Effects of using the simplified airway risk index vs usual airway assessment on unanticipated difficult tracheal intubation - a cluster randomized trial with 64,273 participants

A. K. Nørskov[1,2,*], J. Wetterslev[2], C. V. Rosenstock[1], A. Afshari[3], G. Astrup[8], J. C Jakobsen[2,9], J. L. Thomsen[10], M. Bøttger[4], M. Ellekvist[3], B. M. B. Schousboe[5], A. Horn[11], B. G. Jørgensen[12], K. Lorentzen[13], M. H. Madsen[1], J. S. Knudsen[14], B. K. Thisted[15], S. Estrup[16], H. B. Mieritz[17], T. Klesse[18], H. J. Martinussen[19], A. G. Vedel[6], R. Maaløe[20], K. B. Bøsling[21], P. R. C. Kirkegaard[22], C. R. Ibáñez[23], G. Aleksandraviciute[24], L. S. Hansen[25], T. Mantoni[7] and L. H. Lundstrøm[1]

[1]Department of Anaesthesiology, Copenhagen University Hospital, Nordsjællands Hospital, Dyrehavevej 29, Hillerød 3400, Denmark, [2]Copenhagen Trial Unit, Centre for Clinical Intervention Research, Copenhagen University Hospital, Rigshospitalet, Copenhagen 2100, Denmark, [3]Department of Anaesthesiology, Juliane Marie Centre, Copenhagen University Hospital, Rigshospitalet, Copenhagen 2100, Denmark, [4]Department of Anaesthesiology, Centre of Head and Orthopaedics, Copenhagen University Hospital, Rigshospitalet, Copenhagen 2100, Denmark, [5]Department of Anaesthesiology, Neuroscience Centre, Copenhagen University Hospital, Rigshospitalet, Copenhagen 2100, Denmark, [6]Department of Anaesthesiology, Heart Centre, Copenhagen University Hospital, Rigshospitalet, Copenhagen 2100, Denmark, [7]Department of Anaesthesiology, Abdominal Centre, Copenhagen University Hospital, Rigshospitalet, Copenhagen 2100, Denmark, [8]Department of Anaesthesiology and Intensive care, Section South, Aarhus University Hospital, Aarhus 8000, Denmark, [9]Department of Cardiology, Copenhagen University Hospital, Holbæk 4300, Denmark, [10]Department of Anaesthesiology, Copenhagen University Hospital, Herlev Hospital, Herlev 2730, Denmark, [11]Department of Anaesthesiology, Bekkevold Private Hospital, Hellerup 2900, Denmark, [12]Department of Anaesthesiology, Frederiksberg Hospital, Copenhagen University Hospital, Frederiksberg 2000, Denmark, [13]Department of Anaesthesiology, Glostrup Hospital, Copenhagen University Hospital, Glostrup 2600, Denmark, [14]Department of Anaesthesiology, Lillebælt Hospital, Kolding 6000, Denmark, [15]Department of Anaesthesiology, Copenhagen Private Hospital, Lyngby 2800, Denmark, [16]Department of Anaesthesiology, Nykøbing Falster Hospital, Copenhagen University Hospital, Nykøbing Falster 4800, Denmark, [17]Department of Anaesthesiology, South Jutland Hospital, Aabenraa 6200, Denmark, [18]Department of Anaesthesiology, South Jutland Hospital, Sønderborg 6400, Denmark, [19]Department of Anaesthesiology, Private Hospital Kollund, Kollund 6340, Denmark, [20]Department of Anaesthesiology, Bispebjerg Hospital, Copenhagen University Hospital, Copenhagen 2400, Denmark, [21]Department of Anaesthesiology, Roskilde Hospital, Copenhagen University Hospital, Roskilde 4000,

Denmark, [22]Department of Anaesthesiology, Næstved Hospital, Copenhagen University Hospital, Næstved 4700, Denmark, [23]Department of Anaesthesiology, South Jutland Hospital, Haderslev 6100, Denmark, [24]Department of Anaesthesiology, Thy-Mors Hospital, 7700 Thisted, Denmark, and [25]Department of Anaesthesiology, Lillebælt Hospital, Vejle 7100, Denmark

*Corresponding author. E-mail: anderskehlet@hotmail.com

Abstract

Background: Unanticipated difficult intubation remains a challenge in anaesthesia. The Simplified Airway Risk Index (SARI) is a multivariable risk model consisting of seven independent risk factors for difficult intubation. Our aim was to compare preoperative airway assessment based on the SARI with usual airway assessment.
Methods: From 01.10.2012 to 31.12.2013, 28 departments were cluster-randomized to apply the SARI model or usual airway assessment. The SARI group implemented the SARI model. The Non-SARI group continued usual airway assessment, thus reflecting a group of anaesthetists' heterogeneous individual airway assessments. Preoperative prediction of difficult intubation and actual intubation difficulties were registered in the Danish Anaesthesia Database for both groups. Patients who were preoperatively scheduled for intubation by advanced techniques (e.g. video laryngoscopy; flexible optic scope) were excluded from the primary analysis. Primary outcomes were the proportions of unanticipated difficult and unanticipated easy intubation.
Results: A total of 26 departments (15 SARI and 11 Non-SARI) and 64 273 participants were included. In the primary analyses 29 209 SARI and 30 305 Non-SARI participants were included.

In SARI departments 2.4% (696) of the participants had an unanticipated difficult intubation vs 2.4% (723) in Non-SARI departments. Odds ratio (OR) adjusted for design variables was 1.03 (95% CI: 0.77–1.38). The proportion of unanticipated easy intubation was 1.42% (415) in SARI departments vs 1.00% (302) in Non-SARI departments. Adjusted OR was 1.26 (0.68–2.34).
Conclusions: Using the SARI compared with usual airway assessment we detected no statistical significant changes in unanticipated difficult- or easy intubations. Clinical trial registration. NCT01718561.

Key words: airway management; cluster analysis; preoperative care; randomized controlled trial

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Editor's key points

- The 'Simplified Airway Risk Index' (SARI) may be a reliable model in predicting difficult tracheal intubation, but its reliability has not been verified sufficiently.
- The reliability of preoperative airway assessment based on the SARI was compared with usual airway assessment in predicting difficult intubation in a large number of patients.
- There was no significant difference between the SARI and the usual airway assessments in predicting difficult intubation.

Difficult airway management remains the main cause of adverse events in anaesthesia and the anaesthetist is daily faced with the challenge of predicting airway related difficulties.[1] Difficult tracheal intubation prompts increased risk of morbidity and mortality. Preoperative identification of patients at risk of intubation difficulties allows for thorough planning and may prevent negative outcomes by allocation of relevant personnel and resources.[2]

The 4th National Audit Program (NAP4) and major national anaesthesia societies recommend preoperative assessment of the patients airway,[1] [3–5] but it remains unclear exactly how this assessment should be performed. Consequently, the choice of airway assessment is left at the discretion of the anaesthetist and the prediction of intubation difficulties is therefore ultimately based on each anaesthetist's subjective assessment. There is no standard for preoperative airway assessment in Denmark, thus varying between departments and between providers.[6] In

a previous study we found the diagnostic accuracy of the prediction made by the individual anaesthetist to be poor, with 75–93% of all difficult intubations being unanticipated.[7] We found it intuitive to speculate that a uniform and systematic approach could have a positive impact on this. Furthermore, studies have indicated, that by combining several risk factors for difficult intubation the predictive accuracy of the examination may improve.[8–10] Therefore, it seemed reasonable to assume that the predictive accuracy would improve when introducing a systematically used multivariable model for airway assessment. Several risk models for prediction of difficult intubation have been proposed.[9–11] However, none have been prospectively tested in an independent cohort, thereby testing the generalizability of the model. The 'Simplified Airway Risk Index' (SARI) as proposed by El-Ganzouri and colleagues[10] is such a model and seems to be the best available model because of several important strengths: it was developed from a large study material; it is fast to perform; and it is easily learned and implemented in a clinical setting. Large randomized trials testing the clinical impact of predictive models are seldom performed before models are introduced into clinical practice. This induces risks of over-estimating the models' predictive potential.[12] [13] A comparative design is required when the impact of a new model is to be tested and it is optimally done in a (cluster) randomized trial comparing the model to usual care.[12] [13] No randomized trials exist on optimal preoperative airway assessment and the level of evidence is low on this topic.[2] Millions undergo tracheal intubation every week, thus we found it clinically relevant to test the impact of implementing a systematic, multivariable airway assessment. We hypothesized that this intervention could improve the predictive