≤3	4–6	≥7	
1. The teleconsultation can be widely applied even as a complementary tool, in the field of colorectal surgery	8	3	8	40	Appropriate
2. The teleconsultation can be used instead of a conventional consultation in colorectal surgery	3	28	13	10	Inappropriate
3. The teleconsultation should cost less than 50% of a conventional consultation	4	25	13	13	Uncertain
4. The teleconsultation should cost more than 50% of a conventional consultation	3	30	6	15	Inappropriate
5. Surgery can be scheduled by teleconsultation after considering the pre-operative examinations (including diagnostic assessment) requested during a first conventional consultation	7	11	7	33	Appropriate
6. The teleconsultation can be used for diagnosing colorectal cancer if patients have already performed preliminary examinations such as colonoscopy and/or CT-scan	7	14	7	30	Appropriate
7. The teleconsultation can be used for follow-up of CRC patients after a conventional examination	8	2	6	43	Appropriate
8. The teleconsultation can be used for diagnosing IBD if patients have already performed preliminary examinations such as MRI, dosage of fecal calprotectin and colonoscopy	7	14	9	28	Appropriate
9. The teleconsultation can be used for follow-up of IBD patients after a conventional consultation	8	5	4	42	Appropriate
10. The teleconsultation can be used for diagnosing diverticular disease if a colonoscopy has already been performed	7	13	6	32	Appropriate
11. The teleconsultation can be used for follow-up of patients with diverticular disease after a conventional examination	8	5	2	44	Appropriate
12. The teleconsultation can be used for follow-up of patients affected by colorectal diseases requiring multidisciplinary team discussion (e.g., cancer, IBD)	8	7	4	40	Appropriate
13. The use of social video-call platforms is not recommended for a teleconsultation	7	13	8	30	Appropriate
14. The use of social video-call platforms should be used in the private setting, while hospital-certified platforms are recommended in the public sector	8	12	5	34	Appropriate
15. General practitioners can book patients for a teleconsultation in colorectal surgery	8	6	6	39	Appropriate

assessment for the majority of proctologic disorders except for the diagnosis and management of pilonidal disease and ostomy patients. Conversely, teleconsultation was deemed appropriate for screening, pre-hospitalization and follow-up purposes.

In a recent quality improvement study evaluating patients' satisfaction prior to endoscopy [10], 138 patients underwent an advanced endoscopic pre-procedure consultation visits by three different modalities (telemedicine [26%], traditional in-person visits [21%], or a direct access procedure [52%]). The authors failed to demonstrate any statistically significant differences between these groups. However, patients with a *de novo* diagnosis of gastrointestinal cancer and attending a telemedicine visit had a greater satisfaction level in comparison to a direct access procedure. These results were consistent with the present study, where teleconsultation was considered appropriate for medical history collection, pre-hospitalization and interview preceding a conventional visit.

Moreover, teleconsultation was not recommended for the diagnosis and management of diverticular disease, IBD, and oncological diseases, given the high risk of misdiagnosis. Conversely, it was recommended in the management of stoma patients, in line with the results of a previous randomized controlled trial [11].

The intervening period between two teleconsultations should be shorter than that between two conventional consultations, due to the fear of a misdiagnosis that might cause significant treatment delays. For the same reason, the panel considered teleconsultation appropriate for IBD, oncological and diverticular diseases only after performance of second-line imaging modalities, colonoscopy and dosage of fecal calprotectin.

A recent survey including 374 cancer patients and 14 physicians pointed out that the majority of both patients (63.1%) and physicians (64.1%) preferred a complete in-person assessment, even if remote visits may prevent the risk of contagion [12].

Recently, Ruf et al. [13] showed the effectiveness of telehealth care through a combined setup of videoconferencing appointments attended by 88 IBD patients, with only 0.9% of visits requiring urgent medical evaluation and a non-attending rate of 2.6%. In particular, the authors demonstrated the time and cost-saving potential of telemedicine in remote/rural areas.

Further advantages were reported by Sellars et al. [14], showing that video consultation saved 6.685 traveled miles, 148 h traveling time and £1767 cost as well as a carbon dioxide emission exceeding 250.000 charges of a smartphone. Interestingly, the panel strongly agreed on the potential of telemedicine to reduce distances between geographically distant areas.

In line with previous recommendations [15–17], telemedicine was felt strongly appropriate for multi-decisional team

meetings. In particular, being the collaboration between specialists the cornerstone of cancer treatment, telemedicine can contribute overcoming some barriers that often limit its effectiveness (e.g., increased productivity, remote reporting, and reduced travel costs).

Interestingly, agreement was not reached regarding the cost of a teleconsultation compared to an in-person assessment. In this context, none of the proposed statements were deemed appropriate. The lack of long-standing experience in telehealth care among the panelists may partly explain this finding.

Our study has some limitations. The exact role of telemedicine in colorectal practice remains to be established. However, the agreed goal was to lay the foundation for understanding and preventing harm caused by its reckless use. Despite being selected upon their publication track record in the colorectal field, participants' overall experience with telemedicine was scarce at the time of consensus. Hence, judgments may have reflected a more skeptical view concerning the applicability of telemedicine to a specialty where objective examination is sacrosanct. The good balance of older and younger generations among panelists could have helped to mitigate the selection bias at the cost of low levels of agreement.

## Conclusion

The tragedy of the pandemic has prompted our recognition and understanding of telemedicine's importance. This e-consensus may support healthcare stakeholders in planning structural interventions for the future. It is advisable that all tertiary colorectal centers should have a teleconsultation system. Standardization of infrastructures and costs remain to be better elucidated.

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## Declarations

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical approval** This article does not contain any studies with human participants or animals performed by any of the authors.

**Informed consent** For this type of study formal consent is not required.

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