





Acute appendicitis during the COVID-19 lockdown: never waste a crisis!

M. Podda ^{1,*}, F. Pata ^{2,3}, G. Pellino ^{4,5}, B. Ielpo ⁶ and S. Di Saverio⁷

¹Department of Emergency Surgery, Cagliari University Hospital 'Duilio Casula', Azienda Ospedaliero-Universitaria di Cagliari, Cagliari, Italy

²General Surgery Unit, Nicola Giannettasio Hospital, Corigliano-Rossano, Italy

³La Sapienza University, Rome, Italy

⁴Department of Advanced Medical and Surgical Sciences, Università degli Studi della Campania 'Luigi Vanvitelli', Naples, Italy

⁵Colorectal Surgery, Vall d'Hebron University Hospital, Barcelona, Spain

⁶Unidad de Cirugía Hepatobiliopancreática, Hospital Universitario del Mar, Barcelona, Spain

⁷Department of General Surgery, University of Insubria, University Hospital of Varese, Azienda Socio-Sanitaria Territoriale (ASST) Sette Laghi, Regione Lombardia, Italy

*Correspondence to: Department of Emergency Surgery, Cagliari University Hospital 'Duilio Casula', Azienda Ospedaliero-Universitaria di Cagliari, Cagliari, Italy (e-mail: mauropodda@gmail.com)

Dear Editor

In the past 9 months, the world has been dealing with the devastating global crisis caused by the SARS-CoV2 pandemic. To date, more than 33 million cases have been diagnosed worldwide and over 1 million people have died. This has caused new challenges for healthcare systems, including those associated with the management of surgical emergencies. Changes in the epidemiology, diagnosis and treatment of appendicitis during the pandemic also deserve attention (Table 1)^{1–9}.

Fear of overburdening healthcare systems and becoming infected inside hospitals may have discouraged the patients from seeking care for non-COVID-19 illnesses, with the obvious consequence of a reduction in the rate of hospital admissions for patients with appendicitis.

As a result, while the number of COVID-19 cases increases, fewer patients present as an emergency with appendicitis, and those who do present with more advanced disease^{1,2,10}. Rather than a real decrease in the incidence of appendicitis, these findings are consistent with the hypothesis of prehospital selection, with high rates of successful resolution of uncomplicated appendicitis following patients' self-medication with antibiotics at home.

The reported high proportion of perforated appendicitis during the pandemic can be explained neither by a more aggressive course of the disease nor by delay in seeking medical attention, but rather by selection due to undiagnosed resolving appendicitis. It is well known that a radical approach with a broader indication for surgical exploration is associated with a low proportion of perforations secondary to the detection of a larger number of patients with uncomplicated appendicitis, and not because fewer perforations occur. Conversely, the higher proportion of perforated appendicitis associated with a restrained attitude to surgical exploration, as is happening during the pandemic, is explained mainly by the detection of fewer patients with uncomplicated appendicitis and not by a real increase in the number of perforations.

The exceptional situation related to COVID-19 has led surgeons more often to consider antibiotic treatment alone for patients with appendicitis¹. Non-operative management with antibiotics has been evaluated widely in the literature during 'peaceful times', showing its initial efficacy in over 90 per cent of cases. Such a high efficacy rate for antibiotics-alone treatment strategies has proved to be important during the COVID-19 pandemic, when access to the operating room has been limited or sometimes not possible^{1,2}.

Given the current status of the pandemic, which still requires a broader availability of ICU facilities and health workers to care for the overwhelming number of patients with COVID-19 infection and life-threatening conditions, a potentially increased rate of late recurrence of appendicitis following successful antibiotic treatment might occur.

The negative appendectomy rate has decreased dramatically during the COVID-19 pandemic. A recent multicentre international study¹¹ showed that, in patients aged 16–45 years, the negative appendectomy rate was 20 per cent in the UK and 6.2 per cent in the other countries. Patients admitted with suspected appendicitis during the pandemic are more likely to undergo preoperative imaging, which possibly explains this fall.

Lastly, although there are no data to confirm the presence of SARS-CoV-2 in laparoscopic plumes of surgical smoke, several guidelines recommended erring 'on the side of caution', which has led some to discourage the use of laparoscopy and to advise open appendectomy when surgery is unavoidable. The possible negative implications of open surgery for appendicitis include increasing surgical pain, wound infection and longer hospital stay, all factors that negatively affect the need to reduce the overcrowding of hospitals during the pandemic. Thus, as safe management of surgical plumes is possible^{13,12}, and low-cost smoke filters are now available, surgeons should resume minimally invasive surgery considering the scientific evidence available, and offer patients the benefits of laparoscopic appendectomy.

Received: October 04, 2020. Accepted: October 12, 2020

© The Author(s) 2021. Published by Oxford University Press on behalf of BJS Society Ltd. All rights reserved.

For permissions, please email: journals.permissions@oup.com

Table 1 Overview of published research on acute appendicitis during the COVID-19 pandemic

Reference	n	Management (%)		Time to consultation (days)	Complicated appendicitis (%)	Approach (%)		Imaging (%)	NAR (%)	NOM failure (%)
		Surgery	NOM			Open	Laparoscopic			
English et al. ¹										
Before lockdown	29	76	0	n.r.	n.r.	14	86	CT 50 US 27	9	n.r.
During lockdown	22	9	91	n.r.	n.r.	100	0	CT 72 US 4	0	n.r.
Basamh et al. ²										
During lockdown	42	0	100	n.r.	n.r.	n.a.		CT 100	n.a.	9.3 un- compli- cated AA 20 compli- cated AA
Ganesh et al. ³										
Before lockdown	64	100	0	n.r.	n.r.	8	95	CT/MRI 61	n.r.	n.a.
During lockdown	32	56	44	n.r.	n.r.	89	11	CT/MRI 100	n.r.	3
Kelly et al. ⁴										
During lockdown	18	39	61	n.r.	n.r.	n.r.		n.r.	n.r.	0
Dreifuss et al. ⁵										
Before lockdown	65	n.r.		1.4	17	n.r.		n.r.	n.r.	n.r.
During lockdown	15	n.r.		2.4	47	n.r.		n.r.	n.r.	n.r.
Tankel et al. ⁶										
Before lockdown	237	85.2	14.8	1.8	13.1	1.7	83.5	n.r.	n.r.	n.r.
During lockdown	141	92.2	7.8	1.	20.6	4.3	87.9	n.r.	n.r.	n.r.
Toale et al. ⁷										
Before lockdown	122	87.7	12.3	2	10.3	17.8	82.2	CT 17.2 US 50.8	33.6	n.r.
During lockdown	62	55	45	1.5	38	79	21	CT 55 US 42	0	n.r.
Romero et al. ⁸										
Before lockdown	141	n.a.	n.a.	n.r.	57.1 [†]	n.a.		CT 29.8	n.a.	n.a.
During lockdown	55	n.a.	n.a.	n.r.	92 [‡]	n.a.		CT 46	n.a.	n.a.
Javanmard-Emamghissi et al. ⁹										
During lockdown	500	46	54	n.r.	n.r.	56	44	CT 71	3	10

[†]Appendicitis with periappendicitis, appendicitis with rupture, complicated appendicitis. NOM, nonoperative management; NAR, negative appendectomy rate; n.r., not reported; US, ultrasonography; n.a., not applicable; AA, acute appendicitis.

Disclosure. The authors declare no conflict of interest.

References

- English W, Habib Bedwani N, Smith C, Shatkar V. Investigation and management of suspected appendicitis during the COVID-19 pandemic. *Br J Surg* 2020;107:e337–e338
- Basamh M, Rajendiran A, Chung WY, Runau F, Sangal S. Management of appendicitis during the COVID pandemic: lessons from the first month of the outbreak. *Br J Surg* 2020; doi: 10.1002/bjs.11910 [Epub ahead of print]
- Ganesh R, Lecocq J, Ekpote NO, Ain NU, Lim SK, Alwash A et al. Management of appendicitis during COVID-19 pandemic; short-term outcomes. *Scott Med J* 2020;36933020956316. doi: 10.1177/0036933020956316
- Kelly ME, Murphy E, Bolger JC, Cahill RA. COVID-19 and the treatment of acute appendicitis in Ireland: a new era or short-term pivot? *Colorectal Dis* 2020;22:648–649. doi: 10.1111/codi.15141
- Dreifuss NH, Schlottmann F, Sadava EE, Rotholtz NA. Acute appendicitis does not quarantine: surgical outcomes of laparoscopic appendectomy in COVID-19 times. *Br J Surg* 2020. doi: 10.1002/bjs.11806
- Tankel J, Keinan A, Blich O, Koussa M, Helou B, Shay S et al. The decreasing incidence of acute appendicitis during COVID-19: A retrospective multi-centre study. *World J Surg* 2020;44:2458–2463. doi: 10.1007/s00268-020-05599-8
- Toale C, Westby D, O'Callaghan M, Nally D, Burke P, Peirce C et al. Appendicitis and the COVID pandemic; new challenges in the management of a familiar foe. *Br J Surg* 2020. doi: 10.1002/bjs.12058
- Romero J, Valencia S, Guerrero A. Acute appendicitis during coronavirus disease 2019 (COVID-19): changes in clinical presentation and CT findings. *J Am Coll Radiol* 2020;17:1011–1013
- Javanmard-Emamghissi H
- Ielpo B, Podda M, Pellino G, Pata F, Caruso R, Gravante G et al. Global attitudes in the management of acute appendicitis during COVID-19 pandemic: ACIE Appy Study. *Br J Surg* 2020; doi: 10.1002/bjs.11999 [Epub ahead of print]
- Bhangu A; RIFT Study Group on behalf of the West Midlands Research Collaborative. Evaluation of appendicitis risk prediction models in adults with suspected appendicitis. *Br J Surg* 2020;107:73–86
- Mowbray NG, Ansell J, Horwood J, Cornish J, Rizkallah P, Parker A et al. Safe management of surgical smoke in the age of COVID-19. *Br J Surg* 2020; doi: 10.1002/bjs.11679 [Epub ahead of print]
- Cahill RA, Dalli J, Khan M, Flood M, Nolan K. Solving the problems of gas leakage at laparoscopy. *Br J Surg* 2020; doi: 10.1002/bjs.11977 [Epub ahead of print]