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CE - LETTER TO THE EDITOR

Acquired COVID-19 infection in the Emergency Department after its reorganization during the pandemic: single center prospective study

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Dear Editor,

Despite strict infection control efforts, hospital-acquired coronavirus disease 2019 (COVID-19) was reported [1–3]. The Emergency Department (ED), which serves as a gatekeeper for hospitals, is expected to be the most exposed area to COVID-19 and it can become the epicenter of a hospital-associated outbreak [4].

The aim of our study is to evaluate the burden of ED-acquired COVID-19 (EDAC) in patients discharged from a reorganized Italian ED during COVID-19 outbreak.

This was an observational prospective study approved by the ethical committee conducted in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national). Informed consent was obtained from study patients.

Before the outbreak of COVID-19, the hospital reorganized ED in two areas: suspected COVID-19 and no-suspected COVID-19 area. Patients with respiratory symptoms, fever, or close contact with a COVID-19 case were assigned by the pre-triage staff to the suspected COVID-19 area, while all the others to the no-suspected COVID-19 area. If suspicion of COVID-19 was raised from a more thorough history or test results in patients assigned to the no-suspected-COVID area, those patients were transferred to the suspected COVID-19 area.

Real-time reverse transcription-polymerase chain reaction nasopharyngeal swab was performed immediately after ED physician evaluation on COVID-19-suspected patients and on patients potentially needing observation or hospital admission.

During the stay in the suspected COVID-19 area, patients wore surgical masks and gloves and were distanced from each other by at least 2 m in two open bays, whereas those in the no-suspected-COVID area wore surgical masks and were distanced from each other by at least 1 m in three open bays. Patients with a negative result of the nasopharyngeal swab who needed observation, were transferred to the no-COVID-19 Observation Unit and attended in shared rooms keeping 1 m of distance from each other and wore surgical masks.

Healthcare professionals working in the suspected COVID-19 area wore FFP2 masks, disposable gown/apron/TNT suit/gloves and protective goggles as well as FFP3 masks and visors when aerosol procedures were performed. Healthcare professionals working in the no-suspected COVID-19 area wore non-woven gowns, surgical masks and disposable gloves.

Consecutive patients evaluated in ED from 7 to 30 April, 2020, were considered for the study.

Inclusion criteria were:

- Age > 18 years;
- Discharged patients from ED and Observation Unit;
- Negative nasopharyngeal swab performed during the index ED visit.

Exclusion criteria were:

- Patients lost at follow-up;
- Patient who declined to participate in the study.

Thirty days after the index ED visit, patients underwent a structured telephone interview. Furthermore, hospital

The members of "ED suspected COVID-19" investigators are listed in "Acknowledgements".

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database research for additional ED visits and hospital admissions was performed.

Two expert physicians based on medical chart and follow-up data adjudicated independently the final diagnosis: COVID-19 present or absent. In the first case, they established if COVID-19 was acquired in the community (CAC), in patients presenting the infection before the index ED visit and a false-negative result of the first nasopharyngeal swab, or COVID-19 was acquired after the ED visit (EDAC). Discordances were solved by a third reviewer.

From 7 to 30 April, 2020, 2480 patients attended the ED compared to 7,991 patients that attended the ED in the same period in 2019 (− 69%).

During the study period, 118 patients had a diagnosis of COVID-19, of whom 16 (13.6%) were managed for at least 1 h in the no-suspected COVID-19 area.

Two-hundred-and-twenty-one discharged patients with a negative first nasopharyngeal swab were included in the study: 106 (48%) were discharged from ED (median length of stay 5.5 h, IQR 4–9) and 115 (52%) from the Observation Unit (median length of stay 26 h, IQR 22–45).

At follow-up, 42 (19%) patients performed further swabs, 45 (20.4%) re-attended ED after the index visit and 4 (1.8%) died. No cohabiting family member of the enrolled patients acquired COVID-19 after the patients' return home from ED.

Both reviewers agreed on the diagnosis of CAC before the index visit in two patients who presented a false-negative swab performed in ED and no discharged patient had a final diagnosis of EDAC.

Our study showed that with the reorganization of ED during COVID-19 outbreak, none of the discharged patients with a negative nasopharyngeal swab acquired COVID-19 during the ED attendance. As far as we know, this is the first study that specifically evaluates COVID-19 ED cross-infection. The risk of cross-infection in ED is a serious public health concern, especially during a pandemic threat [5].

Previous studies on patients admitted to the hospital showed that around 12% of admitted COVID-19 patients acquired the infection in a nosocomial environment. This value reaches up to 40% of COVID-19 infection if health care workers are also taken into consideration [2, 3]. However, it is not known if the infection was acquired in the ED or in the wards.

We can speculate that the reasons for not encountering any EDAC in our ED are as follows:

- During the study period, we have seen a reduction in the ED presentations. The reduction in the number of visits has probably led to an increase in the quality of care, allowing health professionals to act safely by taking all measures to avoid the risk of cross-infection and it has permitted to maintain the appropriate security distance.
- The pre-triage staff assigned the majority of COVID-19 patients to the suspected COVID-19 area where patients distanced by 2 m and the measures to avoid cross-infection were of a higher level. However, we did not find any cross-infection either in the no-suspected COVID-19 area where 13% of COVID-19 patients were managed for at least an hour during the ED evaluation. This could probably be attributed to the fact that wearing surgical masks and maintaining at least 1 m of distance was enough to avoid cross-infection.
- Reorganization of hospital wards permitted to rapidly admit highly suspected COVID-19 patients needing hospitalization before nasopharyngeal swab results were available limiting the time of the stay in ED for COVID-19 cases.
- There was no case of COVID-19 among the 280 workers of the ED from 24 February, 2020, (first case of COVID-19 diagnosed in the ED) until 28 September, 2020 (last data update). It is known that cross-infection risk between healthcare workers and patients is as important as between patients [4].

The study presents the following limitations. We included only discharged patients with a negative nasopharyngeal swab to avoid as much as possible the bias of enrolling patients with CAC before the index ED visit. Discharged patients that did not perform the swab in ED were not considered in the study, therefore, it is not known if these patients could have acquired the infection in ED. Some cross-infection in ED may have not been detected in our study as a second nasopharyngeal swab was not performed systematically in all patients. However, we think that we did not lose any EDAC patient that developed COVID-19 needing ED reassessment/hospitalization.

In conclusion, in an ED that experienced a decrease of patients' attendance during COVID-19 outbreak, that was reorganized in suspected and no-suspected COVID-19 areas, that provided maintenance of patients' distancing, use of protective equipment for both patients and healthcare workers and rapid admission of highly suspected COVID-19 patients needing hospitalization, there was not encountered any EDAC among patients discharged from ED.

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Compliance with ethical standards

Conflict of interest None of the authors and investigators report conflict of interest.

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Informed consent Informed consent was obtained from study patients.

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