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Transport Safety Concerning a Patient Infected With SARS-CoV-2 and Emergency Service Officers in an Ambulance Accident—A Case Study

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Report from the Field

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Abbreviations:
COVID-19, coronavirus disease; EMS, emergency medical services; FFP2/FFP3, filtering face piece (protection class 2/3); SARS-CoV-2, severe acute respiratory syndrome coronavirus 2

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Abstract

The manifestation of a new pathogen, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), constitutes a new problem for modern health care systems. Developing updated standards for all emergency services working at an accident site during the pandemic has been a continuous challenge. The principal method of preventing the transmission of the SARS-CoV-2 virus is the use of personal protective equipment, such as protective suits, masks and goggles, or face shields. The study aims to present the recommended on-site procedures during the coronavirus pandemic based on the description of an accident of an ambulance transporting a patient with confirmed SARS-CoV-2 infection, emphasizing the actions taken by the emergency services sent to the accident site.

Introduction

According to the Ministry of Health data, around 2 992 401 infections and 75 869 fatalities have resulted from the acute respiratory tract infection (coronavirus disease [COVID-19]) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in Poland so far (October 10, 2021).[1] The pandemic poses a challenge for modern health care systems and medical rescue systems—the first link in the event of a health emergency. Unfortunately, modern medical rescue systems exhibited a low level of preparedness in the early stage of the coronavirus epidemic worldwide. The insufficient knowledge concerning the new pathogen and inadequate provision of personal protective equipment (PPE) constituted the main issues. Therefore, at the onset of the pandemic, the priority was a rapid development of appropriate procedures for medical emergency rescue teams and medical dispatchers, and those actions were hindered by limited knowledge concerning the virus itself. With time, key research regarding the virus effect was published, increasing its understanding, and allowing for measures to prevent the spread of the virus, prepare effective disinfectants, and prepare equipment protecting medical rescue teams, for example, protective suits, masks, or isolation chambers to be developed.[2–4]

Transport of a Patient Infected With SARS-CoV-2 in Poland

Transport of patients affected by COVID-19 in Poland is coordinated by the chief medical dispatcher in the emergency medical dispatch center, with updated information concerning available hospital beds within its area of operation. That information mediates transport by the emergency medical services (EMS) to the nearest hospital. Furthermore, interhospital patient transfer to an institution with a higher level of care is undertaken by ambulance staff in the hospital structure, ambulances of private entities, or the most severe clinical cases of Helicopter Emergency Medical Services.[5]

The SARS-CoV-2 pandemic required additional safety procedures for emergency services, including ambulance, police, and fire brigade working under emergency conditions. On February 28, 2020, the Chief Sanitary Inspector published guidelines for the police, border guard, state fire service, Internal Security Agency, Foreign Intelligence Agency, among others, on the safety requirements for officers and employees who have contact with persons suspected of being infected with the new type of coronavirus: SARS-CoV-2. The guidelines described necessary safety precautions in the event of direct contact with an infected person while conducting their duties.[6]

According to the data obtained from the police, 1 accident of an ambulance with a patient infected with SARS-CoV-2 has been reported in Poland, so far.[7]

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Figure 1. An accident of an ambulance transporting an infected patient (own source).

The study aims to present the procedure applicable to the accident site in the era of SARS-CoV-2 in Poland, based on the example of an accident of an ambulance transporting an infected patient.

Material and Method

The presented manuscript employs qualitative research—a case study with a research technique of an uncategorized interview. The questions were open-ended and focused on the transport mode, the circumstances of the accident, the rescue actions, epidemiological procedures, epidemiological safety of the event participants, and possible infections that could have occurred during the ambulance accident. The respondents were also asked to present the conclusions drawn from the accident. The questions were directed 30 days after the incident, as access to publicly available information, to units participating in the rescue operation, that is, fire brigades, police, dispatcher of EMS, sanitary inspection, and to the hospital, which ordered the transport of a patient infected with SARS-CoV-2 to a hospital (a hospital that only treats patients infected with SARS-CoV-2 created during the pandemic in Poland).

Accident Description

On July 12, 2020, a transfer of a patient with confirmed SARS-CoV-2 infection on the route from Krynica Zdrój to Kraków (Małopolskie Voivodeship) was initiated. The distance between the medical institutions was approximately 140 kilometers. The patient was transferred to the University Hospital in Krakow, a specialized hospital for patients with SARS-CoV-2. An ambulance with 2 paramedics onboard conducted the transfer.

During the transport, an ambulance collided with a passenger vehicle of a 4-person family. The medical dispatcher, notified of the incident via the emergency number (112), registered the report and dispatched appropriate resources to deal with the incident. The medical dispatcher was also informed that one of the accident participants was the transferred patient with a confirmed SARS-CoV-2 infection. The warning concerning an infected patient was provided to all services at the accident site. As a result, EMS, volunteer fire brigade, state fire service, and the police were sent to the accident site. The incident was also reported to the Sanitary Inspectorate (Figure 1).

Actions of the Fire Brigade

Fifteen firefighters were at the incident, including 9 firefighters from the state fire service and 6 from the volunteer fire brigade. The officers were equipped with special firefighter clothing, FFP3 masks, goggles, protective footwear, safety helmets, and latex gloves. After securing the accident site, the fire services designated a safe zone with no access for unauthorized personnel and secured access to the infected patient in the damaged ambulance. After the initial triage, the total number of injured was 5.

Among the injured, a paramedic and 4 passengers from the second vehicle received qualified first aid. In addition, the fire brigade performed preliminary decontamination of the injured paramedic, and the firefighters provided first aid at the scene. Under this level, decontamination constituted a simple wet method using a damp towel soaked in a cleaning solution followed by a safe undressing procedure (removal of the contaminated clothing, providing a substitute one).

Actions of the EMS

Four EMS were dispatched for the incident, including 1 physician-staffed EMS team and 3 non-physician-staffed EMS teams. The non-physician-staffed EMS teams consisted of 2 paramedics each. The physician-staffed EMS team included a physician and 2 paramedics. All members of dispatched EMS were equipped with PPE, that is, protective suits, FFP2/FFP3 masks, goggles or face shields, and shoe covers. The first EMS team was at the scene 4 minutes after receiving the emergency call, that is, 11:37.

After arriving at the site, EMS took over the casualties from the firefighters, reassessed their clinical state, and implemented the necessary medical care. After being stabilized, the injured were transported to local hospitals. The infected patient was admitted to the destination hospital in Krakow 50 minutes after the EMS teams were dispatched to the accident site.

Six casualties were transported to hospitals, as described in the following:

- The patient with confirmed SARS-CoV-2 infection suffered a contusion of the anterior wall of the chest and abdomen,

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reported pain in the cervical spine area, and was transported to the University Hospital in Krakow.
- An injured paramedic was admitted to the nearest hospital in Brzesko with a suspected upper extremity fracture.
- The passenger vehicle driver suffered head trauma and lost consciousness and was admitted to the local hospital in Brzesko.
- The other 3 casualties, including 2 children with minor injuries, were transported to the local hospital in Brzesko.

Police Interventions

The officer on duty of the District Police Headquarters in Brzesko sent 1 patrol—2 traffic police officers to the site to secure the accident scene. The police officer on duty was warned of the infected patient and reminded of the safety precautions. Before the inspection, the ambulance involved in the incident was disinfected, and, additionally, the police officers conducted the required procedural steps remaining outside of the vehicle in question. Police officers were equipped with FFP3 face masks with a filter and gloves during their proceedings. Collecting witness statements and documentation procedures were conducted, avoiding direct contact, and maintaining recommended physical distance. Other procedural steps, for example, Preliminary Breath Test, were performed only after disinfection of accident participants.

According to the information provided by the police, it was a crash of the ambulance of the EMS team with a passenger car due to the ambulance driver's mistake of running a red light at the intersection.

Actions of the Sanitary Inspection

Sanitary inspectors did not attend the accident scene. Instead, their activities consisted of determining the exposure risk of incident participants by phone, including emergency service officers based on an epidemiological interview with commanders of particular services and a paramedic from the ambulance transporting the patient with confirmed SARS-CoV-2 infection.

Discussion

The presented case study concerning a road accident of an ambulance transporting a patient with confirmed SARS-CoV-2 infection was the first such case reported in Poland. Appropriate actions by the medical dispatcher receiving the accident report, PPE used at the incident site by attending emergency services responding to the scene, the flow of information between the emergency services and cooperation with the sanitary inspection was a result of the preparation of appropriate procedures in the current epidemic situation.

It should be emphasized that PPE in the era of the SARS-CoV-2 pandemic is of interest to researchers, which is reflected in numerous scientific publications.[8–12] In the current pandemic, researchers and organizations present recommendations on adequate and necessary PPE for health care professionals when in contact with infected patients worldwide, with particular emphasis on donning face masks, eye protection, gloves, or protective suits.[8,9] Donning face masks reduces the risk of upper respiratory tract infections, which is vital for health care workers and communities worldwide.[10,11] Tabah et al. (2020) conducted an international study on the safety of intensive care units' employees and their protective equipment in the era of SARS-CoV-2.[12] The research highlighted that more than half of the surveyed health care workers currently use N95/FFP2 masks, protective suits, face shields, and double gloves in their daily care for patients.[12]

In sum, the assessment of the sanitary inspection emphasizes that awareness of the risk of SARS-CoV-2 infection, compliance with anti-epidemic procedures, and professional responsibility of emergency service officers are the greatest way to prevent transmission of coronavirus infections. In turn, according to the EMS dispatcher, the driver of an ambulance transporting a patient infected with SARS-CoV-2 should be entirely excluded from medical care for the patient, isolated from the medical compartment, and should not use protective goggles and protective suit, as they cause discomfort while driving, limit vision and perception, affecting the safety of the transportation. In the opinion of police, a post-accident investigation by road traffic police officers displayed that the universal procedures when using PPE, tactics of taking legal action, and transfer of information between the officers and on-duty dispatcher are sufficient and adequately protect the health of the officers who intervene. Although there are no detailed guidelines regarding the safety proceedings at the road accident site involving a person infected with SARS-CoV-2, the application of general safety regulations seems to be sufficient.

Neither the sanitary inspection nor the dispatcher of the emergency medical system nor the commanding officers of the fire service and the police employed any preventive measures concerning any of the incident participants in the form of isolation, quarantine, forced hospitalization, or diagnostic tests for SARS-CoV-2.

Moreover, 30 days after the incident, no SARS-CoV-2 infection was found among the EMS officers who participated in the activities at the scene of the accident.

Conclusions

Medical transport of a patient with confirmed infection of SARS-CoV-2 due to PPE that restricts the freedom of movement and the field of view while driving an ambulance should be considered a high-risk procedure for patients and paramedics. At the same time, the limited space in the ambulance and care including various medical interventions during transport result in a higher risk of virus transmission compared to other health care facilities.

To reduce the risk of SARS-CoV-2 transmission during medical rescue operations at the scene of the incident, and during patient's transport, the information gathered by the emergency number dispatch operator is of key importance. Also, PPE of emergency officers at an incident site as a minimum standard and cooperation between services based on jointly developed procedures are required.

It seems necessary to conduct further research on the use of adequate and required PPE for health care professionals, particularly employees of emergency medical teams, during patient care, including hospital transport.

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