



# Change in practice in gynecologic oncology during the COVID-19 pandemic: a social media survey

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## HIGHLIGHTS

- Respondents to a survey, distributed online via social media, were from 49 different countries covering all continents.
- A total of 97.3% of respondents reported that COVID-19 affected/changed their clinical practice.
- From 16.5% to 25.5% of respondents were not performing any triage of patients for COVID-19 status.

## ABSTRACT

**Objective** COVID-19 has affected gynecologic cancer management. The goal of this survey was to evaluate changes that occurred in gynecologic oncology practice during the COVID-19 pandemic.

**Methods** A anonymous survey consisting of 33 questions (<https://sites.google.com/view/gyncacovidmartinelli>) regarding interaction between gynecologic cancers and COVID-19 was distributed online via social media from April 9 to April 30, 2020. Basic descriptive statistics were applied. Analytics of survey-diffusion and generated-interest (visualizations, engagement rates, response rate) were analyzed.

**Results** The survey received 20 836 visualizations, generating an average engagement rates by reach of 4.7%. The response rate was 30%. A total of 86% of respondents completed the survey, for a total of 187 physicians surveyed across 49 countries. The majority (143/187; 76%) were gynecologic oncologists, and most were ≤50 years old (146/187; 78%). A total of 49.7% (93/187) were facing the early phase of the COVID-19 pandemic, while 26.7% (50/187) and 23.5% (44/187) were in the peak and plateau phases, respectively. For 97.3% (182/187) of respondents COVID-19 affected or changed their respective clinical practice. Between 16% (27/165) (before surgery) and 25% (26/102) (before medical treatment) did not perform any tests to rule out COVID-19 infection among patients. The majority of respondents did not alter indications of treatment if patients were COVID-19-negative, while treatments were generally postponed in COVID-19-positive patients. Treatments were considered priority for: early stage high-risk uterine cancers (85/187; 45%), newly diagnosed epithelial ovarian cancer (76/187; 41%), and locally advanced cervical cancer (76/187; 41%). Treatment of early stage low-grade endometrioid endometrial cancer was deferred according to 49% (91/187) of respondents, with hormonal treatment as the option of therapy (31%; 56/178). A total of 77% (136/177) of respondents reported no changes in (surgical) treatment for early stage cervical cancer in COVID-19-negative patients, while treatment was postponed by 54% (96/177) of respondent, if the patient tested COVID-19-positive. Neoadjuvant chemotherapy for advanced ovarian cancers was considered by over one-third of respondents as well

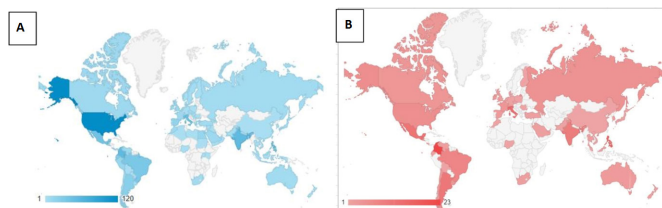
as hypofractionation of radiation treatment for locally advanced cervical cancers.

**Conclusion** COVID-19 affected the treatment of gynecologic cancers patients, both in terms of prioritization and identification of strategies to reduce hospital access and length of stay. Social media is a reliable tool to perform fast-tracking, worldwide surveys.

## INTRODUCTION

The COVID-19 pandemic has had an impacting effect on healthcare worldwide.<sup>1</sup> Since the first infection in Wuhan on November 17, 2019 there has been a rapid but variable diffusion of the virus among countries.<sup>2</sup> This has led to a reassignment of available resources<sup>3</sup> that varied throughout the world and has changed according to the phase of the pandemic. Medical societies issued guidelines and web resources that are continuously evolving.<sup>4–7</sup> One of the main issues was to define prioritization criteria of treatment to spare/divert (to COVID-19 care) resources without compromising treatments. Reducing hospital access and stay was also another concern. For cancer patients, non-surgical treatments were considered; reduction of surgical aggressiveness was taken into account to preserve resources and reduce hospital stay. Deferring treatments up to 6–8 weeks was also considered. Treatments plans were modified such as hypofractionation for radiation therapy, and completion of six cycles of chemotherapy instead of interval debulking surgery for ovarian cancer. Telemedicine or telephone consultations were implemented.<sup>4–8</sup>

A survey was developed with the aim to evaluate changes that occurred in the management of gynecological cancer patients during the COVID-19 pandemic. The survey was administered via social media.<sup>9 10</sup> Few data regarding physicians' attitudes towards a social media-based survey have been reported to date,<sup>11 12</sup> and this was our secondary endpoint.



**Figure 1** (A) Places in the world where people accessed the introductory page of the survey. (B) Countries where the respondents practice.

## METHODS

A survey consisting of 33 questions (online supplementary material – Survey COVID GynCa) was created using a freely available online survey tool (Google Docs<sup>®</sup> [https://docs.google.com/forms/d/e/1FAIpQLSctyp3GNiHvhxizq-WP9i1DDEp5bCSL7KbZdiwy0mj96CH6g/viewform?usp=sf\\_link](https://docs.google.com/forms/d/e/1FAIpQLSctyp3GNiHvhxizq-WP9i1DDEp5bCSL7KbZdiwy0mj96CH6g/viewform?usp=sf_link)). The survey was structured to capture general anonymous data of respondents, data on COVID-19 triaging methods, and data on gynecologic cancer (uterine, ovarian, cervical and vulvar cancers) management during the pandemic. There were only two required questions (question 31 and 33), and it was up to the respondents to choose whether or not to answer any of the other questions within the survey; thus each question was not necessarily answered by all respondents.

The percentages were counted from those who answered a certain question and not from the entire cohort (the denominator was the number of respondents to each single question). Moreover, several questions allowed multiple options to be selected. Questions were created on the basis of major topics covered by societies' recommendations/guidelines proposed to address COVID-19, but they were not formally validated. A pre-test was performed on a group of 10 gynecologic oncologists to evaluate fluency and limits of the survey, and corrections were performed accordingly. An introductory page describing the target of the survey and including the Google Docs hyperlink was created (Google Sites<sup>®</sup> <https://sites.google.com/view/gyncacovidmartinelli>) to screen for respondents (gynecologic oncologists, medical oncologists, and radiation oncologists managing gynecologic cancer patients). This last page was also linked to Google Analytics<sup>®</sup> to estimate the number of people potentially interested in the topic (used as the denominator to calculate the response rate). The hyperlink was unique and ensured the total anonymity of the respondents, unless they decided to be acknowledged (see acknowledge section) (optional questions 34–38).

On April 9, 2020 the Google Sites hyperlink was first launched on social media (Twitter<sup>®</sup> [DrFMartinelli] and Facebook<sup>®</sup> medical groups). In the following days four recalls were done and 78 emails were sent to gynecologic, medical and radiation oncologists across the globe, in areas not yet reached by Twitter and Facebook posts (as per Google Analytics<sup>®</sup> data). The survey was closed on April 30, 2020, as pre-planned, based on the majority of governments' plans to ease restrictions, starting from May 2020.

Evaluation of attitudes of physicians towards the use of social media for professional purposes is not standardized.<sup>11 12</sup> An indirect evaluation could be carried out on the basis of usage intention of a new tool.<sup>13</sup> The snowball effect generated (visualizations),<sup>14</sup> engagements, response rate to the survey, and the percentage of

respondents who identified themselves were therefore analyzed.<sup>15</sup> Engagement rate by reach/posts measures the percentage of people who chose to interact with content after seeing it and is calculated by dividing the sum of interactions (likes, comments+saves, re-tweet) on posts by the amount of reach/followers of the post. On average the engagement rate by reach is: <0.5% for 36% of Twitter users; 0.5–1% for 16% of Twitter users; 1–2% for 21% of Twitter users; and >2% for 27% of Twitter users. Engagement rate by posts between 0–2%, 2–9%, 9–33%, and 33–100% is considered to be low, good, high, and very high, respectively.<sup>16</sup>

## Statistical Analysis

Descriptive statistics in terms of frequency and percentage were used to analyze the results of this study. Comparisons among respondents were evaluated with the Fisher exact test or  $\chi^2$  test when appropriate. P values <0.05 were considered statistically significant. Statistical analysis was performed with Statistical Package for the Social Sciences (SPSS) 18.0 software. In accordance with the journal's guidelines, we will provide our data for the reproducibility of this study in other centers if requested.

## RESULTS

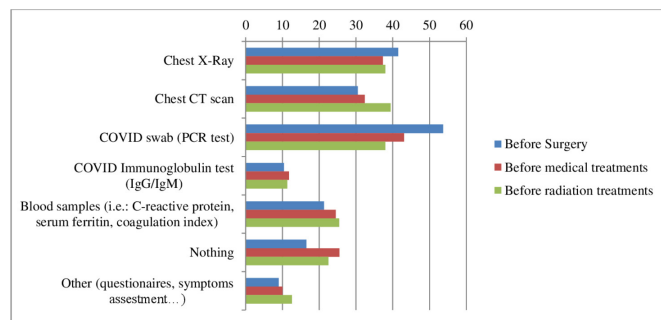
Tweets and Facebook posts received 20836 visualizations over a 3 week period. Average engagement rate by reach and by posts were 4.7% and 11.9%, respectively. People interested in the topic, who clicked on the survey link and accessed the presenting (Google Sites) page, totaled 722 distributed around the world (Figure 1A). Mobile phone access was the preferred way (85%) for responses. There were 217 respondents, accounting for 30% who read the presenting page of the survey. Among people who entered the survey, 187 (86%) completed it. Respondents were from 49 different countries (Figure 1B) covering all continents (except Antarctica).

## Overall Data

In total, 76.4% (143/187) of respondents were gynecological oncologists, 10.2% (19/187) were general gynecologists (Ob/Gyn), and the remaining 13.3% were medical/radiation/surgical oncologists (24) and one pathologist. A total of 78.1% (146/187) of respondents were ≤50 years old (online supplementary figure S1). The majority (65.2%, 122/187) were consultant/attending physicians and 19.8% (37/187) were heads of department. Places of work were equally distributed among general hospitals, cancer centers, and university hospitals. A total of 22% (41/186) of respondents worked in a COVID-free institution and 53.2% (99/186) stated that their hospital had structured paths for COVID-19-positive and COVID-19-negative patients. Nearly half (49.7%, 93/187) of respondents were facing the early phase of the COVID-19 pandemic, while 26.7% (50/187) and 23.5% (44/187) were in the peak and plateau phases, respectively. COVID-19 affected or changed clinical practice for 97.3% (182/187) of respondents, and 79.1% (148/187) needed to modify treatment according to available resources and patient life expectancy (no differences when stratifying for the pandemic phase and COVID-19-free/positive institutions).

## Surgery

The majority (88.2%, 165/187) of respondents managed surgical cases. The patients' COVID-19 status before surgery was evaluated



**Figure 2** Diagnostic tools used for the evaluation of patients' COVID-19 status before any treatment (percentage of usage). CT, computed tomography; Ig, immunoglobulin, PCR, polymerase chain reaction.

mainly with COVID-19 nasopharyngeal swabs (53.7%) and radiological assessments (chest X-ray 41.5%, chest computed tomography (CT) scan 30.5%). Only 16.5% of respondents did not perform any triage for COVID-19 before surgery (Figure 2). Analysis stratified according to the phase of the pandemic (early, peak, plateau) revealed a statistically significant use of at least one tool (vs none) ( $p=0.041$ ), chest X-ray ( $p=0.027$ ), and COVID-19 immunoglobulin test ( $p=0.01$ ) during the peak. Minimally invasive surgery was no longer performed by 30% (49/165) of respondents, and these were mainly in the early and peak phases of the pandemic ( $p=0.036$ ). A total of 18% (30/165) of respondents said that minimally invasive surgery was still performed without any changes, while the remaining 52% (86/165) were still doing minimally invasive surgery with some changes in the equipment and/or some restrictions of indications. Nearly all (98%, 161/165) of the respondents answered the question on sentinel node (Q15). The majority of respondents considered sentinel node mapping as a reliable tool to reduce invasiveness when nodal staging was indicated in endometrial (81%), vulvar (82%), and cervical cancer (75%), but not in ovarian cancer (74%), during the COVID-19 pandemic (online supplementary figure S2).

#### Medical Oncology

Over half (56.7%, 102/180) of the respondents managed medical (oncological) cases. Patients' COVID-19 status before medical treatment was evaluated mainly with COVID-19 nasopharyngeal swabs (43.1%) and radiological assessments (chest X-ray 37.3%, chest CT scan 32.4%). Only 25.5% of respondents did not perform any triage for COVID-19 before medical treatment (Figure 2). No significant differences among tools used for triage emerged, when stratified for the pandemic phase. A total of 27% of respondents reported no change in their practice, and 40% opted for drugs and schedules that reduced the need for hospital stay, with an increase of oral (hormonal, maintenance) treatments. Nearly 25% of respondents reported a reduction of indication for treatments other than first line, and 29% noted a reduced enrollment in clinical trials. Only 6% reported a suspension of immunotherapy-based treatments. Changes were not affected by the pandemic phase.

#### Radiation Oncology

A total of 40.4% (72/178) of respondents managed patients requiring radiation treatments. Patients' COVID-19 status before radiation treatments was evaluated equally with COVID-19 nasopharyngeal

swabs (38%) and radiological assessments (chest X-ray 38%, chest CT scan 39.4%). Only 22.5% of respondents did not perform any triage for COVID-19 before radiation treatment (Figure 2). However, all respondents performed at least one evaluation to rule out COVID-19 infection during the plateau phase ( $p=0.018$ ). Among 70 respondents regarding radiation treatments, 45.7% reported no significant changes, 42.9% described an increased use of hypofractionation to reduce hospital admissions, and 24.3% noticed an increase in radiation treatment indications. There were no differences across the pandemic phase.

#### Cancer Specific Management

Regarding management of specific tumors, the majority of respondents did not alter indications of treatment if patients tested negative for COVID-19, while treatments were generally postponed in COVID-19-positive women (Figure 3 and online supplementary figure S3).

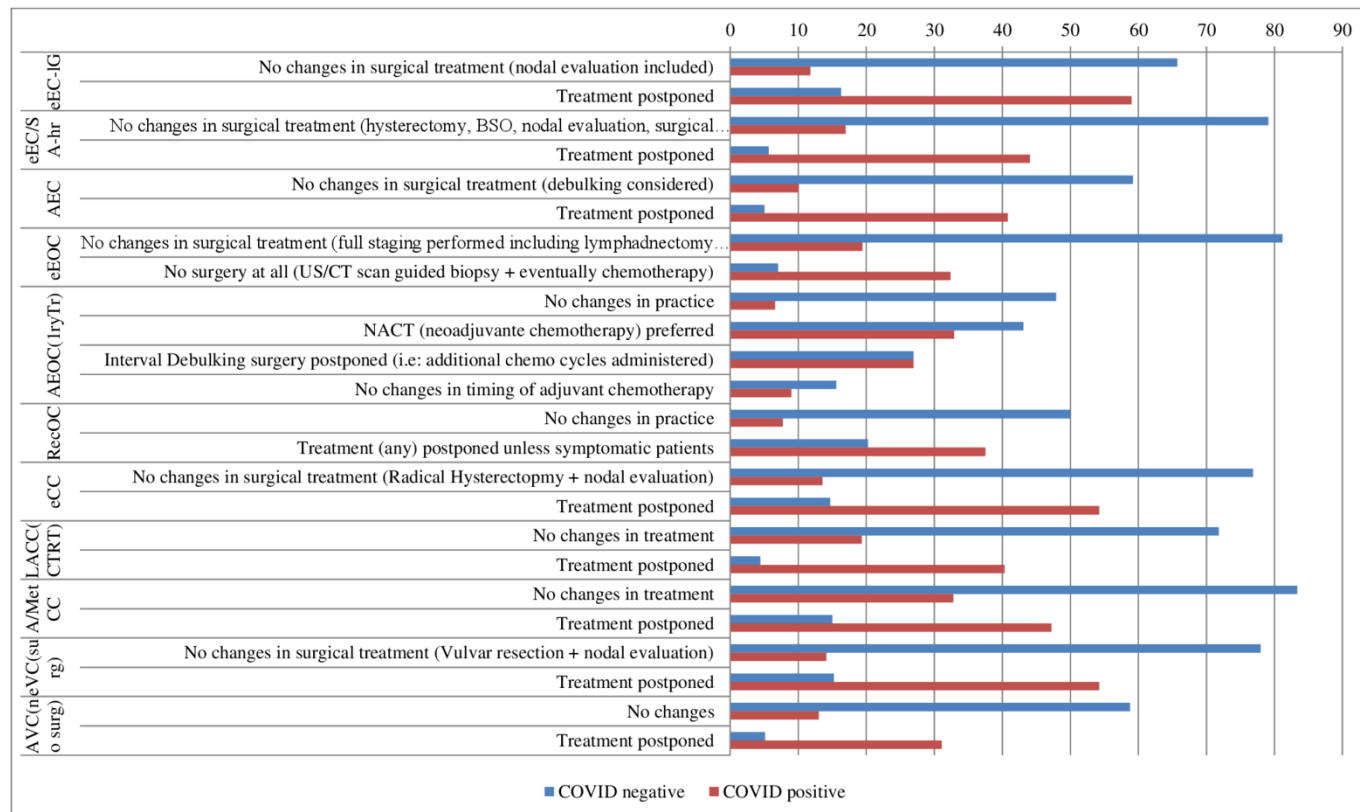
##### Uterine Cancer

Approach to uterine cancer: management of early stage low-grade endometrioid endometrial cancer, early stage high-risk endometrial cancer/ sarcoma, and advanced stage endometrial cancer remained primarily surgical in COVID-19-negative women according to 65%, 79%, and 59% of respondents, respectively. Hormonal treatment for early stage low-grade endometrioid endometrial cancer was considered by 31% and 19% of respondents in COVID-positive and COVID-negative patients, respectively. A total of 33% of respondents considered giving chemotherapy without surgical staging in advanced endometrial cancers either in COVID-19-positive or COVID-19-negative patients. Treatment was considered deferrable in 59%, 44%, and 41% of COVID-19-positive patients with early stage low-grade endometrioid endometrial cancer, early stage high-risk endometrial cancer/sarcoma, and advanced stage endometrial cancer, respectively (online supplementary figure S3A-C).

##### Epithelial Ovarian Cancer

Early stage epithelial ovarian cancer COVID-19-negative patients were considered for full staging by 81% of respondents (19% if COVID-positive). Conversely, surgery (either with a staging or diagnostic) was not considered in 41% of COVID-19-positive women versus 8% if COVID-19-negative with early stage epithelial ovarian cancer (online supplementary figure S3D). Regarding advanced stage epithelial ovarian cancers, for 48% of respondents there were no changes in the primary treatment among COVID-19-negative women, while only 7% agreed the same among COVID-19-positive patients. However, neoadjuvant chemotherapy was preferred by 43% and 33% of respondents among COVID-negative and COVID-positive patients, respectively. A total of 27% of respondents considered postponing interval debulking surgery (ie, additional chemotherapy cycles) regardless of COVID-19 status. Adjuvant chemotherapy was considered deferrable in 20% of COVID-positive patients versus 7% of COVID-negative patients (online supplementary figure S3E). Concerning oligometastatic relapsed (disease-free interval >24 months) ovarian cancer, 50% of respondents did not change their therapeutic approach if patients tested negative for COVID-19, while, if COVID-19-positive, only 8% of respondents did not modify their approach. Surgery for recurrent disease (with either diagnostic or cytoreductive intent) was considered in





**Figure 3** Changes in treatments according to COVID status (percentages of respondents). eEC-IG, early stage low grade endometrioid endometrial cancer; eEC/SA-hr, early stage high-risk (high grade, serous...) endometrial cancer and uterine sarcomas; AEC, advanced stage endometrial cancer; eEOC, early stage epithelial ovarian cancer; AEOC(1ryTr), advanced stage epithelial ovarian cancer (primary treatment); RecOC, relapsed ovarian cancer (oligometastatic, DFI >24 months); eCC, early stage cervical cancer; LACC(CTRT), locally advanced cervical cancer (chemo-radiation); A/MetCC, advanced/metastatic cervical cancer; eVC(surg), early stages vulvar cancer (surgically resectable); AVC(no surg), advanced stages vulvar cancer (not amenable of surgical treatment); BSO, bilateral salpingo-oophorectomy; US, ultrasound.

26% of COVID-19-negative patients and in only 6% of COVID-19-positive women. Treatments (any) were considered deferrable, unless patients were symptomatic, by 20% and 37% of respondents among COVID-19-negative and COVID-19-positive patients, respectively (online supplementary figure S3F).

#### Cervical Cancer

For 77% of respondents there were no changes in the treatment of early stage cervical cancer COVID-19-negative patients (radical hysterectomy and nodal evaluation). If patients tested positive for COVID-19 the planned surgical treatment was continued by only 13% of respondents. If patients were COVID-19-positive, treatment was deferred by 54% of respondents versus 15% of respondents if COVID-19-negative (online supplementary figure S3G). Similar figures were reported for locally advanced cervical cancer patients (chemo-radiation as primary treatment). The majority (72%) of respondents reported no changes in indications among COVID-19-negative patients versus 19% of respondents in COVID-19-positive patients. Only 4% of respondents considered postponing treatment in COVID-19-negative patients versus 40% in COVID-19-positive patients. Change in the schedule of radiation treatments (ie, hypofractionation) was considered by 40% of respondents (online supplementary figure S3H). For advanced/metastatic cervical cancer there were no changes in treatment among COVID-19-negative patients

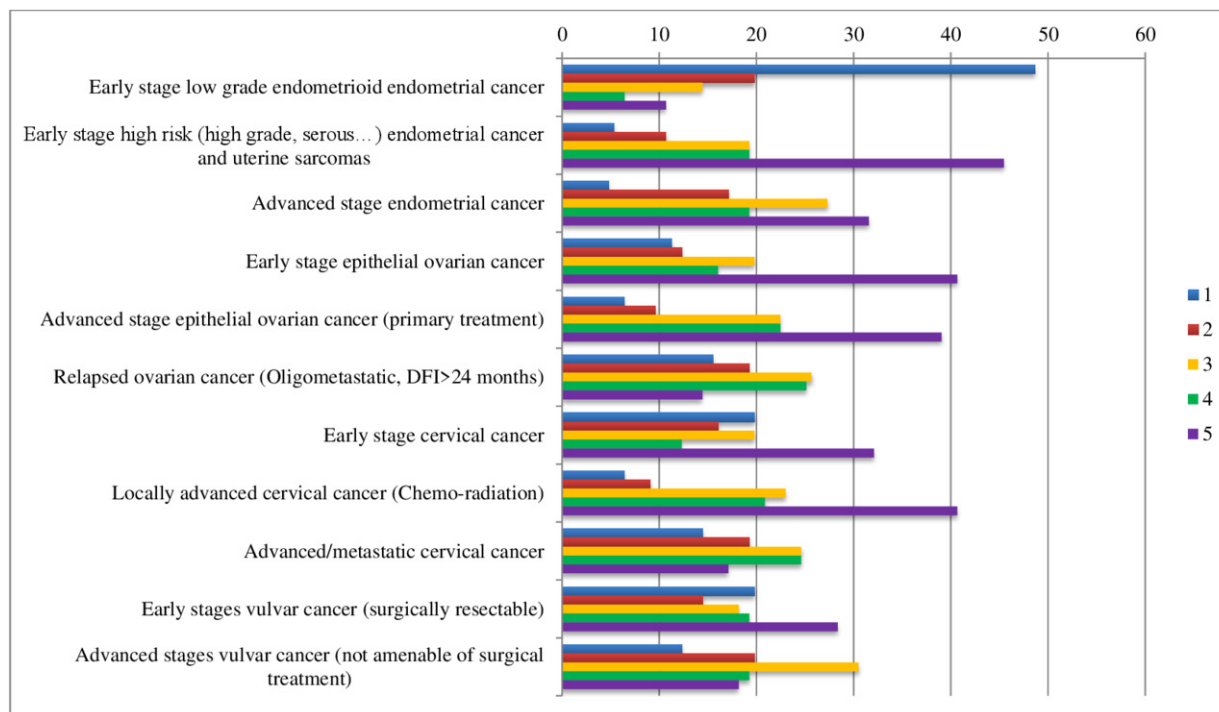
for 83% of respondents versus 15% if COVID-19-positive. Treatment was postponed according to 47% and 15% of respondents among COVID-19-positive and COVID-19-negative patients, respectively. (online supplementary figure S3I)

#### Vulvar Cancer

Early stage resectable vulvar cancers were considered for surgery by 78% of respondents, if COVID-19-negative; otherwise, if COVID-19-positive, treatment was considered deferrable by 54% of respondents (online supplementary figure S3J). Regarding advanced stage vulvar cancer (not amenable to surgical treatment), between 42% (if COVID-19-negative patients) to 46% (if COVID-19-positive patients) of respondents planned treatment according to available resources and patients' life expectancy. If patients tested negative for COVID-19, there were no changes in treatments according to 59% of respondents (online supplementary figure S3K).

#### Perceived Need For Treatment (187 Respondents)

Regarding the perceived priority of the need to treat, in case of low resource availability, early stage endometrioid endometrial cancer was the tumor for which treatment could be postponed according to 49% of respondents. In contrast, the majority of respondents considered early stage high-risk endometrial cancer and uterine sarcomas (45%), early stage epithelial ovarian



**Figure 4** Perceived priority of the need to treat, in case of low resource availability (1, low priority/treatment may be postponed; 5, high priority/better not to postpone treatment) (percentages of respondents). DFI, disease-free interval.

cancer (41%), advanced stage epithelial ovarian cancer (primary treatment) (39%), and locally advanced cervical cancer (chemo-radiation) (41%), as high priority cancers for which it was better not to postpone treatment (Figure 4). Figures were superimposable also after stratification according to institutions (COVID-19-free vs not) and the COVID-19 pandemic phase (early, peak, plateau), except for advanced/metastatic cervical cancer that gained priority in the plateau phase ( $p=0.017$ ). Finally, regarding follow-up of patients, more than half (59%) of respondents considered it was adequate to postpone visits, unless there was evidence of relapses, and to use telemedicine (60%) or phone triage (54%) with the aim of avoiding hospital access to patients (online supplementary figure S4).

## DISCUSSION

Results of this survey offer two primary sources of information, one regarding the clinical impact of COVID-19 on gynecological cancer management, and the other regarding the role of social media in medical surveys. The COVID-19 pandemic has modified and will probably continue to modify the treatment of cancer patients moving forward.<sup>3–8</sup> This survey captured information over a 3 week period, covering five continents, along three different phases of the pandemic. A total of 97.3% of respondents reported that COVID-19 affected/changed their clinical practice. Nonetheless, management of COVID-19 was quite heterogeneous. No standard work-up for gynecologic cancer patients, with respect to COVID-19 status, was reported. Interestingly, 16.5–25.5% of respondents were not performing any triage of patients for COVID-19 status. These aspects prompt questions regarding the preparedness in facing such a pandemic, but availability/shortages of resources need also to be taken into account. Fortunately 75% of respondents

worked in COVID-free hospitals or where COVID-19-positive and COVID-19-negative patients had different paths. Globally, surgical practice (30% no longer performed laparoscopy), medical oncology (30–40% changes in chemotherapeutic schedules or indications), and radiation oncology (24% noticed an increase of indications) were impacted by COVID-19.

Early stage low-grade endometrioid endometrial cancer was considered a low priority by 49% of respondents. Hormone therapy was considered an alternative treatment or a time-gaining method (with curative intent) by up to 31% of respondents. However, some can argue that the accuracy of pre-operative (or non-surgical) staging is not as high to consider “safely” postponing the treatment of a curable cancer.<sup>16 17 18</sup> Conversely treatments of early stage high-risk endometrial cancer and uterine sarcomas were considered non-deferrable (45% of respondents) with sentinel node mapping a reliable tool for nodal staging (69% of respondents). Laparoscopy could be used without issues if adequate personal protective equipment and adequate changes in technical aspects were applied<sup>7</sup>; however, up to 30% of respondents reported not using minimally invasive surgery in this period.

Epithelial ovarian cancer was considered a high-priority cancer (40% of respondents). In early stages, full staging (including lymphadenectomy when indicated) should be performed according to 81% of respondents in COVID-19-negative patients, but only according to 19% of respondents in COVID-19-positive patients. A total of 74% of respondents did not consider sentinel node procedure as a substitute for lymphadenectomy, but the role of nodal dissection is still under debate.<sup>19</sup> In advanced stages, more than one-third of respondents opted for neoadjuvant chemotherapy; however, 27% of respondents considered postponing interval debulking surgery. Only 7–9% of respondents considered performing a diagnostic laparoscopy in COVID-19-positive and COVID-19-negative patients,

## Original research

respectively. The exact sequence of treatments for primary advanced ovarian cancer is still a topic of debate.<sup>20,21</sup>

Cervical cancer (early/locally advanced) ranges among high-priority cancer according to 32% and 41% of respondents, respectively. Surgery remains the main treatment for early stages. Deferral of treatment was considered by 15% of respondents if patients tested negative for COVID-19, while the percentage rose to 54% of respondents in COVID-19-positive women. For locally advanced disease, changes in radiation schedules (hypofractionation) was considered by 40% of respondents, to reduce hospital admission or coupled with novel drugs.<sup>22</sup>

The COVID-19 pandemic has had a global impact on everyone and our lives have been changed. In a period of world lockdown, social media became a reliable tool to stay in contact with colleagues from around the world. With this survey we tried to evaluate through social media the impact of the COVID-19 pandemic on the field of gynecologic oncology. Diffusion of the survey was high and fast, with a snowball effect, generated by the medical community interactions, generating more than 20 000 visualizations in 3 weeks (nearly 1000 per day). Interest (average engagement rates by reach: 4.7%; and by posts: 11.9%) ranged among the highest percentages compared with the average social media communities' scores. Previously published surveys in gynecological oncology were mainly email based, with response rates ranging from 10–30% among prolonged (2–6 months) surveys.<sup>23–26</sup> In this survey, we received a similar response rate (30%) in a shorter time (3 weeks) which is interesting, taking into account that many physician were/are in the front-line or affected by COVID-19 and potentially less inclined to answer surveys. The majority of respondents (78%) were younger than 50 years old, and primarily had a "position" as attending consultant or head of department (85% of respondents), which is representative of 'real-world' clinical practice. More than half of respondents chose to identify themselves (acknowledge section). This is interesting, considering that one of the main causes of not answering a survey (email based) is lack of anonymity.<sup>14</sup> Here physicians decided to be involved and to be included in a network. Thus we can bring a new tool to create networking among physicians all over the world.

There are limitations of this survey. First, the hyperlink was unique and publicly available; there was no control over the possibility that the same person answered the survey multiple times (unless respondents identified themselves). However, this maintained the highest level of anonymity and the possibility of wide diffusion of the survey (re-tweet). In any event, after controlling for demographics (age, country, specialty, position, type of institution) there were 178/187 (95.2%) respondents identifiable as unique. Second, even if there were respondents from 49 different countries, they could not be representative of the global experience inside each country, due to intrinsic variability, according to COVID-19 pandemic diffusion. Third, the COVID-19 pandemic is a rapidly evolving situation. Therefore, practices are changing rapidly, and what has been registered at the time of response might soon be changed among respondents. Fourth, 22 of the 33 questions were multiple-answer questions. Although single-answer multiple choice questions would have been easier to analyze, multiple-answer questions capture the high heterogeneity of this daily changing situation according to the pandemic

phase. This strengthens the value of the most frequently selected answers (single-best-answer multiple choice questions). Fifth, cancer-specific treatments are not standardized (use of neoadjuvant chemotherapy vs primary debulking surgery for advanced ovarian cancer, type of nodal staging in uterine cancers, indication for primary surgery vs chemoradiation therapy for cervical cancer). This can impair the meaning of some responses, but has the advantage of capturing real-world practice.

The main strength of this survey was the ability to capture real-world daily practice among respondents across the world; furthermore, with a high engagement rate and a 30% response rate, social media could be considered a new tool for conducting surveys.

**Twitter** Fabio Martinelli @DrFMartinelli

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**Data availability statement** All data relevant to the study are included in the article or uploaded as supplementary information. Data are available upon reasonable request. Write to [fabio.martinelli@istitutotumori.mi.it](mailto:fabio.martinelli@istitutotumori.mi.it).

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