



Short Report | Kısa Bildiri

PROTECTION FROM AEROSOLS DURING MICROSCOPIC MASTOID SURGERY IN THE COVID-19 PANDEMIC

COVID-19 PANDEMİSİNDE MİKROSKOPİK MASTOİD CERRAHİSİ SIRASINDA OLUŞAN AEROSOLLERDEN KORUNMA

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ABSTRACT

Objective: To design a protective method from aerosols during mastoid surgery in COVID-19 pandemic.

Methods: We designed and applied a barrier tent from microscope to surgical field for four procedures of otologic surgeries.

Results: There were no symptoms nor signs of COVID-19 infection in the surgery team.

Conclusion: This protective method will provide a safe and comfortable way to perform microscopic mastoid surgery.

Keywords: Covid-19, mastoid surgery, barrier tent, aerosols

ÖZ

Amaç: COVID-19 pandemisinde mastoid cerrahisi sırasında oluşan aerosollere karşı koruyucu bir yöntem geliştirmek.

Yöntem: Dört otolojik cerrahi için mikroskoptan cerrahi sahaya uzanan bariyer çadır dizayn edip, uyguladık.

Bulgular: Cerrahi ekipten COVID-19 semptomu gösteren kimse olmadı.

Sonuç: Bu koruyucu yöntem mikroskopik mastoid cerrahisi uygulaması için güvenli ve konforlu bir yol olarak görünmektedir.

Anahtar Kelimeler: Covid-19, mastoid cerrahisi, koruyucu çadır, aerosol

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Introduction

COVID-19, a member of the Coronaviridae family, is a mono-chain, positive polarity, enveloped RNA virus which started as an epidemic in December 2019 in Wuhan, China and developed into a pandemic.¹ COVID-19 causes a dense viral load on the upper respiratory tract (URT) in infected individuals. For this reason, otorhinolaryngologists are at great risk during both examination and surgery due to released aerosols from the patient's URT.² It is reported that the virus was found in the middle ear due to the direct relation between the middle ear and the nasopharynx.³ High speed drilling and irrigation during mastoid surgery increase aerosol release.⁴ An N95 mask, a face shield, glasses, a bonnet and overalls are the main items of personal protective equipment (PPE).¹ The difficulty of working while wearing a face shield and the increased risk of aerosolization during microscopic surgery led us to take more precautions. Thus, we aimed to design a more comfortable and useful method for protection from aerosols.

Methods

A senior surgeon (FM) performed four microscopic mastoid surgeries in a tertiary hospital at the height of the COVID-19 pandemic in our country. The first patient was a 24-year-old female with a recurrent cholesteatoma. The second patient was a 59-year-old male with a massive cholesteatoma eroding the posterior wall of the external ear canal. The third patient was a 51-year-old female with a recurrent cholesteatoma with vertigo. On these patients, we performed a canal wall down mastoidectomy and tympanoplasty with mastoid cavity obliteration. The last patient was a 41-year-old female with a draining ear having a marginal perforation in the anterosuperior quadrant. On this patient we performed a canal wall up mastoidectomy and an anterior pull through tympanoplasty.

We designed and placed an isolator tent between the surgical area and the microscope to protect the surgeon, resident, nurses and anesthetists. The top of the triangle was on the microscope. The tent covered all surgical areas from the top of the operating table to the neck of the patient. The tent was flexible enough to allow the surgeon and the resident to use their hands comfortably. All patients had COVID-19 PCR tests 24 hours before the surgery, and all were negative. All participants in the operating room used N95 masks, and all except the surgeons also wore a face shield.

The first case was prepared and draped. After the incision and preparation of the fascia of the temporalis muscle, a 200x300 cm arthroscopy covering (Tio Medikal Inc., İzmir, Turkey) with a large elastic hole in the center was placed on the microscope (Figure 1). Two other holes were cut for the oculars of the surgeon and the resident. The principal surgeon put his hands in the surgical field from the inferior of the triangle, and a bigger hole was

cut for the resident's arms to reach the surgical field. An extra aspiration system was placed on the tent to aspirate the aerosols in the mastoidectomy region. The major deficiency with this tent was the opacity of the cover, which meant the surgeon could not see the patient with naked eyes. Consequently, we decided to use a transparent cover for the subsequent patients.



Figure 1. The opaque barrier tent with arthroscopic cover

In the second operation, we placed a second microscope cover (Morton Medical Inc., İzmir, Turkey) on the oculars. Because of the narrowness of the cover, we cut it vertically and pasted the edges to the surgical field with sterile plaster. The principal surgeon placed his hands in the surgical field from inferior of the triangle, and a hole was cut for the resident's arms to reach the surgical field. As with the first surgery, an extra aspirator was used. For the last two operations, we decided to reverse the cover, and cut the distal one third. After removing the first microscope cover's lens cover, we placed the second reversed microscope cover's lens to the microscope. The second cover was spread over the surgical area (Figure 2). This method took the least preparation time.

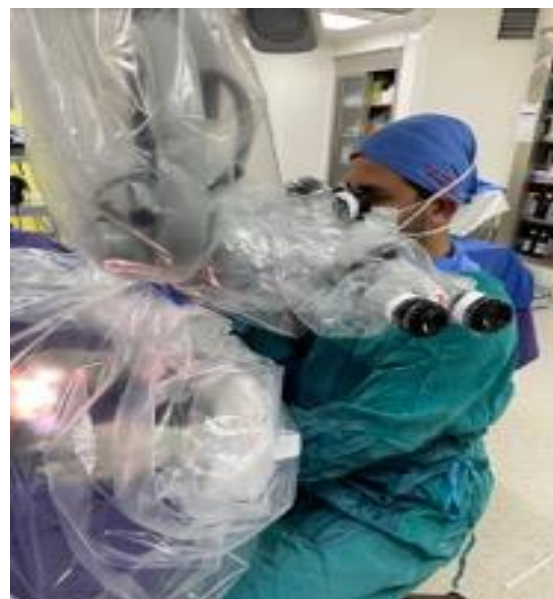


Figure 2. The transparent barrier tent with microscope cover

Results

None of individuals in the operating room during these surgeries had COVID-19-like symptoms for at least three weeks afterward.



Figure 3. The bone dust spread to the medial surface of the transparent barrier tent

Discussion

No clear statement has been made about the spread of COVID-19 during mastoid surgery. COVID-19 RT-PCR test sensitivity is between 50-79% in some studies.⁵ Thus, in a pandemic we must behave as though all patients undergoing mastoid surgery are positive, and that adequate PPE must be used.⁶ Dhruv et al. showed the contamination of the fluorescent particles during mastoid surgery.⁷ Chen et al. pointed out the spread of bone dust during mastoid surgeries.⁴ We also saw bone dust on the medial surface of the cover and we did not see bone dusts on outer side of the tent (Figure 3). Performing surgery under a cover did not put the surgeon in an uncomfortable position. The covers used in this method were very cheap (about 5 USD each), so there was not a significant extra cost. The preparation time was 15 minutes for the first operation but only five minutes for the last operation. Thus, the operation time did not increase by much. For complications of acute or chronic otitis media, emergency surgery could be required without a COVID-19 test being administered first.⁸ Based on the results of our study, it is difficult to say that the barrier tent method is a method that will provide definite protection against COVID-19. However, this protective method can provide a safe and comfortable operation in cases requiring emergency mastoid surgery. More studies are needed to quantify the protection of the barrier tent method against COVID-19 and all microorganisms with similar transmission pathways.

Compliance with Ethical Standards

The Ethics Committee of Kocaeli University approved the study (Decision number: KÜ GOKAEK-2021/16.01; date: 23.09.2021).

Conflict of Interest

The authors declare that they have no conflict of interest.

Author Contribution

FM, AAE, MÖ: Concept; FM, AAE, MÖ: Design; FM, AAE, MÖ: Supervision; FM, AAE, MÖ Resources; FM, AAE, MÖ: Materials; FM, AAE, MÖ: Data collection and/or processing; FM, AAE, MÖ: Analysis and/or interpretation; FM, AAE, MÖ: Literature search; FM, AAE, MÖ: Writing manuscript; FM, AAE, MÖ: Critical review.

Financial Disclosure

None.

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