Perioperative Patient Safety and Quality – Workshop for Anaesthesiologists

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Vth CEEA course, 27.11.2019
Inštitúte vzdelávania veterinárnych lekárov IVVL, Košice, Slovakia
## Competing interests

<table>
<thead>
<tr>
<th>WHAT</th>
<th>DECLARATION</th>
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<tbody>
<tr>
<td>Employee</td>
<td>Hirslanden Clinic Zurich</td>
</tr>
<tr>
<td>No interests related to:</td>
<td>Consultation fees; Speakers bureau; Company sponsoring; Spouse/partner C.o.I.; Scientific Advisory Boards</td>
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<tr>
<td>Honoraria</td>
<td>University of Zurich; Z-INA Nursing School Zurich</td>
</tr>
<tr>
<td>Stock shareholder</td>
<td>UBS, Roche, Nestle, Swatch</td>
</tr>
<tr>
<td>Other (affiliations)</td>
<td>- Past Chair, ESA Patient Safety and Quality Committee</td>
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<td></td>
<td>- Member, Data and Quality Committee, SGAR</td>
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<td></td>
<td>- Associate lecturer, University of Zurich (Patient Safety)</td>
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</tbody>
</table>
Leah Coufal, 11-year-old

Elective surgery:
Pectus carinatum ("pigeon's chest")

- Persisting postoperative pain despite epidural with Fentanyl
- Seems overmedicated, but still in pain
- Resident orders 2mg Lorazepam every 2 hours "for anxiety"

With permission - http://patientsafetymovement.org/patient-story/lenore-alexander/
Leah Coufal, 11-year-old

Elective surgery:
**Pectus carinatum** ("pigeon's chest")

- Mother falls asleep, wakes up at 2 AM to find Leah dead in bed
- Autopsy: epidural catheter malpositioned in left intrapleural space
- 10 yrs later, mother promotes "Leah's Law" (cont. postop. monitoring)

Patient safety issue - or „just a complication“?

A definition of patient safety:
„The avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of healthcare.“

Charles Vincent, 2006

Perioperative outcomes...

© http://radiopaedia.org/cases/right-main-bronchial-intubation
http://www.molnlycke.com/Surgical-Site-Infections-SSI.aspx#confirm
The range of perioperative patient harm

Patient harm: Surgery 20%, intensive care 34% - about 50% preventable


Mortality following complications: “Failure to Rescue“ (FTR)

Leah Coufal – "Failure to Rescue"\textsuperscript{1}

Leah's Mother Lenore Alexander:
"\textit{a lot of things went wrong that day}"...
... in addition to the lack of monitoring, among them:

- Friday night, Saturday: pain despite epidural – \textit{no anaesthesiologist}
- \textit{Unexperienced resident}
- \textit{Medical staff seemed unconcerned, inattentive and disinterested}
- \textit{No hospital staff had entered her room from 8 PM for about 6 hours}

Risk factors

• APSF (US): postop opioids -> monitoring!\(^1\) Lacking!
• Acute Pain Service: fewer adverse events\(^2\) Lacking!
• Nurse/patient ratio, training level -> mortality, FTR\(^3,4\) Adequate? Unconcerned...

5. Whitlock EL et. Anesthesiology. 2015;123(6):1312-1321
James Reason's "Swiss Cheese Model"

Safety/quality is local, and varies over time!

B. Landrigan CP et al. NEJM 2010;363(22):2124-2134.
„If you can not measure it, you can not improve it“
(Lord Kelvin)

https://de.wikipedia.org/wiki/William_Thomson,_1._Baron_Kelvin
Complication rates, mortality rates:

• Do you know them for your department/hospital?

• Do you measure them? Or somebody else?

• If not, *what is the main problem?*
More on complications, mortality, and FTR
Complications - timing and "Failure to Rescue" rates

- **Acute renal failure**²,³ (1.2-1.7% ;³ 35.9-48.3% ;³ 2-8%)
- **Stroke³ / CVA⁶** (0.2-0.3% ;³ 22.5-46.4% ;³ 1-6%)
- **MI²,³** (0.4-0.5% ;³ 27.3-39.5% ;³ 1-4%)  
- **Unplanned intubation³** (3.6-4.6% ;³ 24.8-38.4% ;³ 1-6%)
- **Pneumonia²,³** (1.8-2.4% ;³ 15.9-25.5% ;³ 2-7%)
- **Resp. Depr¹**
- **Surgical site infection²** (1.8-2.0% ;² 7.0-19.3% ;² 6-11%)
- **Pulmonary embolism²,³** (0.6-0.7% ;³ RR 5.9-11.5% ;³ 2-9%)
- **Organ-space infection³** (2.9-3.8% ;³ 4.2-8.8% ;³ 6-11%)
- **Fascial dehiscence³** (1.4-1.9% ;³ 6.0-8.1% ;³ 6-11%)
- **Deep wound infection³** (1.7-2.1% ;³ 3.2-7.1% ;³ 6-11%)

Complication (reported incidence range⁶; reported FtR rates⁶; reported peak occurrence (25-75% interquartile⁶)

Reducing complications and FTR ...

... preoperatively
(e.g.: risk assessment, optimization¹)

... intraoperatively
(e.g.: checklists²; improving/avoiding handovers³,⁴,⁵)

... postoperatively ....
"30-day postop. mortality is 1,000 times greater than preventable intraoperative mortality"⁶

## Promising concepts for reducing complications and FTR

<table>
<thead>
<tr>
<th>Concepts, interventions - examples:</th>
<th>Effect on outcomes:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Workforce</strong>: Nurse staffing↑,(^1,2) Intensivist/hospitalist/resident staffing↑(^3)</td>
<td>mort↓(^1) FTR↓(^2,3)</td>
</tr>
<tr>
<td><strong>Hospital characteristics</strong>: hospital(^2)/surgeon(^4) volume↑, RRT,(^3) APS(^5)</td>
<td>AE/compl↓(^4,5) mort↓(^4) FTR↓(^2,4)</td>
</tr>
<tr>
<td><strong>Continuous ward monitoring</strong>(^6,7)</td>
<td>ICU transf↓,(^6,7) mort↓(^7)</td>
</tr>
<tr>
<td><strong>Measuring/monitoring surgical outcomes</strong>(^8,9)</td>
<td>morbidity↓(^9) mort↓(^8,9)</td>
</tr>
</tbody>
</table>

8. Yuen WC et al. Hong Kong Med J. 2018;24(2):137-144;
Heads of Agreement - Principal Requirements
Principal Requirements – "Bundle of Practice Tools"

1. All institutions providing perioperative anaesthesia care to patients (in Europe) should comply with the minimum standards of monitoring recommended by the EBA both in operating theatres and in recovery areas.\(^{1,18}\)

2. All such institutions should have protocols\(^{19,20}\) and the necessary facilities for managing the following:
   - Preoperative assessment and preparation
   - Checking Equipment and drugs
   - Syringe labelling
   - Difficult/failed intubation
   - Malignant hyperpyrexia
   - Anaphylaxis
   - Local anaesthetic toxicity
   - Massive haemorrhage
   - Infection control
   - Postoperative care including pain relief

3. All institutions providing sedation to patients must comply with anaesthesiology recognised sedation standards for safe practice.\(^{21-25}\)

4. All institutions should support the WHO Safe Surgery Saves Lives initiative and Checklist.\(^{26}\)

5. All departments of anaesthesiology in Europe must be able to produce an annual report of measures taken and results obtained in improving patient safety locally.

6. All institutions providing anaesthesiological care to patients must collect the required data to be able to produce an annual report on patient morbidity and mortality.

7. All institutions providing anaesthesiological care to patients must contribute to the recognised national or other major audits of safe practice and critical incident reporting systems. Resources must be provided to achieve this.

How well has the HD been adopted?

Has been signed, adopted and supported by national societies of anaesthesiology worldwide.

But has it also been implemented...?
Evaluation of the extent of implementation of the Helsinki Declaration for Patient Safety in anaesthesiology: a mixed-methods action research project

Industry Partner Support
- Fresenius-Kabi
- Masimo
- Philips
- Nihon-Kohden

• Phase I
  • Online survey of ESA members about HD implementation (submitted to EJA)
  • Telephone interviews with national leaders in anaesthesiology

• Phase II
  • On-site visits: Documentary analysis; focused, in-depth interviews
Patient safety and the role of the Helsinki Declaration on Patient Safety in Anaesthesiology

A European survey

Henry H.L. Wu, Sharon R. Lewis, Mirka Čikkelová, Johannes Wacker and Andrew F. Smith

1589 responses (33.4% response rate; 38 countries)

Monitoring (SaO2/NIPM/ECG/Capno) 96-99.6%
CIRS 78.7%
WHO Safe Surgery checklist 78.4%
Protocols 72-93%
Morbidity and mortality reports 55.7%
Annual safety reports 37.3%

A "HD – Checklist" for anaesthesiologists...

- HD requirements – implemented?
- "HD checklist" – walk your department

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**Checklist HD PRINCIPAL REQUIREMENTS**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Protocols</th>
<th>Facilities</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Check without reading 60 pages of references!!</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(Heads of Agreement, WFSA International Standards for Safe Practice of Anesthesia)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>01. Comply with minimum standards of monitoring recommended by the EBA (OR / recovery)</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>1. Anaesthesia: spo2, ECG, ECO2, CO2/Vapour analysers, Airway pressure, nerve stim, Temp, Stethoscope</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>2. Recovery: spo2, NIBP, ECG (CO2), nerve stim, Temp</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>02. Should have protocols and the necessary facilities for managing the following</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>2.1. Intraoperative assessment and preparation</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>2.2. Checking Equipment and drugs</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>2.3. Syringe labelling</td>
<td>✓</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>2.4. Difficult/failed intubation</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>2.5. Malignant hypothermia</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>2.6. Anaphylaxis</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>2.7. Local anaesthetic toxicity</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>2.8. Massive haemorrhage</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>2.9. Infection control</td>
<td>✓</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>2.10. Postoperative care including pain relief</td>
<td>X</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>03. Instit. providing sedation: comply with anesthetic recognised standards for safe practice.</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>04. Support WHO SISLA initiative and Checklist.</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>05. Annual safety report: measures taken and results obtained in improving patient safety locally.</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>06. Collect the required data to be able to produce an Annual report on patient morbidity and mortality.</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>07. Contribute to recognised Audits of safe practice and Critical incident reporting systems. Resources must be provided to achieve this.</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

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*ESA Safety Report Template: [https://www.esa.org/safety/safetyreport/aboutreport](https://www.esa.org/safety/safetyreport/aboutreport)*
A case from the Spanish SENSAR reporting system
Case: inadequate difficult airway management

Spanish Incident Reporting System SENSAR\(^1\):

- Woman planned for parathyreoidectomy
- Preanaesthesia assessment: fiberoptic intubation recommended!
- Obese, OSAS/CPAP, Mall. IV, arthrodesis C6-7, history difficult airway...
- OR: direct laryngoscopy chosen – difficult (Cormack & Lehane grad IV)!
- Videolaryngoscopy: Difficult, several attempts, eventually successful...

Case, SENSAR¹:

- mucosal injuries to tongue
- Sutured before extubation
- Factors: (...) no difficult airway protocols!
- Actions: implementation of difficult airway protocol, staff information, airway training

Permission to use figure: Dr. Abad Gurumeta, Editor in Chief, Revista Española de Anestesiología y Reanimación, 24.9.2018
Case: inadequate difficult airway management

The HD\(^2\) - signed by SEDAR on June 12, 2010! Requirements:

- Contribution to CIRS\(^2\) \((\checkmark)^1\)
- Protocols - preop. assessment/preparation\(^2\) \((\checkmark)^1\)
- Medical record/form of preoperative risks\(^2,4\) \((\times)^1\)
- Protocols for difficult/failed intubation\(^2\) \(\times^1\)
- Training/verification: equipment use\(^2,4\) \((\times)^1??\)

**Inexperience,\(^1\) inadequate size of videolaryngoscope\(^1\)**

- Feedback from patient\(^2\) (patient-centeredness) \((\times)^1\)
  - only to patient: lesions "minor"\(^1\)

How to improve...??

• What else would you do if this was your department?

• Would you collect data to monitor success? Which?
A problem of ... safety?

A problem of ... quality??
"Safety" is one attribute of "Quality"

Attributes of Healthcare Quality\textsuperscript{1,2}:

- Patient-Centeredness
- Safety - "no harm"
- Availability
- Appropriateness
- Effectiveness
- Continuity
- Timeliness
- Efficacy
- Equity
- Efficiency

Dimensions of health care quality

Dimensions of Quality (A. Donabedian, 1966)

<table>
<thead>
<tr>
<th>Structure (Framework)</th>
<th>Process (Activities)</th>
<th>Outcome (Results)</th>
</tr>
</thead>
</table>

"Value" - importance of relevant patient outcomes


http://asa-365.ascendeventmedia.com/anesthesiology-2016-daily/porter-focus-on-value-for-patients-will-transform-health-care
Measuring patient safety and quality

„Incident Reporting“ (qualitative)
„Nature of problems“; anonymous; e.g., CIR\textsuperscript{1,3,4}

„Quality Reporting“ (quantitative)
„Extent of problems“\textsuperscript{1} – outcomes that matter to patients\textsuperscript{2}

„Safety Culture Survey“
Quantitative „staff perception“; SC correlates with M&M\textsuperscript{5-6}

„Patient's safety-related reports (PSR)“
„Patient's perception“; correlates with actual harm\textsuperscript{7-8}

<table>
<thead>
<tr>
<th>Number</th>
<th>Question</th>
<th>YES</th>
<th>NO</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Does your NAS provide a set of QI or a quality data collection system to its members?</td>
<td>11</td>
<td>24</td>
<td>31</td>
</tr>
<tr>
<td>2</td>
<td>Is the collection of quality data mandatory for anaesthesiologists in your country?</td>
<td>5</td>
<td>30</td>
<td>14</td>
</tr>
</tbody>
</table>
Two common pitfalls

1. Using CIR rates as trend marker for patient safety (lack of denominator)
2. Relying on self-reported data as safety marker (underreporting)
AQUA – Swiss anesthesia quality data collection system

A) Departmental structure data: number of services/year, facilities, staffing
B) Patient Data: services provided; preoperative risk, intraoperative/postop. events

Conclusions

• Patient safety activities target avoidable patient harm

• Perioperative patient harm is frequent – about 50% preventable

• FTR – increasingly regarded as perioperative quality indicator

• To improve PSQ locally, local measurement is needed

• The "Helsinki Declaration on PS in Anaesth." provides basic PSQ standards
Thank you for your attention!

jwac@gmx.net / johannes.wacker@hirslanden.ch
The International Forum on Perioperative Safety & Quality (ISQ) supports and energizes the movement for health care improvement while bringing together leaders and practitioners committed to improving outcomes for patients and communities.

Keynote Speaker
Dr Jannicke Mellin-Olsen (Norway), President WFSA

"The global burden of perioperative patient harm – current priorities for action"
Can measurement & reporting improve care?

1. Monitor local variation:
   Failed plexus blocks¹

2. Positive effect of reporting on perioperative M&M:
   Maintaining perioperative normothermia (quality metric)²
   Surgical outcome reporting (NSQIP)³,⁴

EuSOS study, 2012

Pearse R.M. et al,
Lancet 2012; 380: 1059 - 65
Perioperative mortality rates 1998-2014
Data: Swiss Federal Office of Public Health, 1'561'012 cases, 22 operation types

Based on: Wacker J, Zwahlen M, Swiss Med Wkly 2019;149:w20034
Lacking records (?) or awareness of risk factors
Lacking protocol for difficult/failed intubation
Insufficient training (?) or skills (?) of difficult airway; use of equipment
Inadequate use of videolaryngoscope

Three groups of barriers to PSQ reporting – and strategies to overcome them

**Practical working conditions:**

*Systems complex, definitions not clear*<sup>1,2,5</sup>

*Lack of time,<sup>1,2,5</sup> additional work,<sup>1,2,5,6</sup> interruptions/noise<sup>2,7</sup>*

**Instit. culture, data management:**

*Concerns of legal actions,<sup>2,3</sup> blame,<sup>4,8</sup> being assessed by data,<sup>4,9</sup>*

*No feedback about data/results<sup>1,2,3,8,10,11</sup>*

**General beliefs and attitudes:**

*Lacking belief that reporting actually improves PSQ*<sup>2,12</sup>

*Physicians more sceptical than nurses*<sup>2,12</sup>

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QI overview – concepts and steps

Input – e.g., from audit (external evaluation)

PDCA:\(^1\)
Plan: Recognize opportunity - plan a change.  
Do: Test the change (small-scale study)  
Check: Review test, analyze results - what have you learned?  
Act: Take action based on what you learned in the study step.

Change management

QI charter (project plan)\(^2\)

1.https://asq.org/quality-resources/pdca-cycle  
Measures are the lenses through which we quantitatively determine quality."

• Definition: "...explicit measure (defined by the developer) of some aspect of patient clinical care used to judge a particular clinical situation and indicate whether the care delivered was appropriate."

• No gold standard to measure quality of care

• Majority of perioperative Q/S indicators not supported by high grade evidence.
So where are the difficulties of reporting?

200 Anästhesien - Häufigkeit und Erfassung von Events

Wacker J et al. Conference Poster, 2011; Basel, Switzerland