

How emergency departments prepare for virus disease outbreaks like COVID-19

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Introduction

Acute outbreaks of novel virus caused diseases like coronavirus disease 2019 (COVID-19) challenge the national and international healthcare systems and specifically the emergency departments (EDs) as patients, even if they have only mild symptoms, intuitively present in the ED once they fear to have a serious disease. Therefore, EDs need to prepare fast and effectively to address the challenge of walk-in patients who might transmit the virus SARS-CoV-2 without displaying severe symptoms themselves, to protect personnel and vulnerable patient groups who are typically present in the ED at any time like patients with immunosuppression, chronic disease and older age.

The outbreak of COVID-19 in Wuhan, China and the transmission to Europe is a typical example with some lessons learned for the ED. This early report reflects the situation from a German perspective including the capital city of Berlin.

Experiences from Germany

In Germany, the Robert Koch Institute (RKI; www.rki.de/covid-19) is the leading authority in safeguarding public health. It updates information about risk areas and recommendations for diagnostic and hygiene measures daily. It is vital for all EDs to have permanent access to this type of information. The intranet page of the RKI is only partly available in English for those who do not have a similar information source in their countries. In the early phase of the spread of a new disease like COVID-19, three factors are most important for the ED:

(1) The definition of cases has to be recognized by all members of the staff. The challenge of the situation is the very fast and dynamic change. Therefore, if not already implemented, EDs need the possibility to update all members of the team digitally online. An interprofessional routine, which we call ‘team time out’ at the beginning of every shift and lasts only a few minutes, can be used for essential updates of everybody with ‘must know’ information.

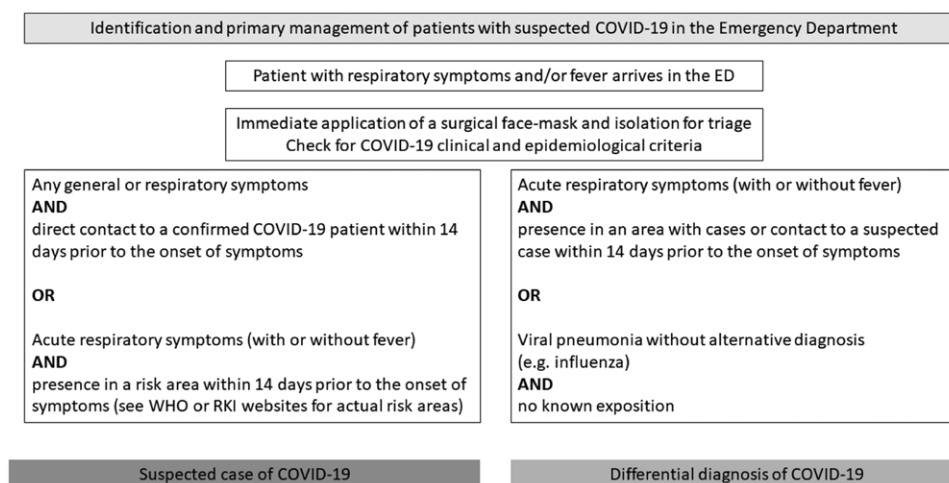
- (2) Potential patients have to be recognized at the door and isolated immediately at triage. If feasible, patients approaching the ED should be guided with signs to a separate room even before triage in order to prevent contact with other patients waiting for triage.
- (3) A set of measures and information needs to be prepared and made available for all potential patients. The recommendations for risk stratification of the diagnostic measures are very dynamic and change daily. Thus, flowcharts should be accessed online when needed rather than printed to avoid the circulation of outdated information.

Initially, COVID-19 was considered similar to SARS with pathology mainly confined to the lower respiratory tract. This was supported by the first case series of $n=41$ from China [1]. On 21 January 2020, the first case was identified in Germany. The first patient and other patients were infected by a Chinese colleague during a business contact 7 days before. The disease was benign and similar to common flu, including fever $>39^{\circ}\text{C}$, respiratory symptoms and fatigue. At the time of presentation and positive testing using the RT-PCR method developed at Charité – University Medicine Berlin [2], the patient had already recovered with no symptoms. This case and the small series detected later brought the cognition that COVID-19 may have a mild cause in the majority of cases and therefore challenges the protection as cases may be very similar to common flu and other mild upper respiratory tract infections. As of 2 March 2020, the source of the Italian outbreak could not be identified and therefore control was much more difficult. As Italian authorities were unable to track all contact persons, the consequence for Germany was, to declare geographic areas in Italy with substantial local transmission as areas of risk (Fig. 1).

After several steps of the development, we distinguish actually on the basis of recommendations of the RKI, two categories of patients:

- (1) Suspected case of COVID-19.
(2) Differential diagnosis of COVID-19.

Fig. 1



Initial recognition and handling of patients with potential COVID-19. COVID-19, coronavirus disease 2019.

Both groups require testing of SARS-CoV-2 in a nasal-pharyngeal swap. We also test these specimens for influenza A/B which is much more common today and the test is available as point-of-care PCR (i.e. Cobas LIAT, <https://www.cobasliat.com/point-of-care-influenza-test/>). The first case in our institution was detected in the routine testing of influenza negative swaps. Criteria for both groups and handling are summarized in the figure. The decision on admission or outpatient management is based on the clinical situation (severity of symptoms) and the surrounding (situation at home, compliance with hygiene advice). Hygiene measures basically include isolation [separate room for group 1, surgical face-mask for all (groups 1 and 2)] and protection of personnel [use of gloves, protective gown, goggles and class 2 or 3 filtering face-piece (FFP) respirators (FFP2 assessing a suspected case; FFP3 when performing aerosol-generating procedures) [3]. Currently, there is no consensus whether surgical face-masks are sufficient protection for none high risk patient assessment. For disinfection, normal standard liquids that are effective against viruses can be used.

Conclusion

EDs are prone to be the first contact of patients infected with novel viral diseases like COVID-19. Factors of success for the ED are excellent communication and preparedness including standards for the identification of patients at risk and measures for different risk groups. The personnel needs to be protected by suitable advice and personal protection gear.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

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