

# Trends in acute abdominal pain visits to EDs and rate of abdominal surgeries during the COVID-19 pandemic in Finland: A retrospective register study

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As the COVID-19 pandemic led to restrictions in Finland, the emergency department (ED) visits decreased and during the first 6 weeks, a 12%-decrease was observed in gastrointestinal diseases.<sup>1,2</sup> Previously, we have reported that the rate of acute appendicitis decreased during the first wave of the pandemic, yet prominent changes in the rate of complicated appendicitis were not observed.<sup>3</sup> A recent study in Finland showed that the incidence of emergency surgery remained stable both before and after the declaration of national lockdown.<sup>4</sup> The aim of this study was to evaluate the rate of ED visits due to acute abdominal pain and abdominal surgeries during the first and second waves of the COVID-19 pandemic.

Three large Finnish hospitals (Tampere University Hospital, Mikkeli Central Hospital, and Central Finland Hospital) covering a catchment area of 900,000 inhabitants participated in this study. We collected the number of ED visits due to abdominal pain in adult patients from hospital registers. Inclusion was based on the International Classification of Diseases—10th Revision (ICD-10) and the list of included diagnosis codes is in Supplemental Appendix 1. Acute abdominal surgeries were retrospectively collected from hospital registers and classified by using NOMESCO Classification

of Surgical Procedures (NCSP) procedure codes (Finnish version). All procedure codes in the J group (digestive system and spleen) were included. The monthly incidences with 95% confidence intervals (CIs) were calculated, and 2020 (study period) was compared to reference period (2017–2019) by incidence rate ratios (IRRs). Analyses were performed using *R* version 3.6.2 (*R* Foundation for Statistical Computing, Vienna, Austria).

The incidence of ED visits due to abdominal pain in all the participating hospitals decreased after the declaration of the national lockdown in spring 2020 (Fig. 1A). The incidence of ED visits during the study period compared to the reference years was similar in February (IRR: 1.08, CI: 0.99–1.18), but a decrease in the ED visit rate was seen in March (IRR: 0.84, CI: 0.77–0.92) when the lockdown was first declared. The incidence of ED visits was similar compared to the reference years in December during the second wave of the pandemic (IRR: 0.95, CI: 0.88–1.03). Nonspecific abdominal pain, the most common reason for admission to ED unit, decreased in April (IRR: 0.67, CI: 0.59–0.75) but were similar compared to the reference years in June (IRR: 0.91, CI: 0.82–1.01). Moreover, the incidence of the other diagnostic groups (appendicitis, cholelithiasis,

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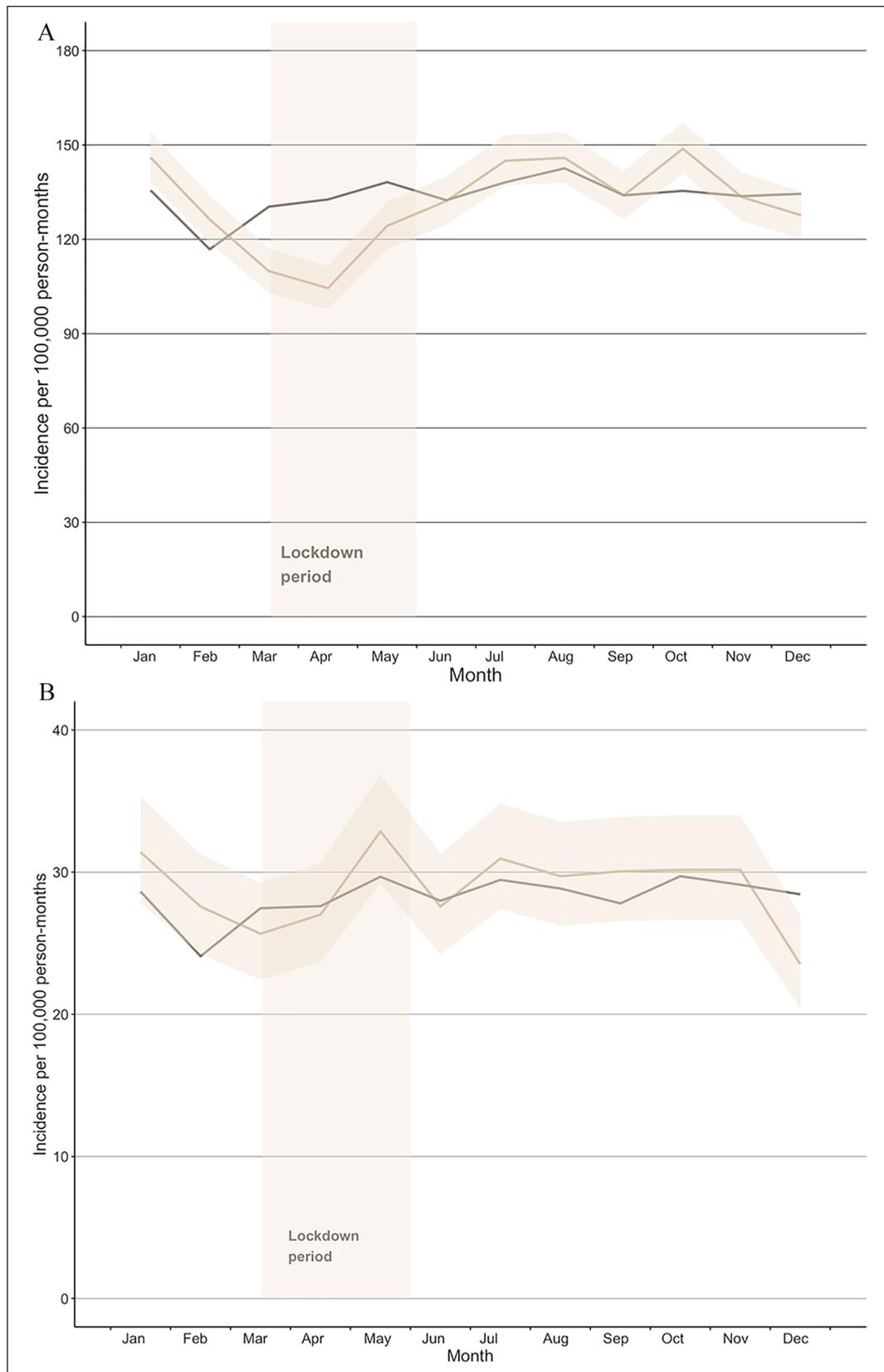
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**Fig. 1.** Incidence of all visits (A) and surgeries (B) to the ED unit due to acute abdominal pain. The light line illustrates the study period (2020) with confidence intervals and the dark line illustrates mean of incidences in the reference years (2017–2019).

hernia, and pancreatitis) remained at a similar level both during the study period and the reference years. The IRR of acute abdominal surgeries remained at the same level in comparison to the reference years after the announcement of the national lockdown, being 0.93 (CI: 0.78–1.12) in March (Fig. 1B). The incidence of acute abdominal surgeries was similar during the study period in comparison to previous years until December, when a decrease occurred (IRR: 0.83, CI: 0.69–0.99). During the first wave of the pandemic, the incidence of laparotomy, laparoscopic cholecystectomy and laparoscopic appendectomy stayed at the same level when comparing 2020 and the reference years.

Previous studies have shown that the number of ED visits decreased during the early stage of the COVID-19 pandemic.<sup>1,5,6</sup> However, most studies have only investigated the impact of the early pandemic period and knowledge of ED visits due to acute abdominal pain, and the impact of the second wave of the pandemic is lacking. In this study, the change was seen in visits due to nonspecific abdominal pain, which was the most common reason for admission to the ED units. The fear of contracting COVID-19 seems to have resulted in citizens avoiding or postponing ED visits, especially those patients with milder symptoms. When comparing the most common abdominal surgeries, no major conclusions can be drawn.

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### Author contribution

V.M., M.U., and V.P. conceived of the presented idea. S.J. and V.P. designed and performed the data analysis and analyzed the data. S.J. wrote the manuscript with input from all authors. V.M., V.P., I.K., M.U., T.P.H., and J.P. provided critical feedback, discussed the results, and helped shape the research and manuscript. V.M. and V.P. supervised the project.

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### Supplemental material

Supplemental material for this article is available online.

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