Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Surgical Treatment

Surgical treatment applies to patients with excessive bleeding and unstable vital signs, including massive hemorrhage caused by pregnancy-relevant incomplete abortion, ruptured ectopic pregnancy and cesarean scar pregnancy abortion, endometrial abnormal hyperplasia/lesions in perimenopausal women, sudden hemorrhage caused by benign and malignant tumors of the genital system, and conditions evaluated by physicians requiring surgical intervention to control bleeding. Surgical treatments include emergency curettage, laparoscopic and laparotomic exploration, and vascular interventional therapy [4]. The surgical methods should be selected by a comprehensive analysis according to the specific condition of the patient. Patients requiring surgical treatment should be managed in accordance with inpatient management requirements (Fig. 3) [5].

Acknowledgments

We acknowledge the thoughtful contributions of the expert team on behalf of the Working Committee on Management of Patients with Emergent Gynaecological Haemorrhage during the coronavirus disease pandemic, including Hua Duan, Chao Chen, and Shuyin Guo at Beijing Obstetrics and Gynaecology Hospital, Capital Medical University; Wei Zhang and Dirong Dong in the Obstetrics and Gynaecology Department, Zhongnan Hospital of Wuhan University; Min Hao in the Department of Obstetrics and Gynaecology, the Second Hospital of Shanxi Medical University; Bin Ling and Jing Liang in the Obstetrics and Gynaecology Department, China-Japan Friendship Hospital; Lu Han at Dalian Maternal and Child Health Hospital of Liaoning Province; Yingfang Zhou in the Department of Obstetrics and Gynaecology, Peking University First Hospital; Wuliang Wang in the Department of Gynaecology, Obstetrics, the Second Affiliated Hospital of Zhengzhou University; Mei Ji in the Department of Obstetrics, the First Affiliated Hospital of Zhengzhou University; Minju Nu at Shenyang Maternity and Child Health Hospital; Jie Chen in the Department of Obstetrics and Gynaecology, People's Hospital of Fujian Province; Meixue Jia in the Department of Obstetrics and Gynaecology, People's Hospital of Fujian Province; Jing Sun at Shanghai First Maternity and Infant Hospital; Hongyan Guo in the Department of Obstetrics and Gynaecology, Peking University Third Hospital; Xu Hong at International Peace Maternity and Child Health Hospital; Wenpei Bai at Beijing Shijitan Hospital, Capital Medical University; Fengxian Fu in the Department of Obstetrics and Gynaecology, Aerospace Center Hospital; Qing Liu in the Department of Obstetrics and Gynaecology, Beijing You An Hospital, Capital Medical University; and Hao Huang at Nanhai Hospital Affiliated with Southern Medical University.

Sha Wang, MD, PhD
Bohan Li, MD
Hua Duan, MD, PhD
Chao Chen, MD
Yinshu Guo, MD, PhD
Beijing, China

Tin Chiu Li, MD, PhD
Hong Kong, China

References

1. Fraser IS, Critchley HOD, Broder M, Munro MG. The FIGO recommendations on terminologies and definitions for normal and abnormal uterine bleeding. *Semin Reprod Med*. 2011;29:383–390.
2. Bradley LD, Gueye NA. The medical management of abnormal uterine bleeding in reproductive-aged women. *Am J Obstet Gynecol*. 2016;214:31–44.
3. Steward JE, Kitley WR, Schmidt CM, Sundaram CP. Urologic surgery and COVID-19: how the pandemic is changing the way we operate. *J Endourol*. 2020;34:541–549.
4. Pryor A. SAGES and EAES recommendations regarding surgical response to COVID-19 crisis. Available at: https://www.sages.org/recommendations-surgical-response-covid-19. Accessed July 19, 2020.
5. National Health Service. Clinical guide to surgical prioritisation during the coronavirus pandemic. Available at: https://www.england.nhs.uk/coronavirus/wpcontent/uploads/sites/52/2020/03/C0221-specialty-guide-surgical-prioritisation-v1.pdf. Accessed July 19, 2020.

https://doi.org/10.1016/j.jmig.2020.06.020

Emergency Gynecologic Surgery for Life-Threatening Conditions in the COVID-19 Pandemic Period

To the Editor:

Since December 2019, the outbreak of novel coronavirus disease (COVID-19) has become a global pandemic and a widespread disaster [1]. Although the COVID-19 epidemic has become well controlled in China, as of May 31, 2020, it had spread to 215 countries, areas, or territories [2]. The number of cases is still growing at a stable alarming speed. The total number of people infected reached 6 750 521, and the death toll was 395 779 [3,4]. The mortality rates are currently the highest in France and the United Kingdom (19.43% and 14.21%, respectively). The Eastern Mediterranean region and South-East Asia are currently at the center of the pandemic. The situation of the COVID-19 pandemic is still worse in the United States. On the basis of the analysis of China's situation, COVID-19 can be controlled [5]. It has been proven that personal protective equipment and the correct isolation measures are highly effective. At present, the recovery rate in China is 95.99%. Governments should take several actions to protect public health and healthcare workers (HCWs) [6−8]. Most importantly, the global infection rate of medical staff has reached a critical level, and more than 5000 medical staff members in Italy have been infected. Severe acute respiratory syndrome coronavirus 2

(SARS-CoV-2) has been isolated from surfaces in isolation rooms, operating theater and even the shoes of HCWs [9], [10]. Therefore, it is necessary to emphasize the protection of medical staff and related HCWs to avoid infection [11−14]. Otherwise, a vicious circle of infection will form.

While dealing with the crisis of COVID-19, we cannot ignore patients with gynecologic emergencies who experience serious consequences. For example, tubal pregnancy, rupture of ovarian pregnancy, rupture of abdominal pregnancy, interstitial pregnancy, cesarean scar pregnancy, spontaneous rupture of ovarian cyst, ovarian tumor pedicle torsion, vascular rupture of uterine fibroids and trophoblastic tumor rupture cause life-threatening bleeding. These patients are transferred from the emergency department or arrive via ambulance with or without emergency acute internal bleeding. Of course, most of these women have acute intra-abdominal hemorrhaging, so they have typical hemorrhagic shock symptoms. How can these emergency patients with acute internal bleeding or typical symptoms of peritoneal irritation be treated properly? These patients are experiencing a life-threatening emergency because of intraperitoneal hemorrhage, and the possibility that they might be infected with SARS-CoV-2 cannot be immediately excluded. In particular, many countries do not have rapid detection kits for SARS-CoV-2 and the median incubation period for SARS-CoV-2 is approximately 5 days, according to the analysis of 181 confirmed COVID-19 cases detected outside Hubei Province before February 24, 2020 [15]. Doctors should pay enough attention to these patients, determine the cause of the internal bleeding as soon as possible, and select the most appropriate operation strategy to solve the problem. How should the type of operation (laparotomy or laparoscopy) be selected for these patients?

Laparotomy

During a nonepidemic period, laparotomy can quickly address critical bleeding in patients. However, because of COVID-19, 3 levels of protection must be implemented to protect doctors and nurses. This makes the operation difficult. Water mist on goggles hinders vision. It is important to rapidly locate the source of the bleeding and stop it during this critical situation. The abundant presence of blood vessels in the uterus during pregnancy and continuous bleeding owing to a rupture of the vascular network increase the risks of a blood transfusion and even mortality. It is also easy to damage the surrounding organs, such as the bladder, the ureter, and the intestines, when operating under a time constraint. If these events occur, they may aggravate bleeding and lead to disastrous consequences.

In addition, as the chance of contact with patients' body fluids increases, the possibility of iatrogenic infection increases for doctors and nurses because of damage inflicted by surgical instruments during the process of surgery. In addition, the use of electric scalpels increases the probability of aerosol formation. Although it is not clear whether SARS-CoV-2 can be transmitted through aerosols, the risk is extremely high when medical staff members are in close contact with patients. Furthermore, during an open surgery, the exposure of the pelvic cavity to air can also easily lead to infection through the inhalation of droplets. All of this leads to increased exposure for doctors and nurses. Certainly, if the patient is in hemorrhagic shock, the doctor can only choose to save the patient's life. Under those conditions, the surgeon must immediately perform the laparotomy.

Laparoscopy

When performing laparoscopic surgery, the doctor's posture is relatively relaxed, even when wearing 3 levels of protective clothing. Because laparoscopic surgery can enlarge the field of vision by 4 to 6 times, doctors can readily expose the surgical site, rapidly identify the lesions, and resolve the bleeding quickly. This type of surgery minimizes the time during which the blood supply to the uterus is blocked, which facilitates subsequent operations. In some cases of acute intra-abdominal bleeding from gynecologic organs, the bleeding is difficult to control. Especially when bleeding from the lower uterine segment cannot be controlled, substantial blood loss can only be avoided if the artery is rapidly treated. Therefore, we propose that laparoscopic management should be used to manage bleeding from the internal iliac artery. After opening the lateral peritoneum and confirming the location of the ureter, the bilateral internal iliac arteries are exposed. The arteries can be temporarily occluded with metal vascular clamps. After the operation is finished, the clips are removed, and the internal iliac arteries are recanalized. This method can solve the problem in a very short period. In these cases, we cannot block blood flow through uterine artery embolization, which may lead to the spread of COVID-19 to many other departments in the hospital as well as to doctors and nurses. However, almost all departments of the hospital have been in lockdown.

Owing to the pandemic crisis, the blood supply is limited and obtaining more blood has become the biggest problem when cities are under lockdown. Laparoscopy can minimize the chance of needing a blood transfusion. In addition, laparoscopic surgery can reduce the risk of contact cross-infection, as previously mentioned; moreover, the smoke generated during laparoscopic surgery is contained in the closed abdominal cavity where it is absorbed rather than being released into the operating room, where it could be inhaled by medical staff. Smoke created by electrosurgical instruments has the same composition in both laparoscopy and laparotomy, according to a narrative review [16]. However, laparoscopy is performed in a closed cavity and may inhibit the spread of surgical smoke/aerosols. As long as

there is no contraindication to laparoscopic surgery, laparoscopic surgery may be safer for the surgical team, and patients can benefit from the minimally invasive surgery. It has even been suggested that robot-assisted and minimally invasive gynecological surgery may be safer during the COVID-19 pandemic, as the surgical team would avoid contact with the patient [17]. In this particular type of emergency operation, doctors must quickly expose the blood vessels and address the source of the bleeding. This type of operation can also reduce the possibility of iatrogenic infection caused by accidental punctures when suturing the incision after laparotomy. Because the length of the laparoscopic puncture hole is only 0.5 to 1 cm, the doctor can use medical incision glue instead of sutures. However, we need to use this strategy carefully. It should be selected according to the skill of the doctor and the medical conditions of the hospital.

Conclusions

These operations must be performed in negative-pressure operating rooms [18]. After the operation, the patient should be transferred along the designated route to a negative-pressure ward with 3 levels of protection. When patients test positive for SARS-CoV-2, they must be transferred to the wards designated for patients with COVID-19 in a timely manner. When patients test positive for COVID-19, they must be transferred to the wards designated for patients with COVID-19 in a timely manner. If the test for SARS-CoV-2 is negative, the patients do not need to be transferred to the designated ward but should be observed for 14 days. Tongji Hospital was designated as the main hospital for the treatment of COVID-19 during the epidemic. We played a vital role in controlling the COVID-19 epidemic. Emergency obstetric operations were managed according to the process described in this article in our hospital [19]. During the COVID-19 outbreak, there were no missed cases of COVID-19, and the maternity ward had a 0% infection rate.

It is difficult to perform prospective research on the treatment of life-threatening emergencies. Doctors' long-term clinical experience is important. Brat et al [20] commented that both laparotomy and laparoscopy are clinically appropriate. As a major tertiary referral hospital, we have long-term clinical experience in dealing with such emergencies. Laparoscopic vascular pretreatment has been found to be safe and effective. Therefore, during the pandemic period, emergency minimally invasive laparoscopic gynecological surgery is appropriate. Compared with laparotomy, laparoscopic surgery has more advantages. Medical staff will benefit from the reduced exposure to SARS-CoV-2, and patients will also benefit from the minimally invasive approach. In some other emergency situations, laparoscopy can also be considered. SARS-CoV-2 will certainly not be the last novel virus to lead to a pandemic. These recommendations are not only applicable during the current COVID-19 pandemic but also during similar future epidemics.

Ronghua Liu, MD
Shixuan Wang, MD
Wuhan, China

References

1. Wu Z, McGoogan JM. Characteristics of and Important Lessons from the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72314 Cases from the Chinese Center for Disease Control and Prevention. *JAMA*. 2020 Feb 24. [Epub ahead of print].
2. Li Q, Guan X, Wu P, et al. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus-Infected Pneumonia. *N Engl J Med*. 2020;382:1199–1207.
3. World Health Organization, WHO Director-General's opening remarks at the media briefing on COVID-19 - 7 June 2020, (2020). https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-COVID-19—7-June-2020.
4. Chinese Center for Disease Control and Prevention. Tracking the epidemic. Available at: http://weekly.chinacdc.cn/news/TrackingtheEpidemic.htm#NHCJune07. Accessed June 7, 2020.
5. Bachireddy C, Chen C, Dar M. Securing the Safety Net and Protecting Public Health During a Pandemic: Medicaid's Response to COVID-19. *JAMA*. 2020 Mar 19. [Epub ahead of print].
6. Ong SWX, Tan YK, Chia PY, et al. Air, Surface Environmental, and Personal Protective Equipment Contamination by Severe Acute Respiratory Syndrome Coronavirus 2 (SARSCoV-2) From a Symptomatic Patient. *JAMA*. 2020;323:1610–1612.
7. Sayburn A. Are UK Doctors Getting Sufficient Protective Equipment Against COVID-19? *BMJ*. 2020;369:m1297.
8. Bogani G, Raspagliesi F. Minimally Invasive Surgery at the Time of COVID-19: The OR Staff Needs Protection. *J Minim Invasive Gynecol*. 2020;27:1221.
9. Lie SA, Wong SW, Wong LT, Wong TGL, Chong SY. Practical considerations for performing regional anesthesia: lessons learned from the COVID-19 pandemic. *Can J Anaesth*. 2020;67:885–892.
10. Hirota K. Air contamination with SARS-CoV-2 in the operating room. *J Anesth*. 2020;19:1–4.
11. Forrester JD, Nassar AK, Maggio PM, Hawn MT. Precautions for Operating Room Team Members During the COVID-19 Pandemic. *J Am Coll Surg*. 2020;230:1098–1101.
12. Pandey AS, Ringer AJ, Rai AT, et al. Minimizing SARS-CoV-2 exposure when performing surgical interventions during the COVID-19 pandemic. *J Neurointerv Surg*. 2020;12:643–647.
13. De Simone B, Chouillard E, Di Saverio S, et al. Emergency Surgery During the COVID-19 Pandemic: What You Need to Know for Practice. *Ann R Coll Surg Engl*. 2020;102:323–332.
14. Menhaji K, Tran AD, Garely AD. Implementing Emergency Gynecologic Surgery Guidelines during COVID-19. *J Minim Invasive Gynecol*. 2020;27:1433–1434.
15. Lauer SA, Grantz KH, Bi Q, et al. The Incubation Period of Coronavirus Disease 2019 (COVID-19) From Publicly Reported Confirmed Cases: Estimation and Application. *Ann Intern Med*. 2020;172:577–582.
16. Mintz Y, Arezzo A, Boni L, et al. The risk of COVID-19 transmission by laparoscopic smoke may be lower than for laparotomy: a narrative review. *Surg Endosc*. 2020;26:1–8.
17. Kimmig R, Verheijen RHM. Rudnicki M; for SERGS Council. Robot assisted surgery during the COVID-19 pandemic, especially for gynecological cancer: a statement of the Society of European Robotic Gynaecological Surgery (SERGS). *J Gynecol Oncol*. 2020;31:e59.

18. Gao YH, Xi HQ, Chen L. Emergency surgery in suspected COVID-19 patients with acute abdomen: case series and perspectives. *Annals of Surgery*. 2020;272:e38–e39.
19. Yu N, Li W, Kang Q, et al. Clinical features and obstetric and neonatal outcomes of pregnant patients with COVID-19 in Wuhan, China: a retrospective, single-centre, descriptive study. *Lancet Infect Dis*. 2020;20:559–564.
20. Brat GA, Hersey S, Chhabra K, Gupta A, Scott J. Protecting Surgical Teams During the COVID-19 Outbreak: A Narrative Review and Clinical Considerations. *Annals of Surgery*. 2020 Apr 17. [Epub ahead of print].

https://doi.org/10.1016/j.jmig.2020.06.014