DEM Journal Club

Article Appraisal

Article: Defining the criteria for intubation of the patient with thermal burns, Budulak *et al.* Published in *Burns* (2018)

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Background and Study Objective(s):

This was a retrospective review of all patients intubated for thermal burns at an American Burn Association-approved Level 1 burn centre between 2008-2013. The authors state that previous research suggests that thermal burn patients are being intubated unnecessarily and that they aim to decrease the number of unnecessary intubations. They aimed to do this by 2 methods: determining the sensitivity and specificity of the American Burn Association (ABA) intubation criteria and secondly to develop their own clinical decision rule (the Denver criteria) for intubation in thermal burns.

Study Design:

This study is a retrospective review of intubated patients admitted to a level one burn centre between 2008-2013. Logistic regression was then used to determine the specificity and sensitivity of the ABA criteria. As well, the authors performed a multivariable logistic analysis of the ABA criteria as well as "traditional" intubation criteria to develop their own clinical prediction rule, the Denver Criteria.

Results:

This study included 218 patients. 151 of these patients had long-term intubations (fewer than 26 ventilator-free days out of 28). 67 had short-term intubations. (greater than 26 ventilator-free days). The ABA criteria for intubation had a sensitivity of 77% and a specificity of 46% for long-term intubations. The Denver criteria had a sensitivity of 95% and a specificity of 24% for long-term intubations.

Validity of Results:

There are several methodological errors with this paper. Firstly, the criteria in the clinical prediction rule are not well defined. Variables like respiratory distress, hypoxia etc are not assigned numerical values and are left to clinician judgement. A great deal of information is lost when complicated variables are turned into dichotomies – respiratory distress, yes or no. This paper also employs a logistic regression to determine the sensitivity and specificity of the ABA and Denver criteria. Logistic regressions assume that all the variables are independent. However, this is likely

not the case. Patients with facial burns are more likely to have swelling on laryngoscopy than patients who do not. More broadly, the study uses short vs long-term intubations as surrogate markers for unnecessary and necessary intubations respectively. By doing this, the authors are likely missing short, necessary intubations and including long-term unnecessary intubations complicated by pneumonia etc.

Generalizability of Results:

This study was carried out in a level one trauma/burn centre which is broadly applicable to our patient context. However, the dichotomous variables would generate significant inter-use variability and be difficult to apply clinically. As well, many of the variables included in the decision rules are classic indications for intubations anyway.

The Bottom Line:

The study aims to address a potentially interesting question – which burn patients need to be intubated? There are however several methodological flaws (mentioned above) that call into question the validity of the study. There is also no mention of burn palliation. Patients with >60% TBSA burns are unlikely to survive yet this factor is not mentioned in management of thermal burn patients.