



# How aware is safe enough? Situational Awareness is higher in safer teams doing Simulated emergency airway cases.

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### References

1. Crozier M, Ting H, Boone D, O'Regan M, Bandrauk N, Furey A, Squires C, Haggood J, Hogan M. Use of Human Patient Simulation and Validation of the Team Situation Awareness Global Assessment Technique (TSAGAT): A Multidisciplinary Team Assessment Tool in Trauma Education. *Journal of Surgical Education*. 2015 72 (1) p156 - 163

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### Background:

Situational Awareness (SA) is the ability to identify, process, and comprehend the critical elements of information about patient condition, stability, the team and operational environment and an appropriate clinical course. The New Brunswick Trauma Program delivers a Simulation Based Medical Education (SBME) program to 20 acute hospitals. The simulation program is embedded in a translational research program in collaboration with the Department of Emergency Medicine, Saint John Regional Hospital. [www.sjrhem.ca/research](http://www.sjrhem.ca/research) The priorities for the SBME program are Inter Professional Education (IPE), developing resilient practitioners, and improve teamwork. SBME is part of an education program [www.nbrauma.ca/education](http://www.nbrauma.ca/education)

Figure 1. TSAGAT Tool

SAGAT			
Perception	Actual	Response	Correct?
1. What was the RR prior to induction?			N / Y
2. What was the SpO2 prior to induction?			N / Y
3. What was the heart rate, blood pressure?			N / Y
4. What was found on chest exam?			N / Y
5. What was found on neurological exam?			N / Y
Comprehension			
6. Was the patient hemodynamically stable?			N / Y
7. What was the cause of the abnormal vital?			N / Y
8. What dose of induction agent was given?			N / Y
9. What dose of paralysis was given?			N / Y
10. Has the patient's hypoxia responded as expected after insertion of the definitive airway?			N / Y
Projection			
11. What other drugs and therapies might the patient need to continue their critical care?			N / Y
12. What other tests might the patient need?			N / Y
13. What further definite care might the patient need?			N / Y
Participant:	Total Score:		/ 13

### Methods:

The Team Situational Awareness Global Assessment Technique (TSAGAT- Figure 1.) is a validated tool for measuring situational awareness in simulated trauma scenarios <sup>1</sup>. The TSAGAT tool was used to measure situational awareness at the end of simulation sessions during a series of standardized high fidelity advanced airway management simulations. *This is different from previous TSAGAT methods stop scenarios at preselected points. For this analysis situational awareness was considered for physician team leaders.* Thirty eight simulated emergency airway cases (Figure 2) were performed from September 2015 to October 2017.

TSAGATS are reported for Physician Team Leaders. Eight standardized cases were used whose educational objectives were to develop the optimization of critically ill patients prior to induction, to deliver patient centred anesthesia and to choose an appropriate airway strategy. Cases were divided into two groups; those that contained critical errors and those that did not based on video assessment. Video Assessment was conducted by 1 reviewer. Critical errors were defined as failure of Oxygenation, Shock correction, Induction dose estimation or Choice of airway management paradigm. TSAGAT scores were non-normally distributed, so results were expressed as medians with interquartile ranges. Mann Whitney U tests were used to calculate statistical significance.

Figure 2. Standardized Simulation case

Set	Briefing	Main Objectives	Equipment
Adult patient Stretcher Resusc Non-hazardous environment Time: 45 mins Simulation: 22 Debrief: 23	A 34 year old male has lost control of his ATV and hit a tree GCS 6 + 9 132, BP 95/65 ETA 3 mins START: Briefing the team pre-arrival of patient in ED END: Once tube is secured, post induction analysis and sedation on board, MTP started	1. Establishes situational awareness of physiology and injuries 2. Maintains airway control 3. Team uses CPM 3. Recognize Head injury requiring neurocritical care 4. Recognizes shock requiring pelvic stabilization and MTP 4. Uses RSI Checklist and Kit Dump	Sim Man (preferably 3g) BVM Fluid, giving set, cannula, dressing Drug monograph for Ketamine and Rocuronium Drugs pouch ETT 8, ESCO2, C/round, HME, CPA NPA Laryngoscope 3 Mac x 3 Pelvic Sling Fale Blood.
<b>Competency Elements</b> Knowledge: Indications and contraindications for RSI, RSI Drug doses, major clinical effects and side effects. Management of Head Injury Indicators for MTP Skills: Laryngoscopy Using checklist and kit dump, Using the pelvic sling Behaviors: Metacognition, Cognitive Resilience, Communication, Situational Awareness and Situational Control.			
Simulation Start State:	Position: Supine on stretcher Silent Physiology: A - - scoring, requiring per structure B - - r 4, SpO2 89% C - - P 141 AF SR, BP 8/160 D - - GCS E1V2 M+ = 7, Slown right eye E - Temp 37, Glucose 7 Small edg	Obvious pathology: Head Injury Bruising over pelvis and perineum (H+ compound femur fracture)	Concealed pathology: Open book Pelvic Fracture
<b>Expected course:</b> Assesses ABCDE on arrival. Applies Oxygen, IV access, bloods, monitoring. Max aggressive basic airway Wastes Pelvic set/ NewThomas, splint pelvic; activates MTP; gives TXA, Blood. Responds to blood to BP of 105 after 4 units of blood. Identifies need for tracheal intubation. Dose adjusts induction agent given shock for mass of 80 Kg. 80mg (1.0 mg/kg) Ketamine or 8-10mg Etomidate. Extends Anesthesia: Ketamine or Propofol given unstable. Expedites CT Trauma. Considers angiography/Orthopaedics.			

### Results:

38 Physicians lead 38 cases. The majority of the cases were team lead by a family doctor (n = 30, 78 %). Of the 38 cases, 14 contained one more critical errors (37%). The median TSAGAT score in the group that contained critical errors was 8 +/- 2 (IQR). The median TSAGAT Score in the group that contained no critical errors was 11 +/- 2 (IQR). The median scores were significantly different with a p-value of 0.02.

	Critical Errors n = 14	No Critical Errors n = 24
TSAGAT Score	8 +/- 2 (IQR)	11 +/- 2 (IQR)

### Discussion:

**Limitations.** This study has the following limitations; 1 Only one video reviewer was used to identify errors, 2. These are simulated and not real cases, 3. The whole group is small 4. Important confounders were not considered because of small subgroup sizes. **Conclusion.** In this study in simulated emergency cases *higher TSAGAT scores were associated with teams leaders that did not commit safety critical errors. Safety critical error were also prevalent in the whole cohort.* **Further work.** This is the initial analysis to develop standards for simulation performance in Emergency Department teams. Scenarios need further video review by and inter-professional team. The influence on SA and safety critical errors by other factors needs to be considered including prior training, knowledge, skill, team leadership and teamwork.

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