ANESTHESIA SAFETY NETWORK

QUARTERLY PERIOPERATIVE INCIDENTS REPORT

Newsletter #003 – mars 2017

TOWARD EXCELLENCE IN HEALTHCARE

ANESTHESIA SAFETY NETWORK

INTRODUCTION

Anesthesia Safety Network
Newsletter #003 - mars 2017

During the first nine months, there've been more than 600 subscribers. At the beginning of January, the platform's been endorsed by the French Junior Anaesthesiologists Association (residents and fellows in France). The networking is in progress with discussions with French anaesthesiology faculties and also with the French Anaesthesiology and Critical Care Society. Moreover, the ANESTHESIA SAFETY NETWORK platform's been invited to attend to the next congress of PAQS to be held in March 2017 in Bruxelles (Belgium). Last but not least, thank you to the CRNA and registered nurses who've contributed to the quality of this newsletter through their reported incidents

WHEN ONE SHARES A MATERIAL GOOD, ONE DIVIDES IT. WHEN ONE SHARES AN IMMATERIAL GOOD, ONE MULTIPLIES IT

Soudoplatoff's law published in the book of Idriss Aberkane (1)

Dr MARTIN Frédéric - Anesthesia Safety Network

18 bis, rue des Vaussourds, 92500 Rueil-Malmaison // Mail : dr.martin.frederic@gmail.com // Site : anesthesiasafetynetwork.com

EDITORIAL

In the last newsletter, it was mentioned that 80 % of accidents were due to human factors in high-risk industries. Claude Valot (Senior Human Factor Consultant, DEDALE) explained to me that it was wrong. He told me that: '' High-risk industries are man-made systems. Their whole conception is part of a human process so the real involvement of human decision is 100 %.
The rate of 80 % had been taken from a Boeing's study in which it was reported that the crew decision was involved in 75 % of accidents. Nowadays, this statistic is still mentioned but the meaning is completely different. Indeed, pilots are one component of the system. They use devices created by the airline industry and follow rules and procedures established by their company. That's why when an accident occurs, all stakeholders share accountability.''

The analysis of an accident needs to be systemic and looks for all contributory factor types leading to the outcome (Managing the Risk of Organizational Accidents from James Reason (2).
In order to improve the quality of the incidents reported, you'll find out at the end of this newsletter two helpful links for your next report. Also, the Anesthesia Safety Network platform is really grateful for the help of REPORT'in contributing to a better analysis of these incidents.

More than ever, we need to share our sentinel events for the benefit of all including patients and healthcare providers.

Best regards

Frederic MARTIN M.D.

PREVENTING COMPLICATIONS, ERRORS, AND OTHER HARM TOO OFTEN DEPENDS ON THE HEROISM OF CLINICIANS RATHER THAN THE DESIGN OF SAFE SYSTEMS. (1)

Dr MARTIN Frédéric – Anesthesia Safety Network
18 bis, rue des Vaussourds, 92500 Rueil-Malmaison // Mail : dr.martin.frederic@gmail.com // Site : anesthesiasafetynetwork.com

Into the cockpit :

Push buttons and switches that command an irreversible action are guarded, to prevent pilots from operating them by mistake.

Any action on a guarded push button or switch is cross-checked by the other pilot prior to displacing the guard.

When new equipment is installed, everybody is systematically trained to its use.

The good functioning of backup equipment is checked daily or weekly depending on the importance of the system they back up. The good operation of backup batteries is checked every day.

A briefing is given by the captain to his crew before each flight. During this briefing, he invites his colleagues, fellow pilots and cabin crew members to speak up, share doubts and ask questions if need be.

REPORT'in

BLACK OUT IN OPERATING ROOM

After twelve hours during a Saturday shift, a woman presented a spontaneous labour under epidural analgesia. Due to the stagnation of the labour, a C-section was proposed if nothing had changed in the next thirty minutes. At the same time, the local anaesthetic syringe was emptied and the infusion was stopped. Thirty minutes later, the C-section was confirmed and the patient transferred into the operating room. The anaesthesiologist decided to inject a local anaesthetic bolus into the epidural catheter but it was impossible to do despite several attempts. As the patient started to feel painful uterine contractions, he finally performed a spinal anaesthesia (12 mg of bupivacaine hyperbaric and sufentanil 3 mcg) while the surgeon and his assistant were washing their hands outside the OR. At the same time, the interim OR nurse decided to switch on the scialytic lights that had been replaced a few days ago.

Dr MARTIN Frédéric - Anesthesia Safety Network

18 bis, rue des Vaussourds, 92500 Rueil-Malmaison // Mail : dr.martin.frederic@gmail.com // Site : anesthesiasafetynetwork.com

« Black out in the operating room»

Expecting to find the right switch light she pushed on the emergency switch to off which lead to a black out. The anaesthesia station went off due to a lack of battery power and the doors were locked. The patient reported weakness in her two arms and drowsiness. With the cardio-pulmonary monitor out of order, the anaesthesiologist suspected a dramatic fall of blood pressure and injected crystalloids and vasoconstrictor drugs. After many attempts, the door was opened and the patient was transferred into the second operating room. She had low blood pressure and bradycardia without coma. The urgent C-section was performed resulting in a healthy newborn infant.

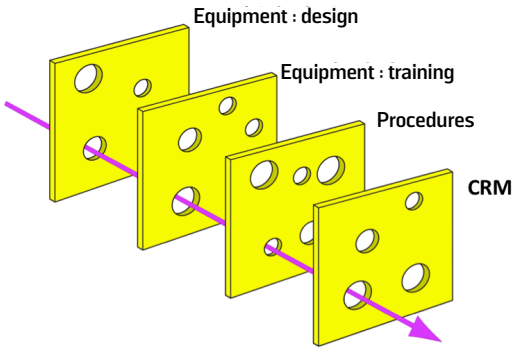
Good points: *good outcome*
Ways for improvement: *new equipment (ergonomy, notice) / avoid stopping epidural infusion before delivery / be aware of total spinal anaesthesia and cardiac arrest / power failure cognitive aids.*
KEY WORDS : semi-urgent C-section / spinal anaesthesia / power failure

The next analysis has been written with the support of REPORT'in - www.reportin.eu

Analysis of the event with the « Swiss cheese » view of James Reason.

According to Reason, every undesirable event is caused by a direct action (e.g. pressing a switch) and by a series of latent conditions.

To learn more : « Managing the risks of organizational accidents » (1997)



	FACT	POSSIBLE SOLUTION
Equipment : design	General shutoff switch badly indicated and not guarded. Door had to be forced open.	Add missing signaling, and place a guard on the switch. Does an emergency door opening system exist in case of power loss?
Equipment : training	Manipulation error (operation of switch) leading to general power loss in O.R. Door had to be forced open.	Has a training been provided to the O.R. staff on the use of new lighting equipment? If an emergency door opening system exists, has the O.R. staff been trained to its use?
Procedures	The backup battery of the scope was missing.	Is there a procedure in force to check backup systems? If so, has this procedure been followed?
CRM	The nurse who pressed the switch thought it was the correct one.	Did the nurse feel confident enough to ask a question to his teammates without being seen as incompetent? An adequate briefing could have eased the expression of doubt.

Dr MARTIN Frédéric – Anesthesia Safety Network
18 bis, rue des Vaussourds, 92500 Rueil-Malmaison // Mail : dr.martin.frederic@gmail.com // Site : anesthesiasafetynetwork.com

APPENDICULAR PERITONITIS IN CHILD 8 Y.O.

A surgeon admitted an eight years old child on a Thursday evening for a suspected case of appendicitis. There was no peritonitis or abscess noticed so the surgeon scheduled a laparoscopy for tne next day with one of his colleagues. The post hoc analysis revealed the onset of an acute renal failure. When the child was operated on at the beginning of the Friday afternoon, the surgeon discovered a diffuse appendicular peritonitis. The nurse who helped the surgeon said that she was concerned about the critical status of the patient but nobody paid attention to her advice, as she said later. There was no organ dysfunction suggesting a septic shock and antibiotics were administered. Before discharging the child into the surgical ward, the anaesthesiologist became concerned and called two colleagues who recommended calling a paediatric surgeon for advice. He didn't call and after a short discussion with her parents, he transferred the child to the adult surgical ward (her mother was a healthcare provider). A few hours later (between 9 and 10 p.m.), the situation worsened with a severe sepsis (confusion, polypnea and oliguria). The night shift anaesthesiologist wasn't aware of the situation and after a quick evaluation decided to transfer the child to a paediatric intensive care unit with a digestive surgery specialisation.

Good points: *call for help / transfer*
Ways for improvement: *foster input and atmosphere of open information exchange among all personnel (nurse, medical doctor, surgeon) / establish clear recommendations before needed / be aware of cognitive bias (confirmation and omission bias) / create a network between non-paediatric and paediatric hospital staff.*
KEY WORDS: communication / delay / transfer by night

CONTRIBUTORY FACTOR TYPES	CONTRIBUTORY FACTOR
Patient factors	Child, 8 years old Appendicular peritonitis. Mother was a midwife
Individual (staff) factors	Biological samples checked ? The second surgeon wasn't the one who admitted the patient
Task and technology factors	Non-paediatric digestive surgeon End of the week and end of the day Bad situation awareness Fear to be viewed as incompetent by paediatric medical team = no call for help
Team factors	Communication among surgical team (the two surgeon) The OR nurse was concerned but nobody listened to her Ask for advice but don't use it The night shift anaesthesiologist discovered this child in the ward without being informed before
Work environmental factors	Paediatric surgery outside specialised environment Not enough specific paediatric equipment Workload was important on Thursday evening
Organisational and management factors	No network with paediatric hospital
Institutional context factors	Few paediatric hospital and often viewed as difficult to convince for an admission in their ward.

Dr MARTIN Frédéric – Anesthesia Safety Network

18 bis, rue des Vaussourds, 92500 Rueil-Malmaison // Mail : dr.martin.frederic@gmail.com // Site : anesthesiasafetynetwork.com

DISTRACTED BY PHONE CALL

A man was admitted to the emergency department for a right shoulder luxation that occurred one hour after eating his dinner. He was in extreme pain and he was nervous. The emergency doctor tried to reduce the luxation but it was impossible. The orthopaedic surgeon decided to fix the problem under general anaesthesia in PACU (usual procedure in our hospital). The equipment was checked before patient arrived with the nurse for a crush induction procedure with tracheal intubation. When the patient arrived he was restless and lying on his left side. The anaesthetist assisted by the PACU nurse proceeded with cardiopulmonary monitoring. At the same time, the doctor's phone rang and he answered the call. His wife was calling him because she had been arguing with one of his sons. He hang up quickly but he was quite angry and annoyed. Then the surgeon arrived and after preoxygenation and a short briefing with the nurse, the rapid sequence induction began with the injection of propofol 200 mg and suxamethonium 100 mg. Just after the injection the nurse measured his blood pressure because she feared he had hypotension. Surprisingly there was no rapid onset thereby allowing tracheal intubation despite usual protocol being administered. The venous catheter was functional and the drugs had been flushed out. The anaesthetist tried to intubate the patient and put it into the oesophagus. Then he realised that the myorelaxation was ineffective due to the blood pressure cuff. He removed it and flushed the venous line. After thrity seconds he proceeded easily to the tracheal intubation.
No desaturation was reported.

Good points: *briefing before procedure / preoxygenation / situation awareness (intubation into the oesophagus, suxamethonium partially delivered)*
Ways for improvement: *all crucial steps must be checked / turn off mobile phones during critical procedures / be careful with the placement of the cardio pulmonary monitoring cuff.*
KEY WORDS: task interruption / briefing / mobile phone

FIXATION ERROR

A 69-year-old woman was admitted for a hip fracture (garden IV fracture) and she needed to be urgently operated on. She was scheduled at the end of the orthopaedic surgeon planning. He was in a hurry because he had an overbooked consultation list in the afternoon. Three months prior to this, the woman had already been operated for lower back surgery. In her past medical history, she had been hurt in 1985 in a car accident (tracheostomy in ICU complicated by a stenosis needing to be operated). Moreover she suffered from a COPD. No difficulty with anaesthesia had been noticed. The surgeon asked for permission to carry out this procedure in a contiguous operating room, sparing "many precious minutes" (equipment, anaesthesia procedure, cleaning, ...). The anaesthetist agreed and quickly checked the OR and its equipment. He began the preoxygenation and injected medication for a general anaesthesia. The tracheal intubation was easy but a rapid oxygen desaturation occurred. He decided to remove the tracheal tube and proceeded with a new attempt with success but there was no improvement in oxygenation. Looking at the insufflation line of the circle breathing system, he discovered that it has been disconnected from the anaesthesia station leading to a major circuit leak. The restoration allowed an adequate oxygen supply and the correction of hypoxemia.

Good points: *check / outcome*
Ways for improvement: *call for help early / cognitive aids for hypoxemia / fixation error / production pressure*
KEY WORDS: cognitive bias / safety / ergonomy / equipment

Dr MARTIN Frédéric – Anesthesia Safety Network
18 bis, rue des Vaussourds, 92500 Rueil-Malmaison // Mail : dr.martin.frederic@gmail.com // Site : anesthesiasafetynetwork.com

DIFFICULT INTUBATION SUSPECTED

A patient under general anesthesia underwent a sleeve gastrectomy for morbid obesity. The preanesthesia evaluation noticed that the Mallampati score was IV (no other risk factors reported). The day of the surgery no specific procedure had been planned for a difficult airway management (fibre-optically guided intubation, ...). The team proceeded with the general anaesthesia and failed to intubate the patient (Mac Cormack IV). Then they asked for the videolaryngospcope but it was out of order (flat battery). The facemask ventilation was very inefficient with ineffective oxygenation despite the help of two other anaesthetists. Finally, they decided to wake the patient up. The patient was discharged with no complications and was scheduled later for a planned fibre-optically guided intubation.

Good points: *outcome / no go*
Ways for improvement: *pre-operative airway assessment / difficult intubation guidelines / cognitive aids / adequate systems and processes*
KEY WORDS: guideline / deficiencies in equipment / decision-making

Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults:
http://sfar.org/wp-content/uploads/2015/09/BJA-2015-reco-ventilation-et-IOT1.pdf

Dr MARTIN Frédéric – Anesthesia Safety Network

18 bis, rue des Vaussourds, 92500 Rueil-Malmaison // Mail : dr.martin.frederic@gmail.com // Site : anesthesiasafetynetwork.com

HEMORRHAGIC SHOCK BY NIGHT

During the night shift, a patient had a hemorrhagic shock. The arterial line and intra-arterial blood pressure monitoring was found to be out of order. Thus, the blood pressure cuff system was used. While every healthcare team member was very busy, the blood pressure cuff indicated "low pulse" and no data was measured. The medical team added sympathomimetic drugs and prepared for a blood transfusion. Surprisingly the radial and carotid pulse was felt with no active bleeding in the surgical field. The anaesthesia team checked the monitor and thereby discovered that the line was disconnected. They fixed it correcting the measurement.

Good points: *immediate action / situation awareness*
Ways for improvement: *avoid getting fixated / check and cross check information / dealing with stress and fatigue*
KEY WORDS: tiredness / equipment / urgent

WRONG SUFENTANIL SETTING USING TARGET CONTROLLED INFUSION DEVICE

In the morning, an anaesthetist set up the sufentanil target to 3 ng/ml instead of 0,3 ng/ml. Then he proceeded with the induction. A few minutes later he discovered that the sufentanil syringe was empty and the blood pressure was very low leading to the injection of high dose of vasopressive drugs associated with crystalloids infusion.
After correcting his mistake, he was concerned during the surgery and reported to be really tired.

Good points: *correction of hypotension*
Ways for improvement: *double check target / the setting of high concentration target should be confirmed through a pop up alert on the device screen / HALT acronym / being aware of impact of tiredness*
KEY WORDS: TCI (target controlled infusion) / tiredness / hypotension

Dr MARTIN Frédéric – Anesthesia Safety Network
18 bis, rue des Vaussourds, 92500 Rueil-Malmaison // Mail : dr.martin.frederic@gmail.com // Site : anesthesiasafetynetwork.com

INTENTIONAL MEDICATION OVERDOSE

A man intentionally absorbed an abnormal quantity of his prescription medication leading to the intervention of an out-of-hospital emergency medicine team. This patient was a morbidly obese patient and also had been treated for arterial hypertension, and colic cancer. The first team was composed of the ambulance driver, a young resident and a young fellow. A CRNA was called for help because the patient was judged difficult to manage (severe hypotension with bradycardia and coma (G = 5)). The glycaemia index was normal. When the CRNA arrived the doctor and the resident suspected an intentional acute poisoning with beta-blockers. They decided to treat him with IV infusion of glucagon and norepinephrine. They also proceeded with invasive respiratory support. Finally they called a senior to admit the patient into ICU. While they were reading the patient's medication they discovered that he didn't have beta-blockers but had amiodarone instead. The resident thought that amiodarone was a beta-blocker. They stopped the glucagon administration without any consequences.

Good points: *situation awareness / call for help*
Ways for improvement: *double check the treatment before using a specific treatment / being able to say:'' I'm concerned'' or ''I don't know'' / avoid intervention of inexperienced medical team when a complex situation is expected.*
KEY WORDS: beta-blocker / poisoning / knowledge error

Dr MARTIN Frédéric – Anesthesia Safety Network

18 bis, rue des Vaussourds, 92500 Rueil-Malmaison // Mail : dr.martin.frederic@gmail.com // Site : anesthesiasafetynetwork.com

ACCESSORY BREATHING SYSTEM

After the preoxygenation of a patient at the beginning of the afternoon, hypnotic and myo-relaxant drugs were injected following the procedure. An early arterial desaturation raised in only a few seconds after the apnea despite easy mask ventilation which seemed to be efficient (PET CO2 and normal values of spirometry). The anaesthetist didn't understand what was going on and decided to intubate the patient. The tracheal intubation was confirmed using capnography and pulmonary auscultation. Unfortunately the arterial saturation dropped to 70% despite a FiO2 set up at 1.0 from the beginning of the preoxygenation. Thinking about a dysfunction of the anaesthesia station, the anaesthetist decided to use the accessory breathing system. Using the bypass system, he immediately realised that it had been turned on because during the previous case it had been used for a local anaesthesia with IV sedation. The reporter said that he had never used that breathing system. However, most of the time he used another type of anaesthesia station in which you select the breathing system on a screen and not with a commutator as in this event.

Good points: *problem understood*
Ways for improvement: *effective de-nitrogenation must be assessed by an end-tidal oxygen fraction above 0.9 confirming the appropriate flow of 100 % oxygen into the breathing system / use bypass for checking which breathing system has been selected*
KEY WORDS: skill error / accessory breathing system / de-nitrogenation

Dr MARTIN Frédéric – Anesthesia Safety Network
18 bis, rue des Vaussourds, 92500 Rueil-Malmaison // Mail : dr.martin.frederic@gmail.com // Site : anesthesiasafetynetwork.com

UNEXPECTED HYPERCAPNIA

A 30-year-old woman (physical status ASA 1) had a laparoscopic cholecystomy. Four days after this surgery, she had an endoscopic retrograde cholangiopancreatography under general anaesthesia in order to treat residual biliary lithiasis. A hypercapnia occurred during the procedure (PETCO2 = 54 mm Hg) despite hyperventilation. Differential diagnosis had been eliminated (malignant hyperthermia, thyroid storm, ...). At the end of the procedure, she was admitted to the post anaesthesia care unit. The arterial gasometry revealed: pH 7,17 PaCO2 71 mm Hg, and lactates à 0,5 mmol/l). The patient was sedated with IV propofol infusion and was hyperventilated until PaCO2 returned to normal range. Finally, she woke up and was discharged a few hours later. When the stakeholders debriefed the incident they said to the anaesthetist: '' that's really strange! The use of carbon dioxide is recommended and there was no break ''

Good points: *think about differential diagnosis*
Ways for improvement: *checklist / communication between healthcare givers about new procedure before beginning*
KEY WORDS: metabolic acidosis / hypercapnia / endoscopy

CONCLUSION

Impact of distraction and task interruption on patient safety
Communication skills:
- **Briefing before action with all stakeholders (checklist, SBAR, check cognitive aids,...)**
- **Use all available information**
- **Double check if possible before critical action**

Designing safer medical equipment to avoid preventable harm

Incident analysis tools

- **The London Protocol: http://www.imperial.ac.uk/patient-safety-translational-research-centre/education/training-materials-for-use-in-research-and-clinical-practice/the-london-protocol/**
- **ALARM Protocol: http://www.has-sante.fr/portail/upload/docs/application/pdf/2011-11/jam_n14_supplement_alarm.pdf**

BIBLIOGRAPHIE
(1) Peter Pronovost, Alan Ravitz and Conrad Grant. How systems engineering can help fix health care. Harvard Business Review. February 09, 2017 -
(2) Reason J. Managing the risk of organizational accidents. Aldershot : Ashgate; 1997

Dr MARTIN Frédéric - Anesthesia Safety Network
18 bis, rue des Vaussourds, 92500 Rueil-Malmaison // Mail : dr.martin.frederic@gmail.com // Site : anesthesiasafetynetwork.com