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## Nosocomial COVID-19 infection in patients with nasal trauma during coronavirus pandemic

Cover Page Footnote

None.

# Nosocomial COVID-19 infection in patients with nasal trauma during coronavirus pandemic

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## Abstract

**Objectives:** Considering the reduction of patients' attendance in hospitals, including patients with nose fracture, in fear of COVID-19 transmission, this study aims to investigate the risk of nosocomial COVID-19 transmission in patients with nasal trauma seeking medical care in hospital.

**Methods:** Patients with nasal trauma referred to our specialized ENT referral center were evaluated, treated, and followed, up to two weeks. After discharge, COVID-19 symptoms were questioned by telephone, and additional assessments were requested for suspected patients.

**Results:** Out of 108 patients with possible nasal fracture, 27 didn't need nasal reduction after physical examination while 81 required nasal bone reduction. Only one of the patients contracted the virus in the 2-week follow-up period, and the difference between the two groups was not statistically significant.

**Conclusion:** Patients in need of emergency medical services -like nasal trauma-in outpatient and short-term inpatient settings should not avoid going to the hospitals. This is provided when both medical staff and patients follow the health protocols.

**Keywords:** Coronavirus, COVID-19, Cross Infection, Infection Control, SARS-CoV-2, Nose trauma

## 1. Introduction

The novel coronavirus, also known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), causes coronavirus disease 2019 (COVID-19) and its complications, which pose a unique challenge for disease control and prevention in medical centers [1, 2]. The disease causes a broad spectrum of symptoms, from asymptomatic infection to mild upper respiratory tract disease, severe viral pneumonia with respiratory failure, and even death [3]. Although many infected people have no symptoms, symptomatic patients experience fever, dry cough, fatigue, lethargy, and shortness of breath [4]. COVID-19 is highly contagious, the incubation period is reported to be 5 to 7 to even 14 days, and it is transmitted through aerosols and close contact

with an infected person [5-7]. In fact, this is an airborne disease that can be transmitted from an asymptomatic or symptomatic person to others [8]. Also, the virus can be transmitted from surfaces for up to 3 days [6].

Nosocomial infections are infections transmitted to a patient that is hospitalized for other reasons [1]. There is insufficient data on the chances of coronavirus transmission in hospitals [9]. However, non-COVID-19 patients in need of health services refuse to go to hospitals even in emergencies during the pandemic in fear of contracting COVID-19. This significant reduction in patients' visits causes progressive morbidity and mortality [10].

Treatment of nasal fractures is an emergency, especially in the presence of septal hematoma and/or active bleeding. In addition, nasal bone fractures with extensive displacement can cause a non-reversible deformity if the person does not seek

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medical care in time [11, 12]. The procedure is possible in outpatient or 1-day inpatient settings [11]. Definite nosocomial infection in these patients is defined as the presence of symptoms fourteen days or more after seeking medical care in a hospital, and probable nosocomial infection is the onset of symptoms within seven days of hospital admission with a proven contact with a COVID-19 patient in the hospital [1, 2, 13]. Due to the lack of sufficient information, this study aims to investigate the risk of nosocomial COVID-19 in patients with nasal trauma seeking medical care in the hospital.

## 2. Materials and methods

Institutional Ethics review board approved this study protocol. In this prospective study, patients referred to the Marvasti Hospital, which is a specialized ENT referral center, from June to August 2020 were evaluated, treated, and followed up to two weeks after their first visit. Patients with previous COVID-19 were excluded from the study. Patients with suggestive symptoms (e.g. fever, dyspnea, and cough) were recorded. We also used standard screening protocols (COVID Ab, PCR or chest CT scan) to reveal the infection status of the patients. Asymptomatic patients with COVID infection were excluded from the study. There were no age or gender limitations.

Patients with nasal fractures underwent nasal bone reduction. Patients over 14 years of age were treated in an outpatient setting, while the patients under 14 years of age and adult patients who could not tolerate the procedure under local anesthesia needed a day of hospitalization to treat the fracture under general anesthesia. During the procedure, all the medical staff used personal protective equipment, including masks and disposable gloves and performed frequent washing and hand sterilization in accordance with the institutional health protocols.

Patients were contacted after their discharge to check for clinical COVID-19 symptoms between 5 and 14 days after their procedure. Fever, cough, weakness, shortness of breath, and olfactory dysfunction were asked of all patients, and they could also report any other symptoms to the physician. Coronavirus PCR or chest CT scan was requested in patients who were suspicious of COVID-19 infection.

## 3. Results

One hundred eight patients including 30 females and 78 males with a mean age of 36 years (range, 6

to 77 years) referred to the Nose fracture emergency department of Marvasti Hospital, Tehran, Iran from June to August 2020.

Eighty-one of these patients - 19 women and 62 men - needed fracture reduction (group A), and 27 patients - 11 women and 16 men - did not need reduction after the physical examination (group B). The gender difference between the groups was not significant.

Seven patients under 14 years of age were transferred to the operating room due to intolerance to the outpatient procedure. In other patients, the nasal bone reduction was performed on an outpatient basis after infra-orbital and supratrochlear nerve blocks with 4% lidocaine and insertion of a xylocaine-soaked pledgets under the nasal bone to anesthetize the mucosa.

In the follow-up, only one out of 108 clients, who was among group A, had olfactory dysfunction ten days after his first visit. The coronavirus PCR result was positive for the patient and his wife, child, and father - with whom he had close contact - and his father needed hospitalization. Follow-up continued until the patient, and all three people in contact with him recovered. There was no statistically significant difference between groups A and B in terms of nosocomial COVID-19 transmission.

## 4. Discussion

Determining the risk of COVID-19 nosocomial infection is influential in macro-decisions and can help decision-makers set guidelines or advise and inform the public [1, 2, 14]. The present study showed that in outpatient and short-term hospitalizations of trauma patients, the probability of nosocomial infection is low provided that protective measures-e.g., proper ventilation in the clinic and operating room, maintaining physical distance, use of gloves, masks, and goggles by the treatment staff, and rules of mandatory masking for patients-are met. Therefore, by strictly following these measures, patients can be recommended to refer in case of emergency.

Risk factors for nosocomial infection include age over 70, immunosuppression, ICU admission, history of trauma, use of antibiotics, and catheter use [15]. As a result, the lower number of nosocomial infections in this study may be due to the outpatient management of most of the patients.

The incidence of COVID-19 nosocomial infection has been reported in studies to have a vast range. In a study in Wuhan, China, the incidence of nosocomial COVID-19 was reported to be more than 41% [16]. However, this rate was reported at the

beginning of the pandemic, when the use of personal protective equipment was not yet standardized and common, and also, the hospitalization ward for patients with COVID-19 was not separate from other patients. These cases probably explain the reason for the high percentage of nosocomial COVID-19 infection reported in this study. In another study by Carter *et al.* in the UK, the rate was reported to be 12.5% [1]. Although in contrast to our study, they included the patients with longer hospital stays and patients admitted to the ICU. In contrast, in a study by Chang *et al.* in Hong Kong, none of the 42 patients who were admitted to the hospital developed nosocomial COVID-19 infection. In this study, personal protection, recurrent hand washing, ventilation of rooms, and isolation of patients were highly emphasized, so the adherence to restrict protocols was considered the leading cause of patient protection [17]. However, the number of included patients was less than other studies, which may impact the nosocomial infection rate.

All cases of nasal fractures can be treated electively, except in the presence of septal hematoma or active bleeding [11, 18]. Endoscopic examination of the nose should be avoided. Also, vasoconstrictor and local anesthetic agents should be used before the manipulation, for which a combination of oxymetazoline and 4% lidocaine is used [18]. Intranasal sprays should also be avoided as they have a chance of increasing secretions and spreading the virus in the environment [19].

There are some limitations in our study that should be mentioned. One of the main limitations is the lack of primary infection source identification. To determine the source, studying the genome of the virus can be helpful, which of course is not readily available in the clinic. Second limitation was that we didn't seek the incidence of infection in the treatment staff. Third limitation is that we followed our patients with phone calls and we based our post-exposure diagnosis on symptomatic patients. Our primary screening methods were also not homogenous because it was not ethical to pose extra expenses on patients to screen all of them with same exam and this also would increase the number of visits in hospital and other places like laboratories, imaging centers, and general transportation systems which would cause bias in our results. So it was wiser to limit hospital visits to one and base our pre-exposure diagnosis on whatever the patient could provide. Finally, our information may not be accurate for all hospitals and treatment centers because the conditions, facilities, and the number of COVID19 patients admitted can vary.

## 5. Conclusion

In this study, it was shown that if the treatment staff and patients follow the health protocols, the incidence of COVID-19 symptoms in the outpatient and short-term inpatient setting is negligible. Further high-quality studies are recommended to rectify the limitations of this study for improving guidelines and decision-making in this epidemic and subsequent possible epidemics.

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## Conflict of interest statement

The authors have no conflict of interests.

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