



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.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



ELSEVIER

Contents lists available at ScienceDirect

## International Journal of Surgery

journal homepage: [www.elsevier.com/locate/ijss](http://www.elsevier.com/locate/ijss)

## Correspondence

## Cholecystectomy during the COVID-19 pandemic: Current evidence and an understanding of the 'new' critical view of safety: Correspondence

## ARTICLE INFO

## Keywords:

COVID-19  
Cholecystectomy  
Pandemic  
Critical  
View

As the COVID-19 pandemic shifted epicenters from Asia to Europe and the US, surgical societies issued guidelines urging deferment of elective procedures and advised non-operative management of emergency conditions [1]. This was then deemed necessary as many healthcare systems were overwhelmed by the sheer scale of the pandemic and all resources were redirected towards tackling this. In addition, many were concerned about the possibility of viral transmission from affected or undiagnosed individuals to healthcare workers (HCW) and secondary nosocomial infection of other patients [2].

Today, as communities gradually relax lockdown measures and healthcare systems plan to reboot, the surgical community must anticipate a surge in both emergency and elective procedures. Cholecystectomy is one of the commonest abdominal surgeries performed worldwide. To date, there are several reports of COVID-19 patients undergoing cholecystectomy, including our institution's experience [3–6]. Taking into account current available evidence, we provide some recommendations for performing cholecystectomy safely in suspected, presumed or confirmed COVID-19 patients.

Firstly, we suggest that COVID-19 positive patients with Tokyo Grade 1–2 acute cholecystitis (AC) may be treated surgically as per the Tokyo Guidelines 2018 [7]. With adequate personal protective equipment (PPE), the risk of viral transmission to HCW during cholecystectomy may be much lower than initially feared, hence conservative management is not necessary. Flemming et al. did not detect SARS-CoV-2-RNA in abdominal fluid and bile samples from a COVID-19 patient who underwent cholecystectomy [3]. This mirrors our own encounter with a COVID-19 positive patient with gangrenous cholecystitis, who similarly had negative bile and peritoneal fluid samples [6]. Although Coccolini et al. isolated SARS-CoV-2-RNA from the peritoneal fluid of a patient with small bowel obstruction [8], these results were not reproduced in the fluid of another COVID-19 patient who underwent appendicectomy [9]. The authors thus infer that the presence of viral RNA in peritoneal fluid may have been due to translocation from feces (which has been well documented to contain SAR-Cov2 virus [2]) secondary to the underlying surgical emergency in a critically unwell patient. In contrast, most reports of COVID patients who successfully underwent laparoscopic surgery describe clinically well individuals, who likely had low viral loads with limited yield for culture. We thus

interpret this data with caution, and encourage surgeons to test abdominal fluid samples from other COVID-19 patients in order to add to the body of evidence in the literature.

Secondly, we advise that laparoscopic cholecystectomy (LC) should be preferred over open cholecystectomy (OC) where possible. To date, there has been no definitive evidence of aerosolization of COVID-19 virus particles during laparoscopy [1,10]. In LC, the surgical plume is almost entirely contained within the closed abdominal cavity, and can be easily suctioned out in a controlled manner using commercially available or improvised filtration systems [10]. Additional measures to minimize leakage of pneumoperitoneum include keeping insufflation pressures low and making port-site incisions as small as possible. LC also offers other advantages such as lesser pain and quicker recovery from smaller wounds as compared to the traditional muscle-cutting subcostal incision utilized in OC. Definitive surgery during the index admission for AC would eliminate the chance of recurrent cholecystitis or other complications such as cholangitis or pancreatitis, which might result in multiple readmissions, higher resource utility and prolonged hospitalisation for these patients down the road.

Thirdly, we recommend mandatory screening for all patients prior to surgery. It was previously suggested that a pre-operative chest X-ray and nasopharyngeal swab should be performed for all elective procedures. However, with better understanding that pre-symptomatic viral transmission can occur [12] and nasopharyngeal swab results may be negative in the initial phase of disease [4], these measures alone may not be sufficient. In our institution, we call our patients 72 hours prior to surgery to ensure that they have no acute respiratory illness or recent travel history [2,11]. A repeat declaration is made on the day of surgery. Any patient who is unwell, or has come into contact with COVID-19 positive patients, may have their procedures postponed. In the event that a suspected patient requires emergent cholecystectomy even before swab results are available, full precautionary measures are taken and enhanced personal protective equipment (PPE) is donned during surgery [2,6,8,11,12].

In conclusion, the battle against this pandemic will be long-drawn. However, we hope that the three components of the 'new' critical view of safety, namely a) knowledge that SARS-CoV-2-RNA is not present in bile, b) evidence of safe laparoscopic surgery in COVID-19 infected

<https://doi.org/10.1016/j.ijss.2020.06.012>

Received 3 June 2020; Accepted 4 June 2020

Available online 09 June 2020

1743-9191/ © 2020 IJS Publishing Group Ltd. Published by Elsevier Ltd. All rights reserved.

patients and c) implementation of rigorous pre-operative screening measures, will help to allay fears in surgeons who find themselves having to perform cholecystectomy during these unprecedented times.

#### Data statement

The data that has been used confidential.

#### Sources of funding

No funding was required for this study.

#### Ethical approval

No ethical approval was required for this cohort correspondence. Our patient who underwent cholecystectomy gave approval for use of his information for this report, and we have a signed consent form in our institution.

#### Research registration Unique Identifying number (UIN)

Name of the registry: NA.

Unique Identifying number or registration ID: NA.

Hyperlink to your specific registration (must be publicly accessible and will be checked): NA.

#### Author contribution

Study design: TK, CMH.

Data collection: TK.

Writing: TK, CMH.

Manuscript review: All authors.

#### Guarantor

Guarantor: Chew Min Hoe.

#### Provenance and peer review

Not Commissioned, internally reviewed.

#### Declaration of competing interest

None.

#### References

- [1] Society of American Gastrointestinal and Endoscopic Surgeons, SAGES and EAES, recommendations regarding surgical response to COVID-19 cases, <https://www.sages.org/recommendations-surgical-response-covid-19/>, (2020) Accessed March 30.
- [2] M.H. Chew, W.J. Tan, C.Y. Ng, K.H. Ng, Deeply reconsidering elective surgery: worldwide concerns regarding colorectal surgery in a COVID-19 pandemic and a Singapore perspective [published online ahead of print, 2020 Apr 29], *Singap. Med. J.* (2020), <https://doi.org/10.11622/smedj.2020070> 10.11622/smedj.2020070.
- [3] S. Flemming, M. Hankir, I. Hering, et al., Abdominal fluid samples (negative for SARS-CoV-2) from a critically unwell patient with respiratory COVID-19 [published online ahead of print, 2020 May 26], *Br. J. Surg.* (2020), <https://doi.org/10.1002/bjs.11713> 10.1002/bjs.11713.
- [4] M. Giulio, P. Achilli, M. Dario, An underestimated "false negative COVID cholecystitis" in Northern Italy and the contagion of a surgical ward: it can happen everywhere [published online ahead of print, 2020 May 13], *Surgery 1-2* (2020), <https://doi.org/10.1007/s13304-020-00781-y>.
- [5] C. Nahshon, A. Bitterman, R. Haddad, D. Hazzan, O. Lavie, Hazardous postoperative outcomes of unexpected COVID-19 infected patients: a call for global consideration of sampling all asymptomatic patients before surgical treatment [published online ahead of print, 2020 may 16], *World J. Surg.* (2020) 1–5, <https://doi.org/10.1007/s00268-020-05575-2>.
- [6] Kabir T, Ngaserin SH, Koh FH, Ong BC, Chew MH. The Covid Conundrum: SARS-CoV-2 is not present in bile. Accepted for publication in *Br J Surg*.
- [7] G. Wakabayashi, Y. Iwashita, T. Hibi, et al., Tokyo Guidelines 2018: surgical management of acute cholecystitis: safe steps in laparoscopic cholecystectomy for acute cholecystitis (with videos), *J Hepatobiliary Pancreat Sci* 25 (1) (2018) 73–86, <https://doi.org/10.1002/jhbp.517>.
- [8] F. Coccolini, D. Tartaglia, A. Puglisi, C. Geiodarno, M. Pistello, M. Lodatomo, N. Chiarugi, SARS-CoV-2 is present in peritoneal fluid in COVID-19 patients, *Ann. Surg.* (April 2020) ([Epub ahead of print]).
- [9] S.H. Ngaserin, F.H. Koh, B.C. Ong, M.H. Chew, COVID-19 not detected in peritoneal fluid: a case of laparoscopic appendectomy for acute appendicitis in a COVID-19-infected patient [published online ahead of print, 2020 May 9], *Langenbeck's Arch. Surg.* 1-3 (2020), <https://doi.org/10.1007/s00423-020-01891-2>.
- [10] A. Shabbir, R.K. Menon, J. Somani, et al., ELSA recommendations for minimally invasive surgery during a community spread pandemic: a centered approach in Asia from widespread to recovery phases [published online ahead of print, 2020 May 11], *Surg. Endosc.* (2020) 1–6, <https://doi.org/10.1007/s00464-020-07618-0>.
- [11] M.H. Chew, F.H. Koh, K.H. Ng, A call to arms: a perspective of safe general surgery in Singapore during the COVID-19 pandemic [published online ahead of print, 2020 Apr 3], *Singap. Med. J.* (2020), <https://doi.org/10.11622/smedj.2020049> 10.11622/smedj.2020049.
- [12] W.J. Tan, F.J. Foo, S.S. Sivarajah, L.H.M. Li, F.H. Koh, M.H. Chew, Safe colorectal surgery in the COVID-19 era - a Singapore experience, *Ann Coloproctol* 36 (2) (2020) 65–69, <https://doi.org/10.3393/ac.2020.04.21>.

Tousif Kabir\*, Juinn Huar Kam, Min-Hoe Chew  
 Department of General Surgery, Sengkang General Hospital, Singapore  
 E-mail address: [tousif.kabir@singhealth.com.sg](mailto:tousif.kabir@singhealth.com.sg) (T. Kabir).

\* Corresponding author. Hepatopancreatobiliary Service, Department of General Surgery, Sengkang General Hospital, 110 Sengkang E Way, 544886, Singapore.