



# Acute intestinal ischemia in a patient with COVID-19

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A 59-year-old man presented to our hospital with a 10-day history of fever, progressive dyspnoea, and a confirmed diagnosis of bilateral COVID-19 interstitial pneumonia. His past medical history was unremarkable, except for mild hypertension. On day 5 after admission, he complained of worsening acute abdominal pain with nausea associated with grade 3 arterial hypertension (160/115 mmHg). Blood tests showed a 30-fold increase of D-dimer levels with leucocytosis and lymphopenia.

A contrast-enhanced computed tomography scan of the chest and abdomen revealed the classic features of COVID-19 pneumonia as well as air fluid levels in the small bowel with associated mesenteric edema and peritoneal free fluid (Figs. 1, 2a–c). The patient had an emergency laparotomy with evidence of segmental small bowel ischemia (Fig. 3a, b). A 15-cm small bowel resection and side-to-side manual anastomosis were performed. The peritoneal fluid, analysed for COVID-19 by reverse transcription-polymerase chain reaction, was negative. The patient died of multiorgan failure on the 4th postoperative day.

COVID-19 may produce cardiovascular, neurological and ischaemic complications [1, 2]. Currently, the underlying mechanism is poorly understood. Hypercoagulability and endotheliitis may be involved [3]. Patients having surgery have a high mortality rate even during the incubation period [4, 5]. Full protective personal equipment and tailored solutions are mandatory to reduce the risk of transmission [6].

## Compliance with ethical standards

**Conflict of interest** All authors declare no personal conflict of interest.

**Informed consent** Informed consent was obtained from the participants included in the study.

**Ethical approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

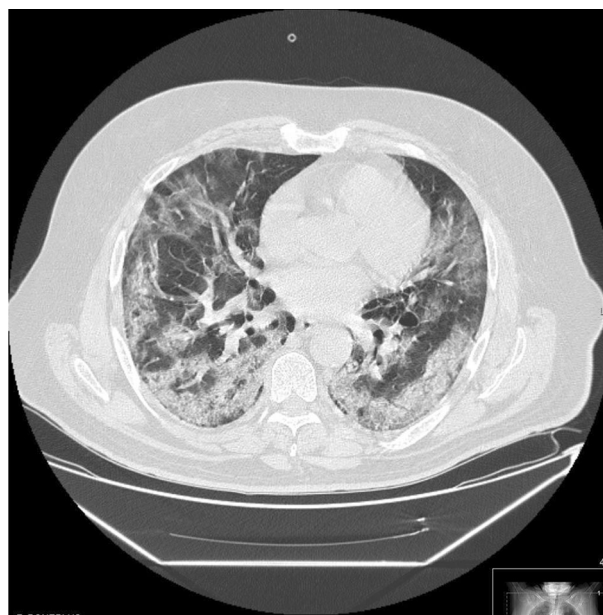
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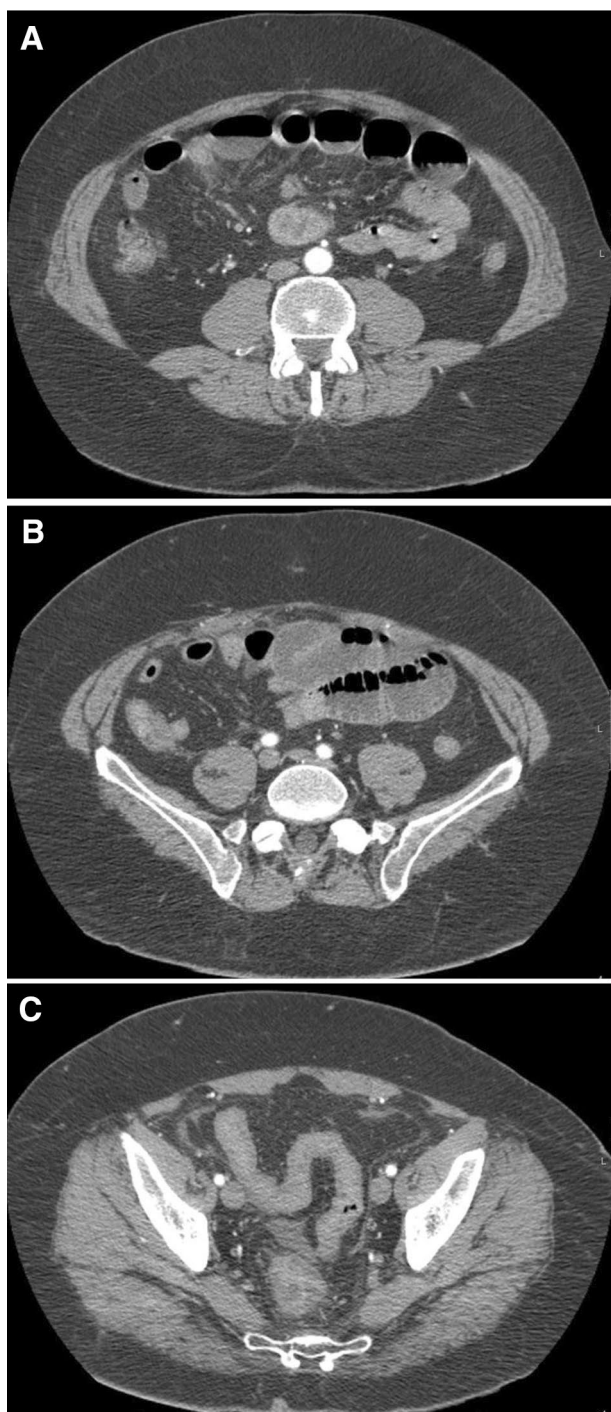
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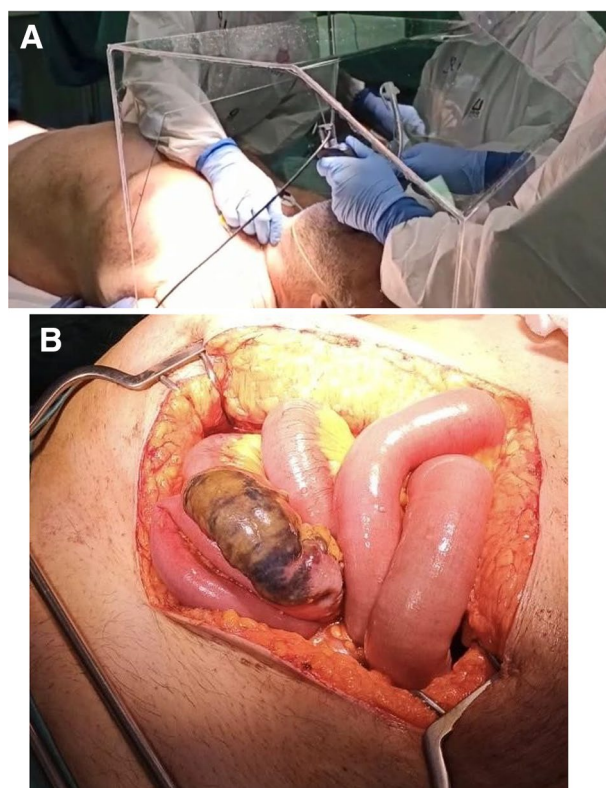
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**Fig. 1** Chest CT scan: a view of the typical ground-glass aspect with pulmonary consolidations



**Fig. 2** a–c Axial CT images showing air-fluid levels in the small bowel with associated mesenteric oedema and peritoneal free fluid



**Fig. 3** a The “Aerosol Box” used during endotracheal intubation. b Small bowel ischemia

## References

1. Wu Y, Xu X, Chen Z et al (2020) Nervous system involvement after infection with COVID-19 and other. *Brain Behav Immun.* <https://doi.org/10.1016/j.bbi.2020.03.031> (in press)
2. Long B, Brady WJ, Koefman A, Gottlieb M (2020) Cardiovascular complications in COVID-19. *Am J Emerg Med.* <https://doi.org/10.1016/j.ajem.2020.04.048> (in press)
3. Varga Z, Flammer AJ, Steiger P et al (2020) Endothelial cell infection and endotheliitis in COVID-19. *Lancet.* [https://doi.org/10.1016/S0140-6736\(20\)30937-5](https://doi.org/10.1016/S0140-6736(20)30937-5) (in press)
4. Lei S, Jiang F, Su W et al (2020) Clinical characteristics and outcomes of patients undergoing surgeries during the incubation period of COVID-19 infection. *EclinicalMedicine.* <https://doi.org/10.1016/j.eclinm.2020.100331> (in press)
5. Gallo G, La Torre M, Pietroletti R et al (2020) Italian society of colorectal surgery recommendations for good clinical practice in colorectal surgery during the novel coronavirus pandemic. *Tech Coloproctol.* <https://doi.org/10.1007/s10151-020-02209-6> (in press)
6. Di Saverio S, Pata F, Gallo G et al (2020) Coronavirus pandemic and Colorectal surgery: practical advice based on the Italian experience. *Colorectal Dis.* <https://doi.org/10.1111/codi.15056>

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