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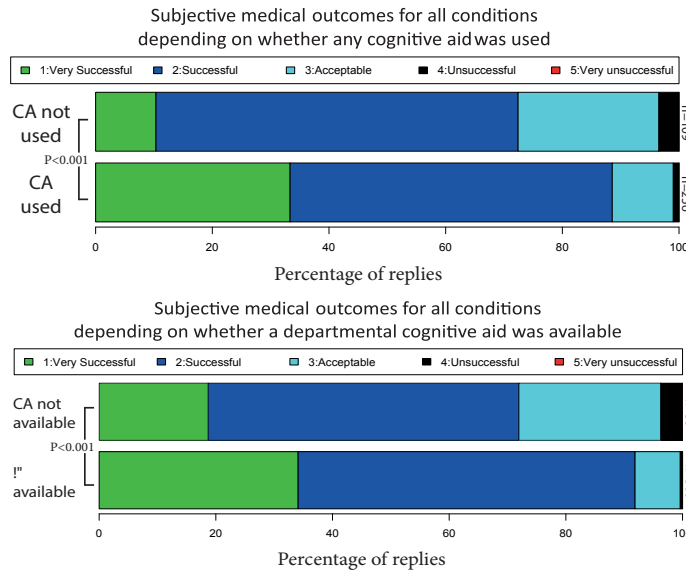
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# Attitudes and use of cognitive aids during anaesthetic crises in Sweden: an electronic survey

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**Background and Goal:** Written or computerized resources designed to reduce human errors when tasks are being performed are called “cognitive aids” (CA’s). CA’s can consist of checklists or algorithms presented in various formats. International associations have produced and published collections of CA’s for use during anaesthetic crises but there is at present no such Swedish equivalent. Despite CA’s for anaesthetic emergencies being intuitively attractive, there is an absence of large clinical trials evaluating their effectiveness: the only hard evidence supporting their use is from simulation-based studies.<sup>1</sup> The aim of this study was to describe attitudes towards, the distribution and use of CA’s for anaesthetic crises in Sweden. This study is part of a bigger project within the Swedish Society of Anaesthesia and Intensive Care (SFAI) with the ultimate goal of creating and implementing a national Swedish collection of CA’s.

**Method:** Following ethical approval, an electronic survey was constructed using Google Forms<sup>®</sup>. The survey was sent by e mail to all members of SFAI. Among other questions we asked if the respondents had been exposed to any of three given crises during the last year so as to specifically ask whether they had used CA’s and how subjectively successful the medical outcome had been. The crises we enquired about were anaphylaxis, massive bleeding and malignant hyperthermia. These three conditions were chosen since they vary in incidence and therefore familiarity. Pearson’s Chi-squared test was conducted to test categorical data and the Kruskal-Wallis-test and Wilcoxon’s rank sum-test were used to analyse continuous data that were collected in order to investigate attitudes towards CA’s.

**Results and discussion:** A total of 279 anaesthetists responded to the survey. 168 were men, 99 were women and 1 was X. Swedish anaesthetists generally have a positive attitude towards CA’s. The mean attitude-score of all of the respondents towards CA’s for anaesthetic crises was 4,2 (where 1 was ‘very negative’, 5 was ‘very positive’). Around 2/3 of departments have common collections of CA’s for anaesthetic crises, most commonly provided on the intranet of hospitals. These are workstation computer based CA’s and are thus not always optimally suited for use in crisis-situations. Smartphone apps are the most commonly reported type of ‘own’ CA. This finding points towards a need for CA’s to be presented in a way that overcome issues of portability and accessibility. For a full specification of all of the CA’s used by the respondents, see Table 1.

Among the respondents who had encountered one or more of our three different crises, departmental or ‘own’ CA’s were used in 70% (256/365) of the cases. This is more than we had expected and it points towards a cultural acceptance of CA’s in Sweden. The respondents who had used CA’s in treating our three crises reported significantly more successful medical outcomes than respondents who had treated the conditions without the assistance of CA’s (p<0.001). Figure 1 displays the distribution of reported medical outcomes. Respondents from hospitals that had departmental CA’s available for our three specific conditions reported significantly more successful medical outcomes than respondents from hospitals where departmental CA’s were not available (p<0.001), see Figure 2.

**Table 1: All of the cognitive aids reported to be used by the respondents**

Smartphone apps	Intranet (Departmental CA’s)	Internet
Swedish Society of Allergy guidelines for anaphylaxis	Stanford emergency manual <sup>®</sup>	Malignant hyperthermia-checklist in “MH-box”
Airway-algorithm on airway-cart	Self-written CA’s	Anaesthetic crisis manual <sup>®</sup>
CPR-checklist for children and adults	CPR-poster	Checklists from Swedish Society of Junior Anaesthetists
Departmental SOP’s	“Published checklists”	Published algorithms
Memorised checklists	SBAR-checklist	Dosage tools
FASS (Swedish formula)	A-B-C-D-E-checklist	CPR-algorithm on defibrillator
Swedish Society for Anaesthesia and Intensive Care guidelines for anaphylaxis	Crisis Management in Anaesthesiology <sup>®</sup>	PediSTAT-app <sup>®</sup>
iAnestese	Pedi safe-app <sup>®</sup>	Drug doses <sup>®</sup>
Posters	Swedish Society of Thrombosis and Haemostasis guidelines for massive bleeding	Copenhagen Pediatric Emergency-app <sup>®</sup>
Massive bleeding-checklist in “Massive bleeding-box”	Akut intern medicin <sup>®</sup>	PubMed-articles

It is interesting that both the respondents who had used CA’s, and that those who worked at an institution where a departmental cognitive aid was available, reported significantly more successful medical outcomes. It indicates that CA’s do have the capability of improving patient care. This should be of clear interest to departmental managers who are able to make CA’s available to their employees.

**Conclusions:** In Sweden, anaesthetists’ attitudes towards CA’s are generally positive and we have shown that CA’s have the potential to subjectively improve medical outcomes. The use of CA’s is widespread in Sweden, but their design and the way in which these CA’s are made available is probably not always optimal. We suggest that the creation and implementation of a national Swedish anaesthetic emergency manual would improve patient care. This should be made available in both paper form and as a smartphone app.

(1) Marshall S. The use of cognitive aids during emergencies in anesthesia: a review of the literature. *Anesthesia and analgesia*. 2013;117(5):1162-71.