The deteriorating patient – recognition and management

Dave Story
MBBS, MD, BMedSci, FANZCA
Professor and Foundation Chair of Anaesthesia
Head of Anaesthesia, Perioperative and Pain Medicine Unit (APPMU)
Director of Melbourne Clinical and Translational Sciences (MCATS)
Melbourne Medical School
No Conflict of Interest
Perioperative Medicine

Collaboratively managing patient and operative risks before, during, and after surgery to provide patient-centred, clinically effective and cost effective care

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Austin: Perioperative Medicine Collaborative
ORIGINAL ARTICLE
Complications and mortality in older surgical patients in Australia and New Zealand (the REASON study): a multicentre, prospective, observational study*

D. A. Story,¹ K. Leslie,² P. S. Myles,³ M. Fink,⁴ S. J. Poustie,⁵ A. Forbes,⁶ S. Yap,⁷ V. Beavis⁸ and R. Kerridge⁹; on behalf of the REASON Investigators, Australian and New Zealand College of Anaesthetists Trials Group
REASON: 4,158 patients, 23 Hospitals

20% one or more complications within 5 days
10% critical care within 5 days
5% died within 30 days
Complications : 30/100 patients,
    LOS 1 week longer
### REASON complications

<table>
<thead>
<tr>
<th>Factor</th>
<th>Frequency</th>
<th>Adj OR Mort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systemic inflammation</td>
<td>7%</td>
<td>2.5</td>
</tr>
<tr>
<td>Acute renal impairment</td>
<td>6%</td>
<td>3.3</td>
</tr>
<tr>
<td>Unplanned ICU</td>
<td>4%</td>
<td>3.1</td>
</tr>
<tr>
<td>Pulmonary oedema</td>
<td>3%</td>
<td>2.9</td>
</tr>
<tr>
<td>Return to OR</td>
<td>3%</td>
<td>2.5</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>2%</td>
<td>2.9</td>
</tr>
<tr>
<td>Reintubation</td>
<td>1%</td>
<td>5.0</td>
</tr>
<tr>
<td>Cardiac arrest</td>
<td>&lt;1%</td>
<td>66.2</td>
</tr>
</tbody>
</table>
• Both medical and surgical therapies have:
  – more frequent minor complications, and
  – less frequent major complications

• Artificial to divide surgical and medical complications
  – surgical site infection + AF
  – Postoperative bleed + AMI
  – Fluid losses + AKI
  – Hypoxia + wound infection
Survival after postoperative morbidity: a longitudinal observational cohort study

After Complications?

85,000 patients, 150 hospitals, median age 62
Mortality by hospital: 3.5 to 6.2%, quintiles
Inpatient surgery…“failure to rescue”

Clinical paper

Defining clinical deterioration

Daryl Jones\textsuperscript{a,b,c,*}, Imogen Mitchell\textsuperscript{d}, Ken Hillman\textsuperscript{e,f}, David Story\textsuperscript{b,g,h,i}

\textsuperscript{a} DEPM Monash University, Australia
\textsuperscript{b} Austin Health, Australia
\textsuperscript{c} Department of Surgery, University of Melbourne, Australia
Patient:
- Age, co-morbidity, surgery, emergency (4 “A”s)
- Vital sign changes: number, severity, trajectory, duration
- End organ dysfunction: Conscious state, AKI

Resuscitation:
- Intensity of therapy and response

Situation
- Day of week, Time of day

Organisational:
- Nursing: numbers and skills (usual ward)
- RRT + ICU
- Level of ongoing medical review
Rescue: There are no magic bullets…”

AMI
AKI
Sepsis
Stroke
Mortality Related to Severe Sepsis and Septic Shock Among Critically Ill Patients in Australia and New Zealand, 2000-2012

Kirsli-Maija Kaukonen, MD, PhD, EDIC; Michael Bailey, PhD; Satoshi Suzuki, MD; David Pilcher, FCICM; Rinaldo Bellomo, MD, PhD

Fig 1. Mean Annual Mortality in Patients With Severe Sepsis or Septic Shock

100,000 patients, 170 ICUs

“The observation that an equivalent improvement occurred in non-septic patients supports the view that an overall change in ICU practice rather than management of sepsis explain most of our findings”
Indivdualised care by experienced professionals

1. Surveillance

2. Intervention
Skills for postoperative medicine

5 skill sets:

- Surgical site management
- Acute pain medicine
- General medicine adapted to perioperative period
- Resuscitation
- Rehabilitation

Story and Jones, *Anaesth Intensive Care*, 2013
Some gross generalisations on skill sets...

**Anaesthetists**
- ? OP site
- +/- Gen Med
- + Pain Med
- + Resus
- ? Rehab

**Physicians**
- ? OP site
- + Gen Med
- ? Pain Med
- +/- Resus
- ? Rehab

**Surgeons**
- + OP site
- ? Gen Med
- ? Pain Med
- ? Resus
- +/- Rehab

**ICU**
- +/- OP site
- + Gen Med
- +/- Pain Med
- + Resus
- ? Rehab

No medical craft group has all these skills: Co-management teams
Consultation vs Co-management

- Consultation - give opinion
- Co-management – ongoing review
  - joint responsibility AND authority
  - mutual recognition of strengths + weaknesses

- Low risk  Benefit?
- Targeted group – high risk

Siegal, *Journal of Hospital Medicine*, 2008
Austin Model: Surgical ICU Fellow
High risk patients in hospital with ICU and RRT
- Two adjacent surgical wards

ICU FCICM
- Collaboration surgeons / APS
- Consultation with gen med
- Throughout stay
Hospitals without ICUs

Austin Repat Campus
8 ORS, no HDU  no ICU
Perioperative Medicine Collaborative
-Moderate risk orthopaedic joint patients
-Evolving model
-Potential patients referred to anaesthesia by ortho
-D/W +/- reviewed and optimised by Gen Med
-Planned Post op review by Gen Med
-Agreed ICU transfer plan
Surgical Comanagement by Hospitalists Improves Patient Outcomes

A Propensity Score Analysis

Nidhi Rohatgi, MD, MS,* Pooja Loftus, MS,* Olgica Grujic,† Mark Cullen, MD,* Joseph Hopkins, MD, MMM,*† and Neera Ahuja, MD*

Stanford: Ortho + Neuro

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Pre, % (n = 12,740)</th>
<th>Post, % (n = 4190)</th>
<th>Odds Ratio (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients with &gt;1 medical complication†</td>
<td>9.5</td>
<td>8.0</td>
<td>0.83 (0.70–0.95)</td>
</tr>
<tr>
<td>Patients with LOS &gt;5 d</td>
<td>28.4</td>
<td>21.2</td>
<td>0.72 (0.59–0.91)</td>
</tr>
<tr>
<td>30-d readmission for medical cause</td>
<td>3.0</td>
<td>1.8</td>
<td>0.63 (0.54–0.90)</td>
</tr>
</tbody>
</table>

Saved about $3,000 US / patient
The POMS think the same...

BEFORE SURGERY
Major surgery may trigger a deterioration in long-term illness and delay patient recovery. We must use the time between the decision to perform surgery, and the procedure itself to assess the needs of individual patients, and to optimise treatment of long-term disease. There are many examples that show how we modify perioperative care to the benefit of both the patient and the healthcare system.

DURING SURGERY
Safe surgery is one of the greatest successes of modern healthcare. The challenge of care during surgery is now to improve the quality of patient care, as well as preventing medical error. The presence of an experienced anaesthetist supported by a multi-disciplinary team, provides an opportunity for the delivery of treatments which need significant medical input, without disrupting the surgical-care pathway.

EARLY AFTER SURGERY
Surgeons are increasingly diversified in their technical expertise, whilst care of acute and long-term medical disease is ever more sophisticated. It is no longer realistic to expect surgeons to have an in-depth knowledge of recent advances in the management of patients with complex needs, who develop acute medical problems. Improving the quality of care early after surgery represents a major challenge.

LATER AFTER SURGERY
As we work to ensure patients recover quickly and return home early after surgery, primary and secondary care services will need to work more closely together to address the needs of surgical patients with long-term disease. Even several months after they return home, complex patients need ongoing care from experts who understand the impact of major surgery on long-term health.
"Between the Flags" intervention on the 'Slippery Slope' of patient deterioration.
Effectiveness of Rapid Response Teams on Rates of In-Hospital Cardiopulmonary Arrest and Mortality: A Systematic Review and Meta-analysis


In-hospital mortality RR = 0.88, 95%CI: 0.83-0.93

Non-ICU cardiac arrests RR = 0.62, 95%CI: 0.55-0.69
Plan care with patients in advance; avoid futility and allow death with dignity

In search of a good death

Diagnosing dying is an important clinical skill

Murphy, Medical Journal of Australia, 2008
Outcome and Costs

Difference in Cost

- Lower costs, worse outcome
- Higher costs, worse outcome
+ Higher costs, improved outcome
+ Lower costs, improved outcome: DOMINANT

Difference in Effectiveness
Reality is more subtle

Policy Implication of CEA Results

- **DOMINATED**
  - No!

- **TRADE-OFFS**
  - Threshold WTP
  - Cost-Saving
  - Yes!

ΔCost

ΔEffect
Must read…

To prove I’m not a raving looney…

Samer Nashef

THE POWER AND PERIL OF TRANSPARENCY IN MEDICINE

‘Gripping, honest, and numerate – an essential companion on our journey from blind trust in doctors to kind truth’ – Dr Phil Hammond

THE NAKED SURGEON
Conclusions

• Good nurses essential
  – People
  – Training
• Team approach
• Co-management
• No magic bullets
• Personalised care
  – Surveillance
  – Intervention
  – (LOMT)
Ongoing Collaboration in Clinical Care, Research, Teaching, and Engagement…

We play a TEAM SPORT…
New (STEEEP) Partners

Biostatistics

Health Economics

Health Informatics
Thank you!
Allied Health Professionals

Nurses

Physiotherapists

Pharmacists
Patients...