Human Factors in Complex Airway Management

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from the article, highlights:

- "Human factors have been defined as 'the environmental, organizational, and job factors, and human and individual characteristics which influence behavior at work in a way which can affect health and safety' (1) and have been described with particular relevance to anaestheisa in the Anaesthetists Non-Technical skills Framework.

- 1. Health and Safety Executive, *Reducing Error and Influencing Behaviour,* HSG48, London: HSE books, 1999;2

from the abstract and introduction

- Fourth National Audit Project of the Royal College of Anaesthetists
- Examined major complications in airway management
- Poor human factors could have contributed to 40% of cases reported
- In 25% of cases, inadequate human factors were felt: major contributor
- Average of Four human factors issues per reported case
- (article describes importance of human factors when dealing with patients with an '*anticipated difficult airway*')
- Six specific human factors in complex airway management:

Leadership

- Important that the team is aware as to who is in charge of the case
- The leader is usually the most experience anesthesiologist
- Formulate the airway management plan & communicate with team
- Allocate roles with the team, identify any limitations
- Maintain situational awareness and not become task fixated while the airway is being secured
- Define trigger points for moving from *Plan A* to *Plan B*, and further

Teamwork

- Good teamwork is integral (paramount) to success in all airway management
- Especially in anticipated difficult airway
- Team: distinguishable set of two or more people interacting dynamically, interdependently and adaptively toward common goal
- Have assigned specific roles and functions to perform
- The team is aware of the plan
- A team briefing will ensure this is achieved, opportunity to ask questions and clarify any differences in opinion

Situational Awareness

- "The perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projection of their status in the near future"

- Loss of situational awareness is one of the most common recurring features in adverse incidents involving airway management"

three stages of situational awareness first

- Gathering information
- Start with taking a history and examining the patient. Supplemental: nasendoscopy, CT scan, discuss with colleagues
- Once airway management occurs, further information from monitors, images on f/o cameras, scopes, tactile feedback
- Mistakes may occur if the individual misinterprets task-relevant information

three stages of situational awareness second

- Interpreting the information
- Mistakes may occur if and individual wrongly perceives specific information
- (one episode of water vapor in the “tube” does not mean the tube is in the trachea)

three stages of situational awareness third

- Anticipating future states
- Mistakes occur if future status is wrongly predicted:
- Either from a poor initial mental model
- Or personal memory failure
- Note: A mental model is and explanation of a person's thought process, or what they expect to happen
- Good situational awareness (anesthesia oriented for us) – the team leader often had both "hands-on" responsibilities and an all-round view of all the events happening

Decision making

- After assessment of the patient before treatment (operation)
- Clinician identifies potential difficulties and problem areas
- Risks and benefits of each potential airway management method need to be weighed
- Risks & benefits vary for each case
- Location of the planned intubation (usually specific room in OR or office)
- Experience level of staff available
- Clinical urgency of the case
- Re-evaluate “Plan A”, take into account significant changes (Plans “B” & “C”)

Followership

- Good leadership is crucial to good teamwork, so is good followership
- "follower" – anyone not acting in the position o leader and responding to organizational actions
- A person who is active rather than passive
- In terms of difficult airway management – anticipates actions, supports the team leader, offers good communication via feedback loops
- "feedback loop" – team leader (sender) transmits an instruction to another member who receives it and then feeds back that they understand the instruction

Communication & team brief

- Paramount to successful execution of securing the patient's airway
- Communication failures responsible for 43% of errors in study of 3 large teaching hospital in USA (*Gawande*)
- Introduction of team members
- Individual levels of training and competencies
- Allocation of tasks
- Discussion of potential problems and highlighting solutions
- Clarification of the team leader's mental model and the airway plan(s)

Communication, special note

- "Sterile Cockpit" concept --- during the intubation attempt
- For the team:
- Noise level is kept to an absolute minimum
- Only required team members present
- This enables all monitors, comments, and instructions to be heard clearly

ADAM six step method

- Aintree Six-step Approach to Difficult Airway Management
- 1. How much time do I have?
- 2. What access to the airway is available (nose, mouth, trachea)?
- 3. How compromised is the airway?
- 4. Which fascial spaces are involved?
- 5. Which management plan(s) best fit the circumstances?
- 6. Could I make the situation worse" if so, how?

ADAM

- Difficult airways are time critical emergencies and can be classified:
- 1 No time for assessment and planning: need to act immediately to avoid hypoxic brain death/injury

- 2 Some time for assessment and planning: the six-step approach is used, remembering that actions can gain or lose time, airway management is a fluid situation. Often incomplete information, necessary to evaluate repeatedly, avoid being too rigid in one's approach

- 3 adequate time for assessment and planning. Structured approach to assess options, evaluate risk, maximize success.