Review

Hysteroscopy in COVID-19 times

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Objective: The coronavirus disease 2019 (COVID-19) pandemic is a global public health concern. Health Care Facilities in every country have to deal with a complete reorganization of labor and delivery unit, and resource management. Aim of this review is to summarize the available literature data about the impact of COVID-19 on hysteroscopic surgery. *Mechanism*: A search on PubMed and Medline databases was performed until March 2021. *Findings in brief*: Most of evidence agree on complete cancellation of elective endoscopic gynecologic surgery, and on its deferring until the pandemic has been contained. When hysteroscopy is performed, precautions should be observed to prevent COVID-19 infection. *Conclusions*: We summarized all best practice to perform safe and effective hysteroscopic surgery in COVID-19 times and in the slow restore of normal activities.

Keywords

Hysteroscopy; Coronavirus; COVID-19; Hysteroscopic surgery

1. Background

The outbreak of a novel coronavirus isolated in Wuhan (China) in late 2019 (SARS-CoV-2), has fast raised clinical and public health issues of international significance and exceptional magnitude.

In early March 2020, the World Health Organization (WHO) declared the Coronavirus Disease 2019 (COVID-19) as a pandemic. That we are facing with a global public health emergency is just testified by dramatic data, with 126.1 million confirmed cases, and 2.8 million deaths, updated to the end of March 2021 [1].

The most common symptoms of COVID-19 include fever, cough, dyspnea, severe headache, loss of smell or taste, and fatigue. Less common symptoms include hemoptysis, diarrhea, and abdominal pain. In severe cases, bilateral interstitial pneumonia, arises, causing acute respiratory distress syndrome (ARDS), multiorgan failure and death.

While it is true that the virus is primarily spread through respiratory droplets, or by touching contaminated surfaces, an additional problem is the substantial risk of viral spread by asymptomatic individuals [2].

Governments, nations, and Health Care Facilities in every country have sought to address its impact, primarily by dealing with a complete reorganization of labor and resource management.

First of all, during the most critical COVID-19 phases, hospital systems, clinics, and communities prepared to meet increases in demand for the care of people with COVID-19, implementing strategies to mitigate spread of the virus and to maximize health care resources. Either complete or partial lockdown was arranged to reduce the viral transmission, and healthcare systems focused their resources to the management of patients infected by the Coronavirus [3].

This has been reflected also on routine surgical and medical activities, that dramatically dropped out as all the most important scientific organization agreed on urgent suspension of elective surgery for benign conditions, considering alternative medical treatment approaches to minimize suffering and keep people away from hospitals. In fact, during the time of crisis, exclusively emergencies and procedures in which delay could potentially worsen the patient's outcome could be performed.

Focusing on gynecological field, we tried to summarize the main evidence published in the current literature regarding endoscopic surgery during the COVID-19 times, specifically regarding hysteroscopy.

2. Materials and methods

A literature search on the MEDLINE database (accessed through PubMed) for articles in English and published from December 2019 until March 2021 was performed.

The following key words were used to screen and identify studies, in association with "COVID-19" and "SARS-CoV-2": "hysteroscopy" and "gynecological endoscopic surgery". 23 records were identified through this database searching. 18 records were left after duplicates removed.

In our search, only articles concerning hysteroscopic surgery were included. The selection criteria for the narrative review included original articles, guidelines and review articles regarding the management of hysteroscopic surgery during COVID-19 pandemic. So, 13 articles were assessed for eligibility.

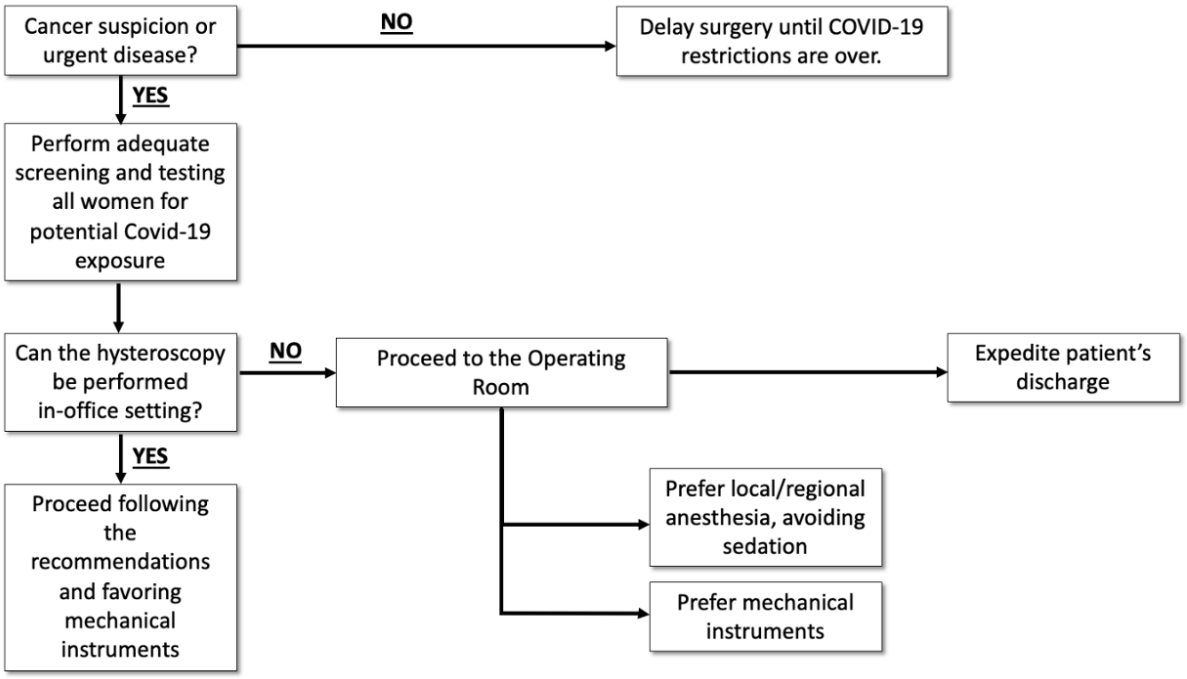

Fig. 1. Algorithm for the management of hysteroscopic procedures during the COVID-19 pandemic.

Articles that met the inclusion criteria were carefully read, and, when appropriate, further articles retrieved from their references were also reviewed with the aim to include other critical studies that might have been missed in the initial search. We presented here a narrative synthesis of the available evidence about the topic.

3. SARS-CoV-2 infection risk in hysteroscopy

As surgeons, and even further as endoscopists, gynecologists should be educated about potential virus dissemination during gynecologic minimally invasive procedures, aiming to optimize protective measures against virus exposure and to protect patients and healthcare providers.

Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) is mainly spread through respiratory droplets; the few studies about the presence of viruses in body fluids has shown the presence of SARS-CoV-2 in anal swabs and blood as well, suggesting oral-fecal and blood transmission; on the opposite, evidence currently available does not indicate presence of the virus in vaginal fluid of women with proven COVID-19, even if the data are limited [4–6].

That is why the main concern is about aerosolization of the virus during surgery, generated during intubation, or caused by smoke-generating devices. Currently, there is lack of evidence regarding the transmission during laparoscopic surgery [7], but the theoretical risk of detecting a virus in surgical smoke comes from previous studies about laparoscopic surgery; some authors have demonstrated the presence of some viruses in surgical smoke, although documented cases of transmission of the respective diseases through this mode are rare. In particular, the presence of Human Papillomavirus (HPV)-DNA in surgical smoke, derived from 40% of cervical excision biopsies, has been reported [8], with only 4 confirmed cases of transmission documented [9]. The presence of Hepatitis B Virus (HBV) was demonstrated in more than 90% of the cases analyzed, in the surgical smoke of patients undergoing laparoscopy [10], but no case of transmission has been confirmed. The same can be said for Human Immunodeficiency Virus (HIV), for which no case of transmission by these modalities has been documented [11].

It becomes clear that the risk of virus spread is high during laparoscopic surgery, due to the effect of the gases used during pneumoperitoneum and to CO_2 leakage.

Instead, hysteroscopy is not considered a high-risk aerosol generating procedure (AGP). Hysteroscopy and hysteroscopic electrosurgery takes place in an 'underwater' environment. So, aerosol generated is cooled down instantaneously in distension medium and water-soluble particles in smoke bubbles dissolve in it [12]. The relative surgical smoke generated during the use of electrosurgery in hysteroscopy remains mostly confined to the uterine cavity and is released through outflow into the suction device or rapidly absorbed by the fluid distending media or into the circulation; there are no bubbles that go on to be released into the atmosphere, eventually popping releasing aerosol. Thus, despite the actual risk has not been assessed, the importance of surgical smoking during hysteroscopic surgery is supposed to be low or even absent.

Given the previous considerations, even leakage of contaminated fluids from the uterine cavity during hysteroscopy is not considered dangerous for a potential virus spread.

4. Hysteroscopic surgery during COVID-19 times

Scientific societies have provided recommendations for hysteroscopic surgery during COVID-19 pandemic in its critical phase and during a slow return to normal activities.

The Global Congress of Hysteroscopy Scientific Committee suggested a useful algorithm for the triage of a patient requiring hysteroscopic procedure during COVID-19 pandemic, by first handling the scheduling of surgical cases [13]. According to *Joint Society Statement on Elective Surgery*, gynecologic procedures for which a delay will negatively affect patient health and safety should not be postponed, while elective procedures should be delayed until COVID-19 restrictions are over [14].

American College of Surgeons, in "*COVID-19: Elective Case Triage Guidelines for Surgical Care*", analyzed every single obstetric and gynecological procedure and divided them into categories [15].

In the field of hysteroscopy, acute and severe uterine bleeding represents an emergency procedure for which no delay is permissible, as it can occasionally become life-threatening. Referring to the PALM-COEIN classification system of abnormal uterine bleeding (AUB) in non-pregnant women [16], developed by the FIGO (International Federation of Gynecology and Obstetrics) Committee on Menstrual Disorders, even in COVID-19 times surgical management of the structural disorders is an effective and fast approach to immediate cessation of blood loss. On the opposite, if AUB is likely caused by a functional pathology, hysteroscopy might be postponed and medical treatment should be proposed, with no negative effects on the patient [17].

Other gynecologic emergency procedures include cesarean scar pregnancy, that can be treated by hysteroscopic resection; also, hysteroscopic removing of retained products of conception (RPOC) should not be delayed, as it can effectively reduce bleeding and preventing dangerous condition [18].

Endometrial cancer and endometrial intraepithelial hyperplasia are clinical indication for surgery that if delayed could potentially worsen the patient's outcome, and it should be performed even in lockdown period.

Abnormal uterine bleeding could be delayed just for a few weeks, considering medical treatment in the meanwhile [19].

Lastly, for every non-urgent disease, in which cancer is not suspected, surgery can be delayed several months.

Once established surgical cases stratification, it is mandatory adequate screening and testing all women for potential COVID-19 infection, not limited to symptomatic patients. Any women should be interviewed by phone about her potential virus exposure status, before she arrives to the hospital, and intervention should be delayed, if feasible, when COVID-19 infection is suspected based on symptoms [13]. Universal COVID-19 testing should be performed, using either rapid point-of-care testing or nasopharyngeal swabs with polymerase chain reaction (PCR) amplification based on facilities and settings.

If positive COVID-19 infection is confirmed and urgent hysteroscopy is needed, it should be performed in an operating room with negative pressure and independent ventilation, with adequate personal protective equipment (PPE) provided [13]. Since the mean time length of negativity from the onset of COVID-19 symptoms is about 21 days, non-urgent emergencies such as suspected cancer could be delayed by a few weeks.

However, despite negative tests, the *Royal College of Obstetricians and Gynecologists (RCOG)*, the *British Society for Gynecological Endoscopy (BSGE)*, *the American Association of Gynecologic Laparoscopists (AAGL)* and *Global Congress of Hysteroscopy Scientific Committee*, all agree on need of standard PPE for all healthcare members in close contact with the patient during *in-patient* or *out-patient* procedures [13, 20, 21]. PPE includes surgical mask, eye protection, gloves, which must also be worn by companions, that actually are allowed only if strictly necessary.

If hysteroscopy can be performed in office setting, it should be preferentially performed on *out-patient* basis, with both the aim to relieve the pressure on main theatre resources and to reduce the time of hospitalization, and subsequent potential exposure to the virus.

When hysteroscopy is performed in an *in-patient* setting, local/regional anesthesia should be preferred, avoiding sedation, an anesthetic technique with the major risk of contamination through aerosolized particles [22].

Whether in ambulatory setting or in operating theatre, hysteroscopic surgeons must choose the device that will allow an effective and fast procedure; they should also favor the use of mechanical instruments that reduce bioaerosol exposure, such as scissors, graspers and tissue retrieval systems. In fact, minimal or none use of electrosurgery in the open surgery is recommended to eliminate surgical smoke [2]. Tissue retrieval systems could get the additional advantage of avoiding multiple insertion and removal of the hysteroscope from inside the uterine cavity; this can avoid smoke and fluids leakage [7].

European Society for Gynaecological Endoscopy (ESGE) guidelines and the GLOBAL CONGRESS ON HYSTEROSCOPY (GCH) Committee Consensus Statement recommend ensuring that active suction device is connected to an outflow sheath, carrying away any gaseous and particulate surgical by-products into sealed containers, especially when using smoke generating instruments [3, 13].

After the procedure, operating room or ambulatory decontamination should be performed, and instrumentation has to be disinfected as usual. At the end, patient's discharge should be expedited. The management of hysteroscopic procedures during the COVID-19 pandemic is summarized in the algorithm in Fig. 1.

Ad hoc indications have also been made regarding residency training programs. There is a need to suspend trainees' participation and to introduce innovative alternative methods to maintain the didactic, clinical, surgical, and research

activities of trainees [23]. Learners and physicians in training education should be organized by video transmission and not by physical presence in the office or operating room [13].

Important considerations about management of surgery after the great wave of the COVID-19 Pandemic come from *Joint Statement of American College of Surgeons, American Society of Anesthesiologists, Association of periOperative Registered Nurses* and *American Hospital Association*; they provide a roadmap for resuming elective surgery as soon as a sustained reduction in the rate of new COVID-19 cases occurs. Strategy about prioritization should be identified, to address case scheduling, and should account for a list of previously cancelled and postponed cases, with objective priority scoring; this, always favoring an *out-patient* approach over *in-patient* setting [24].

5. Conclusions

The coronavirus disease 2019 (COVID-19) pandemic is a global public health concern. Health Care Facilities in every country have to deal with a complete reorganization of labor and delivery unit, and resource management. In this study, we have summarized all best practice to perform safe and effective hysteroscopic surgery in COVID-19 times and in the slow restore of normal activities. Most of evidence agree on complete cancellation of elective endoscopic gynecologic surgery, and on its deferring until the pandemic has been contained. When hysteroscopy is performed, precautions should be observed to prevent COVID-19 infection. Considering the advent of vaccines and the expectation of a gradual containment of the pandemic emergency, each surgical team and hysteroscopy unit should identify a clear strategy to respond to this emergency. This could allow to ensure essential care to patients on the basis of the severity of each condition and the availability of resources, and to modify them as the health status modifies and more data are obtained.

Author contributions

ADSS, AG, RDI and CDA performed the literature research. AG and ADSS wrote the manuscript. CDA and AL made the final revision. All authors contributed to editorial changes in the manuscript. All authors read and approved the final draft.

Ethics approval and consent to participate

Not applicable.

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Conflict of interest

The authors declare no conflict of interest. RDI is our Guest Editor, given his role as Guest Editor, had no involvement in the peer-review of this article and has no access to information regarding its peer-review.

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