Anaesthesia with THRIVE in Microlaryngeal Surgery is a Game Changer

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Abstract: Background: Microlaryngeal surgeries (MLS) are typically performed under general anaesthesia either by employing a microlaryngeal tube or by providing apnoeic oxygenation without endotracheal intubation using high-frequency jet ventilation. Though the micro laryngeal tube impedes surgical access less than conventional endotracheal tubes (ETT), it does not provide an unobstructed view of the larynx. Jet ventilation is used as an alternative to endotracheal anaesthesia, but it may cause movement of the vocal cords, barotrauma and tumor implantation in the trachea. Transnasal Humidified Rapid-Insufflation Ventilatory Exchange (THRIVE) is a technique that uses rapidly insufflated, heated, humidified gases administered via high flow nasal cannula (HFNC) to achieve apnoeic oxygenation. There is an emerging literature that has demonstrated the safety and feasibility of using THRIVE as the sole mode of oxygenation for such procedures. In the present study, we aimed to assess the feasibility and safety of tubeless micro laryngeal surgery using THRIVE under TIVA with BIS and muscle relaxation.

MATERIALS AND METHODS: After approval from the institutional ethics committee, a case note review was conducted of 21 patients who underwent elective micro laryngeal surgery over a period of one year (Dec 2019-Dec 2020) using total intravenous anesthesia and THRIVE. Pertaining to THRIVE, the following parameters were collected - Duration of safe apnoea (defined as spO2 >90%), need for rescue ventilation, and build-up of CO2. ETCO2 values were recorded following the normal ventilation using I-Gel. Also, in this study, the surgeon was asked to rate the following using a 5-point Likert scale: Ease of introduction of DL scope, Ease of reaching the lesion, Field quality, Overall impressions. Results: The mean apnoea time observed in our study was 27.85 (±5.87) minutes. Total theatre time (time in - time out of theatre) was 56.6 minutes (±11.8 minutes) which is shorter than the routine method with the same surgeon. No major complication noted apart from desaturation to 85% in 3 patients with a mean apnoea time of 30 mins ETCO2 was measured immediately after resuming normal mechanical ventilation with the help of supraglottic airway at the end of surgery. Mean ETCO2 at 0 minutes- 66 mmHg , at 2 minutes - 53 mmHg, at 5 minutes - 45mmHg Surgeon’s satisfaction was rated as either excellent (70 %) or good (30 %) in all patients. Conclusion: The authors propose that, in carefully selected patients, a combination of THRIVE and TIVA offers a good alternative to conventional anesthesia with micro laryngeal tubes. Our study demonstrated a safe apnea time of 27 mins with an acceptable CO2 build-up. Also, compared to historical controls in our institution, theatre time was greatly reduced in these patients. Finally, surgeon acceptance of the technique was extremely promising and the operating conditions were highly rated by them. We propose that a formal prospective case-control study might add further credence to the safety and efficacy of this NOVEL technique.

Keywords: apnoeic oxygenation, micro-laryngeal surgery, TIVA, trans-nasal rapid insufflation, ventilatory exchange

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