A Simple No-Cost TSE “Mask” Reduces Severe Desaturation and Improves Oxygenation in Obese Patients under Propofol Sedation during Upper GI Endoscopy

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Introduction: Patients routinely receive IV sedation and supplemental oxygen (O2) via nasal cannula (NC) during upper GI endoscopy (EGD). Nasal cannula becomes ineffective in delivering O_2 when the mouth is kept open by a bite block. Over-sedation and/or airway obstruction may cause severe desaturation.

Obese patients have increased risk of respiratory complications due to airway anatomy, obstructive sleep apnea, decreased FRC and high O_2 consumption.

A simple plastic sheet was shown to improve oxygenation in sedated patients by transforming a NC to a face tent (TSE "Mask") during EGD[1-3]. We examined its effectiveness in improving oxygenation in obese patients during EGD.

METHODS: This retrospective review of 344 patients undergoing EGD (EGD, EUS, ERCP, EGD/Colonoscopy or PEG) identified 2 groups.
Group1 (NC, n=76) received NC O_2.
Group 2 (TM, n=268) received NC O_2 and a TSE “Mask” from the start using a clean plastic specimen bag [1-3]. It covered patient's eyes, nose and mouth.

Monitors included ECG, BP cuff, pulse oximetry, capnography and oximetry. Patients received NC O_2 (3-5 l/min, or higher) and only iv propofol.
Data collected for comparison included age, height, weight, ASA Physical Status Classification (using 1 for ASA I, 2 for ASA II, 3 for ASA III and 4 for ASA IV), baseline O_2 saturation Sat), highest NC O_2 flow rate, FiO_2, O_2 Sat every 5 min, the lowest O_2 Sat, severe desaturation (O_2 Sat <85%), total amount of propofol, procedure duration, assisted bag-mask ventilation and FiO_2.
Student t-test and the Chi Square test were used for analysis. A p value <0.05 was considered as significant. Data are presented as Mean±S.D.

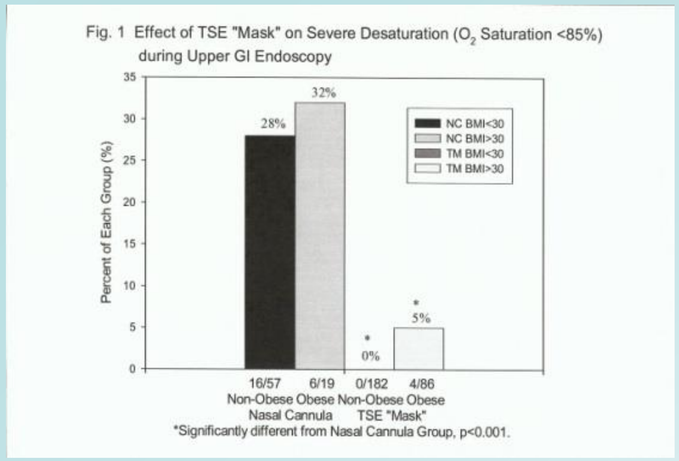
RESULTS: Among **non-obese patients (BMI <30),** there were no differences in age (NC: 61±19 yrs; TM: 61±17), BMI (NC: 24.5±3.6; TM: 24.2±3.5), ASA Physical status (NC: 2.2±0.7; TM: 2.3±0.8), room air (RA) O_2 Sat (98±2%), duration (NC: 30±19 min; TM: 31±20) and propofol dosage (NC: 206±83 ug/kg/min; TM: 215±94) between groups.

There were significant differences in the **highest O_2 flow (NC: 5.3±2.4 l/min; TM: 4.6±1.1),** O_2 Sat after 5 min with O_2 (NC: 99±1%; TM: 100±1%), **the lowest O_2 Sat (NC: 89±11%; TM: 97±3%) (Fig. 1), severe Desat (O_2 Sat≤ 85%) (NC: 16/57; TM: 0/182) and assisted bag-mask ventilation (NC: 7/57; TM: 0/182).**

RESULTS(continued):

Among **obese patients (BMI>30),** there were no differences in age (NC: 57±16 yrs; TM: 59±17), ASA Physical status (NC: 2.3±0.7; TM: 2.5±0.7), RA O_2 Sat (97±2%), O_2 Sat after 5 min with O_2 (99±1%), highest O_2 flow (NC: 5.4±1.7 l/min; TM: 5.6±1.8), duration (NC: 25±11 min; TM: 26±17) and propofol dosage (NC: 202 ± 61 mcg/kg/min; TM: 192±79) between groups.

There were **significant differences** in **BMI (NC: 32.3±2.2; TM: 35.1±5.3), the lowest O_2 Sat (NC: 87±14%; TM: 94±6%) (Fig. 1), severe Desat (O_2 Sat ≤85%) (NC: 6/19; TM: 4/86) and assisted bag-mask ventilation (NC: 4/19; TM: 2/86).**



In 28 NC patients, their **NCs** were converted to TSE “Masks” due to severe desaturation (O_2 Sat: Non-Obese: 81±11%, n=22; Obese: 78±16%, n=6). O_2 Sat was greatly improved 5 and 10 min after adding TM (Non-Obese: 92±6%, 95±4%; Obese: 95±5%, 97±4%).

FiO_2 was higher in TM patients (0.49±0.13) than NC patients (0.30±0.08).

DISCUSSION: These data show that TSE “Mask” improves oxygenation and reduces severe desaturation and the need of assisted bag-mask ventilation in both non-obese and obese patients during EGD.

This simple face tent takes less than 10 seconds to prepare at no cost. It may have great impact on patient safety in obese patients and should be routinely used during EGD.

References: 1. James Tse, Shaul Cohen and Paul Stricker: A simple and effective technique to increase oxygenation for patients with nasal cannulae during upper endoscopy. Anesthesiology 102: 484, 2005;
2. Shaul Cohen, Tamir Ben-Menachem, Adev Kuppusamy, Shruti Shah and James Tse: TSE “Mask” improves oxygenation in deeply sedated patients with nasal cannula during upper endoscopy. Anesthesiology 107:A922, 2007;
3. www.TSEMask.com