



## Detection of SARS-CoV-2 in Peritoneal Fluid in Covid-19 Patient

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### Abstract

**Background:** The mechanisms of excretion of SARS-CoV-2 are actually mostly unknown. We report a case of detection of SARS-CoV-2 in peritoneal fluid in Covid-19 patient.

**Case presentation:** A 73-year-old woman had emergency surgery for bowel obstruction. An oropharyngeal and peritoneal swab for SARS-CoV-2 virus was performed during admission. Both swabs were positive.

**Discussion:** In the literature, in addition to ours, there is only one case of peritoneal swab positive for SARS-CoV-2 in patient Covid-19.

**Conclusion:** The presence of SARS-CoV-2 virus at peritoneal level suggests that Covid-19 infection is a systemic disease and that it is necessary to increase the level of consciousness and protection of surgical personnel, especially in emergency surgery situations.

**Keywords:** Covid; Emergency; SARS-CoV-2; Surgery

**Abbreviations:** ER: Emergency Room; WBC: White Blood Cells

### Background

The COVID-19 pandemic forced the rapid introduction of new guidelines directed to doctors, nurses, and health-care workers in general, while performing clinical practices, in order to allow the treatment of COVID-19 patients preserving the personnel from infection, particularly in an emergency setting [1]. The development of new guidelines is necessary because the mechanisms of excretion of SARS-CoV-2 are actually mostly unknown. Here we report a case of detection of SARS-CoV-2 in peritoneal fluid in Covid-19 patient.

### Case Presentation

The patient, a 73 year-old woman, came to our E.R. the 06/04/2020 for acute abdominal pain in the central abdomen associated to a painful bulge in the umbilical area. Temperature was 38°C and saturation was 92% with oxygen therapy. The physical examination revealed that the periumbilical lump was hyperemic, hard, fixed, and non-reducible. Blood tests revealed 15,05 x 10E9/L WBC and an 356.0 Mg/L C-reactive protein. As indicated in our

current protocol, at hospitalization she was immediately subjected to oropharyngeal swab, that was positive for SARS-CoV-2. She underwent total-body CT scan that did not reveal any sign of active pneumonia, but showed a large umbilical hernia in which some loops of the small intestine were engaged, with stagnation of liquid and some air-fluid levels. The jejunal loops were thickened and hyperemic, and presented edematous imbibition of perivisceral soft tissues. There was also the evidence of free fluid in the pelvis. Emergency surgery was therefore indicated, and the following day the patient was prepared for surgery. Surgery was performed following our current protocols for Covid-19 positive patients. The safety protocol requires operating room staff to be equipped with an ffp2 protective mask, double pair of gloves, double goretex gown, protective visor and boots. An explorative laparotomy confirmed the presence of free fluid in the abdomen and the presence of a strangulated hernia with incarcerated and necrotic jejunal loops without perforation. A sampling of peritoneal fluid was collected at the beginning of the procedure for the detection of SARS-CoV-2. Surgery consisted of an ileal resection with mechanical latero-lateral anastomosis, and the suture of the hernial defect with separate stitches. Forty-eight hours after surgery the result of the peritoneal fluid sampling was obtained, and resulted positive for SARS-CoV-2. The postoperative course was characterized by the formation of a wound hematoma that was evacuated, and worsening of the pulmonary radiological picture, fever (T38°C)

and desaturation (sat 88% in O2 in Venturi mask 24%). The patient was subjected to infectivological and pneumological examination. Viral pneumonia was treated with antibiotic therapy (Piperacillin-Tazobactam 4,5g/3die), anticoagulant therapy (Clexane 6000/2die) and oxygen therapy (Venturi mask followed by nasal canulae 4-6L/min). The patient was discharged one month after surgery, after resolution of the clinical picture and negativization of SARS-CoV-2 virus in two oropharyngeal swabs. The real-time Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) used for the detection of nucleic acid in SARS-CoV-2 is Allplex™ 2019-nCoV Assay. The test identifies the 3 different target genes (E gene, RdRP gene and N gene). There is no difference between the swab used for oropharyngeal sampling and the peritoneal swab.

## Discussion

The mechanisms of excretion of SARS-CoV-2 are actually mostly unknown. We know that the primary mode of transmission of the virus is contact with saliva droplets, but the most widespread test, the oropharyngeal swab, showed in some works low sensitivity with a percentage of false negatives around 30% [2,3]. The virus has also been detected in faeces, cerebrospinal fluid and marrow sampling [4]. There have not been reports of Covid 19 being found in vaginal and amniotic fluid [5]. Limited and discordant data exist on peritoneal detection of the virus.

Simultaneously with us Coccolini et al. reported the detection of SARS-CoV-2 in peritoneal fluid in Covid-19 patient [6]. Hui-Na Ngaserin et al. have presented a case of a Covid-19 patient with negative peritoneal swab [7]. The presence of SARS-CoV-2 in several physical compartments indicates that Covid-19 infection is a systemic disease, and that precautionary measures should not be taken only when performing procedures involving patient's airways. The evidence of the presence of SARS-CoV2 in the peritoneum in Covid-19 patients opens a new scenario about the necessity of further guidelines to adopt operating in the Covid-19 pandemic era, since the presumed safer nature of a traditional open surgery over the laparoscopic technique, with regard to surgeons, nurses, and the surgical environment, should be reassessed. Newest guidelines recommend caution in the application of laparoscopy and robotic surgery in positive Covid 19 patients for the risk of viral transmission by air drops from the peritoneal fluid [8,9].

## Conclusion

In accordance with the data in the literature, we believe that it is necessary to increase the level of consciousness and protection of surgical staff, especially in emergency surgery situations. SARS-CoV-2, in fact, is present in peritoneal fluids and potentially aerosolizes the environment, and nasopharyngeal swabbing is currently not a completely reliable procedure for the diagnosis of Covid-19 infection [10,11] (Figures 1,2).

Esame	Risultato	Unita' Di Misura	Valori di Riferimento
<b>RICERCA VIRUS RESPIRATORI</b>			
(Mediante amplificazione genica)			
COVID-19 (SARS-CoV-2)	Positivo		-
Materiale :	Tampone faringe		-

**Figure 1:** Oropharyngeal swab.

Esame	Risultato	Unita' Di Misura	Valori di Riferimento
<b>RICERCA VIRUS RESPIRATORI</b>			
(Mediante amplificazione genica)			
COVID-19 (SARS-CoV-2)	Positivo		-
Materiale :	Sangue		-

**Figure 2:** Peritoneal swab.

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