

Comparison of Formulae for Orotracheal Intubation Depth in the Paediatric Population

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Abstract

Introduction: Multiple formulae have been proposed for calculating oro-tracheal depth for paediatric intubation. However, literature on the validation of these formulae in the emergency department setting is limited. Three methods described in the local Advanced Paediatric Life Support curriculum include the Broselow tape, endotracheal tube (ETT) size x 3, and the age-based formula of age divided by 2, add 12. We aimed to determine their accuracy. **Materials and Methods:** Patients with intubation performed in the Children's Emergency from 1 January 2009 to 31 December 2013 were included in this retrospective observational study. The depths of ETT placement based on the formulae were calculated from the actual depth of ETT. ETT position between T2 to T4 vertebral bodies of the chest radiograph was taken as the reference position for radiological accuracy. **Results:** ETT size x 3 has the highest accuracy of 76.5%, as compared to 67.9% for age-based formula and 63.5% for Broselow tape. When the formulae were inaccurate, Broselow tape often predicted a depth that was too shallow as compared to ETT size x 3 ($P = 0.006$) and age-based formula ($P = 0.011$). The accuracy of Broselow tape was not uniform across the age groups, with highest accuracy in patients 1 to 8 years old. ETT size x 3 had the highest accuracy in patients weighing more than 25 kg. **Conclusion:** ETT size x 3 was superior for determining oro-tracheal intubation depth but cannot preclude the confirmation of appropriate placement of ETT by auscultation and chest radiograph.

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