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When the Mask Doesn't Fit: A Modified Bag Mask Technique

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Bag mask ventilation is central to airway management, especially in the context of sedation and general anesthesia [1]. It can often save a patient's life until a more secure airway is established or until the patient is awakened if attempts at intubation fail. In certain situations, awakening the patient may not even be an option. However, bag mask ventilation (BMV) can be difficult or even impossible in patients with abnormal facial features [2]. Facial abnormalities such as an elongated face, facial asymmetry, or midface hypoplasia can result in a poor mask fit making mask ventilation very challenging. Additionally, application of excessive force in order to achieve a tight mask fit may result in trauma to the bridge of the nose, lower jaw line, and the submental area. Custom printed 3D masks have been reported but are not widely available [3].

We describe a nontraditional positioning of the usual anesthesia face mask to rescue a failed bag mask ventilation scenario. By placing the mask directly over the mouth and chin and occluding the nostril, an adequate seal can be obtained when it may not have been previously possible. We have found this technique to be useful in adolescents when an adult face mask does not form a proper seal and for whom the largest adult face mask is too small. Figure 1 shows this technique being used on a 17-year-old male, 62 kg patient with achondroplasia without dwarfism. After routine IV induction with 1 mcg/kg of fentanyl, 1 mg/kg of lidocaine, and 3 mg/kg of propofol, the patient experienced progressive upper airway obstruction despite maintenance of spontaneous ventilation. BMV was inadequate due to improper seal on the sides of the mask. The top, hard plastic rim of the mask pressed on the bridge of the nose making it impossible to press the mask down any further to create a good seal. Inflating the mask with more air did not improve the fit and we were already using the largest, adult size mask available at our institution – Vital Signs™ Adult Face Mask with Adjustable Air Cushion Size 5 (Vyaire ™ Medical, Inc. Mettawa, IL). The mask was also rotated upside down to create a seal without improvement. It shortly became impossible to deliver positive pressure ventilation. We placed an oral airway, but our mask fit was still inadequate. We then moved the mask lower on the face, so it covered only the chin and mouth. The nose was pinched closed and the seal was adequate up to now deliver adequate ventilation based on end tidal CO_2 reading and visible chest rise. The mask applied in the matter described provided a secure seal for positive pressure mask ventilation and occluding the nostrils prevented air from escaping through the nose. Alternatively, a sport nose clip may be used if another clinician is not readily available.

Figure 1: Bag mask ventilation with the nostrils occluded, oral airway in place, and mask over the mouth and chin creating a tight seal.

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The ASA difficult airway algorithm recommends placing a supraglottic airway if BMV fails [2]. However, patients may not be at an appropriate level of anesthesia for LMA placement during the early stages of induction of anesthesia risking coughing, laryngospasms, aspiration and hypoxemia. We have used this technique of masking in 2 adolescent patients with dysmorphic facial features in the past and both times achieved success to rescue a failed bag mask ventilation. Further investigation analyzing specific facial features and age groups in which repositioning the mask over the mouth and submental area with the nostrils occluded may be warranted due to the potential lifesaving alternative to LMA placement or intubation.

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