



# Failed Mask Ventilation due to Air Leakage around the Orbit in a Patient with a History of Radical Maxillofacial Surgery with Orbital Exenteration

Orbital Ekzenterasyon ile Birlikte Radikal Maksillofasiyel Ameliyatı Öyküsü Olan Bir Hastada Orbita Çevresindeki Hava Kaçağından Kaynaklanan Başarısız Maske Ventilasyonu

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A 72-year-old male (height: 160 cm, weight: 53 kg) was scheduled to undergo left renal and male with ans uterine tract resection. The patient had previously undergone right radical maxillofacial surgery with orbital exenteration 14 years before the present operation to treat squamous cell carcinoma of the right maxillary sinus, with tumour invasion to the orbital floor. An anaesthesiologist encountered difficulty in performing mask ventilation during the induction of anaesthesia in the patient, despite a good mask fit on the face, because the adhesive tape around the orbit had moved. Urgent endotracheal intubation was successful without desaturation. A postoperative examination revealed that a communication between the nasal cavity and the orbit was visible on computed tomograms obtained nine years before the surgery. The patient felt the air leakage around the adhesive tape. The anaesthesiologist should have removed the adhesive tape to directly observe the lesion and should have realised that the communication might cause difficulty in mask ventilation. Careful examination of the airways using computed tomography and precise interviews may improve the understanding of patients' airways and may help avoid similar events.

**Keywords:** Airway management, maxillofacial surgery, orbit

Yetmiş iki yaşındaki bir erkek hastaya (boy: 160 cm, ağırlık: 53 kg) sol renal ve uterin septum rezeksiyonu uygulanması planlandı. Hasta 14 yıl öncesinde, sağ maksiller sinüste oluşan ve orbita tabanına yayılım gösteren yassı epitel hücreli karsinoma tedavisi için orbital ekzenterasyon ile birlikte sağ radikal maksillofasiyel cerrahi geçirmiş. Anestezist, maskenin hastanın yüzüne uygun olmasına rağmen, orbita çevresindeki yapışkan bant hareket ettiği için, indüksiyon boyunca maske ventilasyonunun uygulanmasında zorluk yaşadı. Acil olarak yapılan endotrakeal entübasyon, desatürasyon olmadan başarılı bir şekilde uygulandı. Postoperatif incelemede nazal kavite ile orbita arasındaki temasın ameliyattan 9 yıl önce çekilen bilgisayarlı tomogramlarda görülebildiği ortaya çıktı. Hasta yapışkan bant etrafındaki hava kaçağını hissedebiliyordu. Anestezistin lezyonu direkt olarak gözlemlemek için yapışkan bantı çıkarması ve temasın maske ventilasyonunda zorluğa neden olabileceğini farketmesi gerekiyordu. Bilgisayarlı tomografi kullanılarak havayollarının detaylı bir şekilde incelenmesi ve görüşmelerin dikkatli yapılmasıyla, havayolları daha iyi anlaşılabilir ve benzer olaylardan kaçınılabilir.

**Anahtar Kelimeler:** Havayolu yönetimi, maksillofasiyel cerrahi, orbita

## Introduction

Securing the airway in a patient with a history of maxillofacial surgery may be difficult, particularly when the surgery involves the patient's airway. A previous study investigating the predictors of difficult intubation in patients who underwent maxillofacial surgery found that difficult intubation occurred in 6 of 18 (33.3%) patients with a history of major head and neck surgery (1). In particular, difficult mask ventilation sometimes results in difficult intubation (2). In this report, we describe a case in which we experienced failed mask ventilation in a patient with a good mask fit who had previously undergone right radical maxillofacial surgery with orbital exenteration.

## Case Presentation

A 72-year-old male (height: 160 cm, weight: 53 kg) was scheduled to undergo left renal and urinary tract resection. Written informed consent was obtained from the patient for the publication of this report. The patient had previously undergone right radical maxillofacial surgery with orbital exenteration 14 years before the present operation to treat squamous cell carcinoma of the right maxillary sinus, with tumour invasion to the orbital floor.

The patient could fit more than three fingers into his mouth. His tongue size was normal. An epidural tube was inserted at the level of T11-12. The patient's right orbit was covered with an adhesive tape. An anaesthesiologist confirmed a good

mask fit on the face before the induction of anaesthesia. After the induction of general anaesthesia using propofol and rocuronium, the anaesthesiologist encountered difficulty during mask ventilation and realised that the adhesive tape around the orbit had moved, allowing air leakage. The anaesthesiologist quickly and successfully intubated the patient with an endotracheal tube (7.5-mm internal diameter) without desaturation. At the time, the patient was classified as Cormack - Lehane grade 2. The operation proceeded without any further events. The operation time and anaesthesia time were 191 min and 254 min, respectively. Mild sore throat and no pain were observed.

The patient postoperatively declared that he had felt the air leakage around the adhesive tape. His postoperative examination revealed that while the adhesive tape was initially properly attached around the orbit and oral cavity (Figure 1), it shifted during the Valsalva manoeuvre while the nares and mouth were held shut by attending physicians. Computed tomograms obtained nine years before the present surgery revealed a communication between the nasal cavity and the orbit (Figure 2).

**Discussion**

In this patient, mask ventilation failed because of the air leakage around the orbit during the induction of anaesthesia in a patient who had previously undergone radical maxillofacial surgery with orbital exenteration. In this patient, who had previously undergone radical maxillofacial surgery with orbital exenteration, mask ventilation failed because of the air leakage around the orbit during the induction of anaesthesia. The presiding anaesthesiologist and the other anaesthesiologist did not realise before anaesthesia induction that the communication between the nasal cavity and the orbit could lead to difficulty in mask ventilation.

There have been several reports on difficulties in the airway management of patients with maxillofacial trauma (3, 4). One study found that difficult intubation occurred in 6 of 18 (33%) patients who underwent maxillofacial surgery and previous major head and neck surgeries (1). However, reports concerning patients who underwent radical maxillofacial surgery with orbital exenteration are rare.

The anaesthesiologists did not realise the potential airway problem because the hard palate seemed normal and the orbit was covered with the adhesive tape. The patient felt was feeling the air leakage around the adhesive tape. The anaesthesiologists should have removed the adhesive tape to directly observe the lesion and should have interviewed the patient regarding issues related to airway management. The airway history or physical examination results may provide indications for additional diagnostic testing in some patients. Certain diagnostic tests [e.g. radiography, computed tomography (CT) scans and fluoroscopy] can identify various acquired or congenital features in patients with difficult airways (5).



Figure 1. The oral cavity and the right orbit covered with an adhesive tape

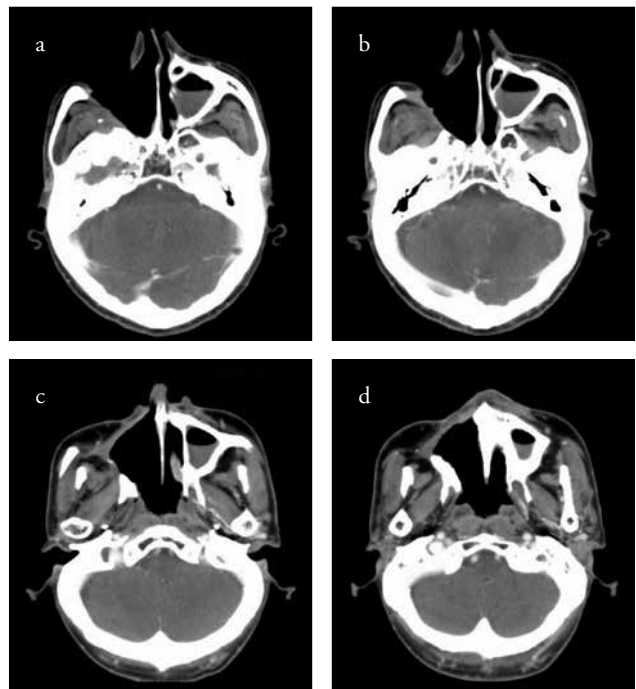


Figure 2. a-d. Computed tomograms of the head. A communication exists between the nasal cavity and the orbit

If we had known of a possible air leakage around the surgical cavity (scar or wound) preoperatively, we would have filled the cavity with an appropriate material and used a large adhesive cover, such as a drape. A more firmly attached adhesive tape might have prevented air leakage. Larger face masks [total or full face continuous positive airway pressure masks (6)] that can cover both orbits might facilitate mask ventilation in patients with communications between the nasal cavity and the orbit.

The anaesthesiologist decided to intubate after observing the failed mask ventilation. If the intubation had been unsuccessful, a supraglottic airway device might have been effective in the present case because it would have prevented leakage around the glottis and thus would have stopped the air leakage through the orbit.

Anaesthesiologists may select awake intubation in patients with facial defects or disfigurement (7). In 38 claims regarding anticipated difficult airways in an American Society of Anesthesiologists (ASA) closed-claims analysis, the first strategy was more likely to be intubation after the induction of general anaesthesia (followed by failed ventilation) with ventilation ablated (61%) than awake intubation (32%) (8). However, awake intubation is not always successful. Awake intubation was attempted but was unsuccessful in 12 claims, resulting in death or brain damage in 75% (8).

When faced with difficult intubation, we adhere to the 'Practice Guidelines for Management of the Difficult Airway' published by the ASA (9). In our hospital, an Airway Scope (Pentax, Tokyo, Japan), a GlideScope video laryngoscope (Verathon, Tokyo, Japan), Mallinckrodt intubating stylets (Covidien, Medtronic Japan Co., Tokyo, Japan), an LMA Fastrach (Teleflex, the Laryngeal Mask Company Limited, Le Rocher, Victoria, Mahé, Seychelles) and a fiberoptic bronchoscope (Olympus, Tokyo, Japan) are available for intubation. We often use the Airway Scope in patients with difficult laryngoscopy.

## Conclusion

A history of maxillofacial surgery may result in difficult airways or was plural. A careful examination of airways using CT, even with images acquired approximately a decade previously, and precise interviews may improve the understanding of patients' airways and help avoid similar events.

**Informed Consent:** Written informed consent was obtained from patient who participated in this case.

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