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Does Supplemental Oxygen Affect the Humidity Provided by Tracheostomy HME (Heat Moisture Exchange) Devices?

Authors: Sara Ilyas[1*], Brendan A McGrath[1,2], Athia Haron[1]

1: University of Manchester, Manchester, United Kingdom
2: Manchester University NHS Foundation Trust, Manchester, United Kingdom
*Corresponding Author: sara.ilyas@student.manchester.ac.uk

Background: Despite widespread use of HME devices with oxygen ports in tracheostomised patients, the impact of supplemental oxygen on humidification performance remains poorly understood, with no published data. Inadequate humidification may lead to mucosal damage, thickened secretions and airway obstruction.1,2 We hypothesised that increasing oxygen flow via the HME port reduces the absolute humidity provided. This study aimed to assess this effect using a simulated tracheostomised airway.

Methods: Expired tracheal airflow was simulated with a Bellavista 1000 ventilator (Zoll Medical, USA), MR850 Humidifier (Fisher & Paykel, NZ), AirSim Combo anatomical dummy (TruCorp, NI) and BlueSelect size 9 tracheostomy tube (ICU-Medical, UK). Three HME devices (Atos-Freevent, Atos-Trachphone, ICU-Medical Thermovent) were tested across five supplemental oxygen flow rates (0, 1, 2, 4, 10 L/min). Each condition was tested in triplicate. Absolute humidity was measured within the HME devices using a Sensirion SHT85 temperature and humidity detector (Sensirion, CH). Data was analysed in SPSS-30.0 using the Kruskal-Wallis test with post-hoc pairwise comparisons ($p < 0.05$).

Results: Statistically significant but small differences in absolute humidity were observed across oxygen flow rates for all three devices, with all maintaining humidity above 26 g H2O/m3. Only two devices met the ISO 9360 standard of delivering 30 g/m3 (compared with 44 g/m3 in the human trachea).

Conclusions: Although the hypothesis was not consistently supported, these results provide quantitative evidence that entraining oxygen into tracheostomy HMEs causes variable changes in humidity, which may increase the clinical risk of dried secretions and tube blockage.

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A Prospective Comparative Study Between Conventional Open Plating Versus Minimally Invasive Plating Technique for Midshaft Clavicle Fractures

Authors: Nagendra Manju Prasad B S[1*]

1: SSMC, Tumkur, India
*Corresponding Author: nagendrampbs@gmail.com

Background: Clavicle fractures account for about 44%-66% of injuries to the shoulder girdle.
Till now, conventional open plating was practiced in displaced clavicle fractures. The concept of minimally invasive plating in clavicle fractures is least explored. The aim of this study was to compare the Functional (using Constant & Murley Score) & Radiological outcome of Conventional Open versus Minimally invasive plating techniques in the fixation of mid-shaft clavicular fractures.

Methods: This is a prospective comparative study of 80 displaced clavicle fractures treated with open plating & minimal invasive technique at a tertiary referral centre. All clavicle fractures seen in the emergency were alternatively allotted into 2 groups after inclusion and exclusion criteria was met.
40 Patients were treated with minimal invasive plating (Group 1) & 40 with open plating (Group 2). Functional outcome was measured in terms of Constant & Murley Scoring System. Radiological outcome was assessed by serial X rays at 8,12,16 and 24 weeks and VAS (Visual analogue scale) scoring for pain.

Results: Group 1 who were treated with minimal invasive plating had an average radiological union time of 7.2 weeks & group 2 had 8 weeks
Constant & Murley scoring was better in group 1 compared to group 2 ($p<0.05$)

Conclusions: From our study, it can be concluded that minimal invasive plating had excellent outcomes as compared to open plating methods in midshaft clavicle fractures in terms of Constant & Murley scoring, radiological union and VAS score.