






# Effects of SARS-CoV-2 emergency measures on high-risk lesions detection: a multicentre cross-sectional study

Manuele Furnari <sup>1</sup>, Leonardo Henry Eusebi,<sup>2</sup> Edoardo Savarino,<sup>3</sup> Carlo Petruzzellis,<sup>4</sup> Gianluca Esposito,<sup>5</sup> Marcello Maida,<sup>6</sup> Luigi Ricciardiello <sup>2</sup>, Silvia Pecere <sup>7</sup>, Andrea Buda,<sup>8,9</sup> Manuela De Bona,<sup>10</sup> Cristiano Spada,<sup>4</sup> Emilio Di Giulio,<sup>11</sup> Guido Costamagna,<sup>12</sup> Ivo Boskoski <sup>7</sup>, Edoardo G Giannini <sup>13</sup>, The Young-ENDO-ITA Study Group

For numbered affiliations see end of article.

## Correspondence to

Dr Manuele Furnari, Department of Internal Medicine, Gastroenterology Unit, University of Genoa, Genova 16126, Italy; manuele.furnari@unige.it

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## MESSAGE

COVID-19 pandemic enforced the interruption of routine endoscopic examinations raising the issue of potential delays in the diagnosis of high-risk lesions. We conducted a multicentre study to assess the decrease of GI and pancreato-biliary high-risk lesions detection consequent to the reduction of the endoscopic activity. The lockdown period was compared to the equivalent timeframe of the previous 3 years. Endoscopic procedures decreased by 72.9% (elective 72.4% and urgent 51.3%); the overall cases of high-grade dysplasia/cancers decreased by 59.1% (23.4% pancreato-biliary cancers; 70.6% and 68.8% upper and lower GI lesions). The postemergency period should aim at limiting high-risk lesions delayed diagnoses.

## IN MORE DETAILS

A multicentre, retrospective, cross-sectional study was performed in eight tertiary centres, representative of Northern and Southern Italy, to assess the decrease of GI and pancreato-biliary lesions detected, as a consequence of the reduction of endoscopic procedures caused by the COVID-19 pandemic restrictions. Five were academic centres (62.5%), and all working groups were involved in research activities and training programmes.

We collected data from the pandemic lockdown period from 9 March to 4 May (11°–18° week) of 2020, referred as P2; and the equivalent pre-pandemic period (11°–18° week) of 2019, referred as P1. Data from the corresponding periods of the previous 2 years (2017 and 2018) were also collected in order to assess trends of the last 3 years.

Main parameters analysed were:

- ▶ Type and number of elective and emergency procedures performed.
- ▶ Detection of GI and pancreato-biliary high-risk lesions during elective procedures.

## DATA ANALYSIS ONLINE

### Endoscopic procedures

The total number of endoscopic procedures performed at the eight centres in P1 was 13 293 (median 1912/centre; IQ 25th–75th: 1135–2691) procedures against 3799 (median 408/centre; IQ

25th–75th: 331–842) performed in P2, thus representing an overall reduction of 71.4% (details shown in [figure 1](#)).

Elective procedure decreased by 72.9%: from 12 632 (median 1453/centre; IQ 25th–75th: 908–2213) to 3475 (median 302/centre; IQ 25th–75th: 247–545). In this contest, lower GI endoscopy decreased more than upper GI ones, both diagnostic and therapeutic ( $p<0.001$ ). Hepato-pancreato-biliary (HPB) endoscopy reported a minor drop compared with upper and lower GI endoscopies, with an overall reduction of 45.7% ( $p<0.001$ ). Endoscopic retrograde cholangio-pancreatography (ERCP) for benign diseases (52.2%, 299 vs 143) showed a significant greater reduction compared with cancer-related procedures (18.3%; 104 vs 85;  $p=0.009$ ) (online supplementary table S1).

Emergency procedures were also affected with a global decrease of 48.2% (621 vs 322,  $p<0.001$ ); more in detail, procedures performed for food impaction decreased by 63.6%, foreign body by 62.5%, caustic injuries by 61.1%, bleeding by 53.1%, while intestinal obstruction and urgent HPB endoscopy decreased by 31.6% and 26.4%, respectively.

### Lesion detected

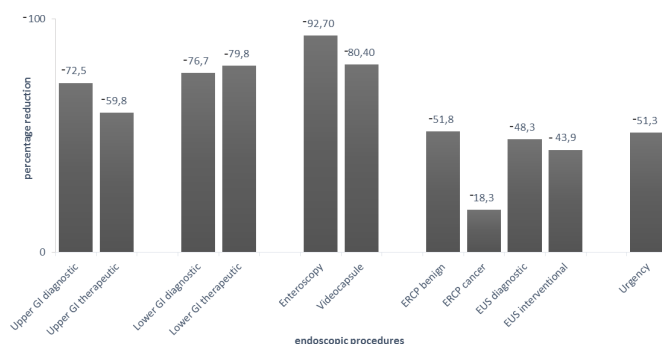
Upper GI high-grade dysplasia (HGD) and cancer diagnoses decreased by 84.2% and 62.4%, respectively; nevertheless, the rate of diagnoses in the two periods was similar (P1: 3.4% vs P2: 3.6%,  $p=0.153$ ; RR=0.89, 0.54–1.44). Routine colonoscopy reported a decrease in the number of HGD and neoplastic lesions detected of 69.8% and 67.8%, respectively, with a similar global rate of diagnoses (P1: 6.3% vs P2: 8.4%,  $p=0.08$ ; RR=1.23, 0.93–1.62). HPB endoscopy identified 183 cancers in P1, as opposed to 140 in P2, representing a 22.9% reduction. The global rates of HBP malignancies diagnosed were 15.7% in P1 as compared with 22.0% in P2 ( $p=0.034$ ; RR=1.43, 1.04–1.95) ([figure 2](#); online supplementary table S2).

We performed subanalyses by geographical distribution and endoscopic procedure volumes of the participating centres; no significant differences in



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**Figure 1** Percentage reduction of the global activities of the endoscopy units in P2 compared with P1. ERCP, endoscopic retrograde cholangio-pancreatography; EUS, endoscopic ultrasound.

terms of reduction in the proportion of procedures performed and lesions diagnosed were found.

The analysis of the previous 3 years demonstrated that there were no significant differences from 2017 to 2019 in the number of endoscopic procedures performed and of lesions detected (online supplementary figure S1 and table S2).

## COMMENT

The pandemic emergency measures drastically affected the activity of the endoscopy units.<sup>1</sup> Our study demonstrated that non-urgent endoscopic procedures decreased by 72.9% with a 57.9% reduction of diagnosed lesions, similar to what reported by Rutter *et al.*<sup>2</sup> Colonoscopy has been the most affected examination, followed by upper GI endoscopy, and lastly by HPB procedures. HPB endoscopy is generally performed following the identification of suspicious lesions by means of advanced imaging. Indeed, ERCP for malignancy decreased by 18.3%, representing the lowest value reported in our study.

As expected, we observed a greater reduction in upper GI diagnostic endoscopies compared with therapeutic ones. Notably, chronic functional disorders represent a frequent indication for endoscopies in general practice that can be safely deferred if no alarm signs are associated.<sup>3</sup> Moreover, the procedures conducted

during the lockdown period were mainly due to the presence of alarm symptoms, thus selecting patients bearing higher chances of requiring endoscopic treatment.

Similarly to what reported in the UK and Italy regarding emergency and accident department access, we observed that emergency endoscopic examinations dropped 48.2% despite the admission of urgent cases was maintained in our units.<sup>4,5</sup> The reasons for declining emergency procedures might be several: (1) the fear of contracting the SARS-CoV-2 in the hospital and the consequential refraining from seeking urgent treatment for potentially severe diseases, eventually leading to increase 'at-home' mortality; (2) the reduction of elective interventional endoscopy and surgery and therefore the occurrence of related adverse events; and (3) the reduction of non-severe conditions that were previously overtreated as urgent.

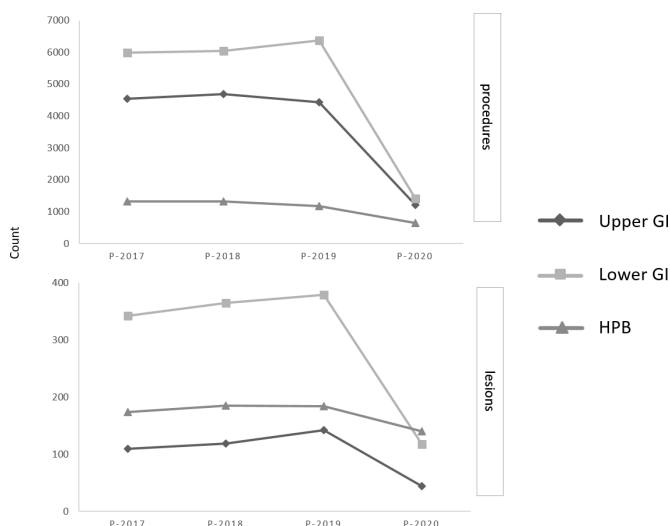
The direct short-term effect of the drastic reduction of the endoscopic activities is the poor endoscopic outcomes in terms of high-grade dysplastic and neoplastic lesions detection. Although unpostponable procedures were maintained for cancer staging or treatment and to investigate warning features, we still observed a worrisome reduction in the number of HGD/cancers diagnosed 70.6% in the upper and 68.6% in the lower GI tract. However, the rate of diagnoses between the two periods was similar, which justifies the linear reduction of the number of procedures and the number of lesions detected. Differently, HPB reported an overall reduction of 22.2% cancers diagnosed, despite a 45.7% reduction of procedures performed, mainly due to a more focused activity on oncological cases rather than benign diseases as compared with the previous year, with an increased diagnostic rate of cancers (20.5% vs 15.7%,  $p=0.007$ ).

We feel that two further considerations are needed in order to address these findings: first, our data suggest that during routine practice, a considerable proportion of cancers are accidentally detected in patients without alarm symptoms, and therefore these cases are not accounted for during the lockdown period of the study due the overall reduction of endoscopic procedures; second, in the course of the pandemic, patients with alarm symptoms might have not sought medical care due to the fear of getting infected by COVID-19 in the hospital or underestimated their condition.

We recognise as potential limitations of the study the retrospective design and the relatively short observation time. However, we included data from multiple centres representative of both academic and non-academic hospitals, as well as diverse areas of our country with different risk levels of infection. Moreover, the short study timeframe is inherent to the recent emergence of this new disease and has been compared with the previous 3 years.

We agree with the position statements recently published by the Asian Pacific Society for Digestive Endoscopy that identified three main variables to be considered in the resumption of endoscopy service: the epidemic curve of confirmed COVID-19 cases, the availability of appropriate medical equipment and the accumulated volume of postponed endoscopies.<sup>6</sup> In addition, we feel these recommendations need to be adjusted considering the regional prevalence of COVID-19 infection.

To conclude, our study demonstrated that COVID-19 outbreak caused a drastic reduction of both emergency and elective endoscopies, particularly diagnostic procedures, leading to an alarming reduction of the number of cancers and high-risk lesions detected. Despite indications for endoscopy have been reserved for selected cases, the rate of diagnoses did not increase, except for pancreato-biliary cancers. Adequate strategies are required during the postemergency period aimed at reorganising



**Figure 2** Correlation between number of GI and pancreato-biliary lesions detected and number of endoscopic procedures during 8-week lockdown period (P2) and corresponding timeframes of the previous 3 years. HPB, hepato-pancreato-biliary.

the endoscopy programmes to identify the missed lesions and limit delayed diagnoses.

#### Author affiliations

<sup>1</sup>Department of Internal Medicine, Gastroenterology Unit, University of Genoa, Genova, Italy

<sup>2</sup>Department of Medical and Surgical Sciences, University of Bologna, Bologna, Italy

<sup>3</sup>Department of Surgery, Oncology and Gastroenterology, University of Padua, Padua, Italy

<sup>4</sup>Digestive Endoscopy Unit, Fondazione Poliambulanza Istituto Ospedaliero, Brescia, Italy

<sup>5</sup>Department of Medical-Surgical Sciences and Translational Medicine, Sant'Andrea Hospital, Sapienza University of Rome, Rome, Italy

<sup>6</sup>Gastroenterology and Endoscopy Unit, S Elia-Raimondi Hospital, Caltanissetta, Italy

<sup>7</sup>Digestive Endoscopy Unit, Fondazione Policlinico Universitario A Gemelli IRCCS, Rome, Italy

<sup>8</sup>Department of Surgical, Oncological, and Gastroenterological Sciences, University of Padova, Padova, Italy

<sup>9</sup>Gastroenterology and Digestive Endoscopy Unit, Ospedale Civile di Feltre, Feltre, Veneto, Italy

<sup>10</sup>Department of Gastroenterology, Feltre, Belluno, Italy

<sup>11</sup>Department of Medical-Surgical Sciences and Translational Medicine, Sant'Andrea Hospital, Sapienza University of Rome, Roma, Italy

<sup>12</sup>Digestive Endoscopy Unit, Catholic University, Gemelli University Hospital, Roma, Italy

<sup>13</sup>Department of Internal Medicine, Gastroenterology Unit, University of Genoa, Genoa, Italy

**Twitter** Manuele Furnari @manuelefurnari and Ivo Boskoski @ivoboskoski

**Collaborators** The Young-ENDO-ITA Study Group: Stefano Angeletti; Federico Barbaro; Matteo Brunacci; Maria Cazzato; Vito Domenico Corleto; Maria Giulia Demarzo; Elisa Giambruno; Gaetano Morreale; Alessandro Moscatelli; Mario Pesenti; Lino Polese; Davide Rizzo; Giacomo Tamanini; and Fabiana Zingone.

**Contributors** MF, ES, LHE and GE conceived the study and wrote the manuscript. IB and EGG designed the study and wrote the manuscript. AB, EDG, AM, MDB, MGD, EG, GT and MC acquired data. FZ, LP, SA, VDC, MP and FB created and managed the database, searched literature and revised final manuscript. DR, CP, SP and MM analysed data. CS, LR and GC designed and revised the manuscript. All members of the Young-ENDO-ITA Study Group Study Group extracted and collected the data for each centre. All authors critically read and intellectually contributed to the manuscript.

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**Competing interests** Beyond the conduction of this study, IB declares to be: consultant for Apollo Endosurgery, Cook Medical and Boston Scientific; board member for Endo Tools; research grant recipient from Apollo Endosurgery; GC declares to be: consultant for and food and beverage compensation from Cook Medical, Boston Scientific and Olympus; ES declares to be: lecturer or consultant

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**Data availability statement** Data are presented as median and IQR percentile (25th–75th) or as absolute value and percentage. Continuous data were compared using Wilcoxon test. Categorical data were compared using the  $\chi^2$  test with Yates correction. We used a Poisson generalised linear model (GLM) to compare the number of procedures between 2019 and 2020. To compare the proportion of lesions found in each year, we used a Poisson GLM using the number of found lesions as response and the number of procedures as offset. Moreover, relative risk (RR) were assessed for these variables. P value <0.05 in a two-tailed test was considered significant. Statistical analyses were performed using the R statistical software (V.4.0.0).

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#### ORCID iDs

Manuele Furnari <http://orcid.org/0000-0001-6424-079X>

Luigi Ricciardiello <http://orcid.org/0000-0003-2568-6208>

Silvia Pecere <http://orcid.org/0000-0002-4401-7344>

Ivo Boskoski <http://orcid.org/0000-0001-8194-2670>

Edoardo G Giannini <http://orcid.org/0000-0001-8526-837X>

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