SPEEDBOMB - a simple and rapid checklist for Pre-hospital Rapid Sequence Induction

Lars Mommers MD, anesthesiologist, fellow in Intensive Care Medicine[1]

Sean Keogh FRCSEd, FRCP, FIMC, FCEM, FACEM, professor[2]

[1]Department of Intensive Care Medicine, Maastricht University Medical Centre, Maastricht, The Netherlands; [2]University of the Sunshine Coast, Maroochydore, Queensland, Australia

Corresponding author:

Dr. Lars Mommers

Department of Intensive Care Medicine, Maastricht

University Medical Centre Maastricht
PO Box 5800, 6202 AZ,
Maastricht, The Netherlands.

Email: l.mommers@mumc.nl

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Abstract

Pre-hospital emergency medical services often operate in the most challenging and austere environments. Checklist use for complex tasks in these circumstances is useful, but must make task completion simpler, faster and more effective. The SPEEDBOMB checklist for Pre-hospital Rapid Sequence Induction (PRSI) management rapidly addresses critical steps in the RSI process, is designed to improve checklist compliance and patient safety, and is adaptable for local circumstances.

Introduction

Prehospital rapid sequence induction is a critical and high-risk intervention that often engenders clinician stress, even in experienced pre-hospital care medical practitioners. Hostile or cramped environments, inadequate or excessive lighting conditions, unfamiliar team composition, multiple distractions, time constraints and the presence of a critically ill, non-fasted patient are some of the many issues that make this pre-hospital intervention a challenge.

Checklists are useful to structure complex tasks and to help prevent omissions, facilitating successful task completion.(1, 2) To be successfully adopted, a checklist must be seen to be relevant and useful rather than a nuisance task.(3) Rapid sequence induction is an intervention in which checklist use is strongly advised,(4) and numerous checklists have been developed that are often detailed and predominantly for use in the more controlled in-hospital environment. Our retrieval organisation has previously used a detailed checklist that, although valuable, often took too long to complete in a time-critical emergency with limited staff availability operating in sub-optimal conditions. This resulted in poor checklist use compliance, a well recognised clinical risk issue.(5)

CareFlight Queensland has created and introduced an abbreviated PRSI checklist, SPEEDBOMB, comprised only of the most critical components of a PRSI that are at risk of omission, table 1. The content and practical use of SPEEDBOMB was specifically designed as an adjunct to time-critical PRSI using the Development – Drafting – Validation process for medical checklists recommended by Gawande and Boorman(6) and purposely does not address issues such as airway evaluation, difficult airway algorhythms or post-intubation care, for which separate information resources are available (7, 8). An element of flexibility has been inbuilt for different operators and different services, such as the type of induction drug chosen or the non-specific failed airway back-up plan, whereas other elements, such as the requirement for end-tidal carbon dioxide ($ETCO_2$) measurement, are fixed as these are regarded as crucial for PRSI safety(8, 9).

A small printed and laminated version of the checklist is available in all airway bags carried by our service and the clinical team must make reference to it just prior to induction, rather than relying on memory. The check items are spaced widely enough to allow the clinician's thumb to accurately move down the checklist as each section is verified. As a new checklist, SPEEDBOMB also has the advantage that doctors and paramedics from different organisations, who may have previously used

differing checklists with resultant confusion on scene, now have an identical reference checklist to use during training and in the field.

Checklists and the SPEEDBOMB mnemonic

SPEEDBOMB is a 'challenge-confirm' (or 'challenge-response') rather than a 'call-do-response' checklist, and is used to *verify* that critical tasks have already been completed, using mutual supervision. With practice, a 'challenge-confirm' checklist is less time consuming than calling a task, completing the task, then moving on to the next task and makes it less likely that a mistake will pass un-noticed following sequence interruption.(10)

In order to improve speed and flow, the checklist is not designed to be consulted prior to, or during, PRSI preparation, rather it is expected that all medical staff should know, through regular training, the proper set up for the procedure without physical reference to the checklist, though using a 'mental' SPEEDBOMB if desired. Once PRSI preparation is complete, medical staff may commence induction only after a final and rapid team challenge-confirm SPEEDBOMB reference to capture and correct any omissions.

In practical terms, the doctor calls the listed item, preferably makes eye contact with the paramedic, the doctor and paramedic verify it is complete, then the paramedic calls the verified status of the item, for example using a phrase such as 'check'. Verification should not be vocalised before it has actually occurred, a common error in a high-pressure clinical scenario. The concept of 'chunking', where several headline components are called and verified in one go is not recommended as it relies on short and long term memory – exactly what the checklist seeks to avoid.

The SPEEDBOMB subheading read-through and verification takes about 45 seconds and uses standard abbreviations understood within our service. Once the checklist is finished, the challenging clinician should declare 'SPEEDBOMB checklist complete'

Summary

SPEEDBOMB is not the only PRSI checklist available(8) and it is specifically not designed to be exhaustive, but we believe it offers a viable and flexible alternative for those seeking a faster and more focused check prior to PRSI in the time-critical treatment of the injured patient.

Table 1: SPEEDBOMB mnemonic

S **Suction**
- 2 x working suction

P **Positioning**
- MILS C-spine
- Clinically appropriate (obesity, pregnancy, etc)

E **Equipment for intubation**
- 2 x laryngoscope and blade
- Bougie
- ET tubes plus syringe

E **End-tidal CO_2**
- Quantitative capnography on BVM OR
- Alternative capnography ready to go

D **Drugs and IV access**
- 2 x IV / IO access
- Drugs, pre-drawn, labeled, standard concentrations
    - Pre-medication (if appropriate)
    - Induction
    - Paralytic(s)
    - Vasopressors

B **Back up airway ready**
- BVM and airway adjuncts *plus*
- LMA out and ready *plus*
- Surgical airway kit out and ready

O **Oxygen**
- O_2 to patient – BVM / NRM plus nasal prongs
- O_2 supply adequate

M **Monitoring minimum**
- Pulse rate and short interval BP
- SpO_2 and ECG

B **Briefing**
- Roles (who is doing what)
- Plan A – conventional or video laryngoscopy
- Plan B – alternative airway (LMA or surgical) as appropriate

Standard dilutions in standardised syringes are used within our service, according to local Standard Operating Procedures MILS = manual in-line stabilisation, ET tube = endotracheal tube, BVM = bag-valve mask, OPA = oropharyngeal airway, NRM = non-rebreather mask, LMA = Laryngeal Mask Airway, IV = intravenous, IO = intra-osseous

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