Physical Restraints in the ICU

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Toronto, Canada

CCCF
October 30, 2014
Disclosures
Objectives

- Restraint use internationally
- Predictors of restraint use
- Consequences of restraints
- Alternatives to physical restraint
Physical Restraint

• Definition: any physical or mechanical device attached or adjacent to a patient’s body that he or she cannot easily remove, which restricts freedom of movement or normal access to one’s body

• The primary ethical dilemma resulting from physical restraint is the clinician’s value or emphasis of beneficence versus the patient’s autonomy
Patient-initiated device removal in intensive care units: A national prevalence study*

Lorraine C. Mion, PhD, RN, FAAN; Ann F. Minnick, PhD, RN, FAAN; Rosanne M. Leipzig, MD, PhD; Catherine D. Catrambone, PhD, RN; Mary E. Johnson, PhD, RN

- 49 ICUs; 49,482 pt-days
- Patients removed 1623 devices on 1097 occasions
- 45% of patients were restrained at the time of device removal
- “Major” harm: 10 patients (1%)
  - 6 ETT, 5 central line
  - All required reinsertion of the devices
  - 2 required surgical procedure and 1 required blood transfusion
  - No deaths

Is it a big deal?
International use
CANADA

– I-CAN-SLEAP
  • 51 ICUs across Canada - observational study
  • 374/711 (53%) patients restrained

– The SLEAP trial
  • 16 tertiary ICUs – 14 Canada/ 2 US
  • protocolized sedation plus daily sedation interruption vs protocolized sedation alone
  • 328/430 (76%) patients had restraints applied at least once during ICU admission

Luk et al. Crit Care 2014
Mehta et al. JAMA 2012
International restraint use in the ICU

• Egypt (Kandeel, Nurs and Health Sciences 2013)
  – “Restraint use is a conventional practice”
  – “…no guidelines or legal regulations”

• France (De Jonghe, ICM 2013)
  – 82% of 130 ICUs: PR used at least once during MV
  – 62% of ICUs: PR, when applied, is used for >50% of MV duration
  – 29% of ICUs: PR used in >50% of awake, calm and cooperative patients

• Korea (Choi, J of Clin Nursing 2003)
  – 46% restrained: no legal guidelines

• 39% US vs 0% Norway (Martin, Am J Crit Care 2005)
  – Norway: higher acuity, more sedated, higher N:P ratio (1:1 vs 0.65:1)
  – Unplanned device removal: 7 US vs 0 Norway
• Prospective point prevalence survey
• 34 general ICUs, 9 countries, 669 patients
• Prevalence of PR in individual ICUs: 0-100%
• 33% patients restrained
  – More likely to be MV, sedated, managed in larger ICU, managed in ICU with lower daytime N:P ratio
Denmark

“...restraints are not used in Danish ICUs. Our protocols are unfortunately all in Danish; I have attached a national protocol written by the Danish society of intensive care medicine (written by physicians). Restraints are not mentioned as an option. Sedation is discouraged, but used if necessary. 

Non-pharmacological options are encouraged. In rare cases we have a student watch a very agitated patient. The nurse-patient ratio is 1:1. We have family visits around the clock. We use dynamic lighting, early mobilization, music therapy, etc.

In my own experience (having worked in the US and Denmark) patients get agitated and panic when they are restrained. Restraints are a kind of torture that should not be considered. Restraints do not prevent self-extubation and other harm; on the contrary. “

Ingrid Egerod, RN MSN PhD
Professor of Clinical Nursing
University of Copenhagen Health & Medical Sciences
Predictors of restraint use
Delirium as detected by the CAM-ICU predicts restraint use among mechanically ventilated medical patients

Scott T. Micek, Pharm D; Nitin J. Anand, MD; Brad R. Laible, Pharm D; William D. Shannon, PhD; Marin H. Kollef, MD

Objective: The first goal of this investigation was to identify individuals with delirium defined by the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) among medical patients with respiratory failure. Our second goal was to compare clinical interventions including use of continuous sedation infusions, the number of ventilator-free days, ICU length of stay, hospital mortality, and use of physical restraints in mechanically ventilated patients with and without delirium.

Design: A prospective, single-center, observational cohort study.

Setting: The medical intensive care unit (19 beds) of an urban teaching hospital.

Patients: Adult, intubated, and mechanically ventilated patients.

Interventions: Daily evaluation with the CAM-ICU, outcomes assessment, and prospective data collection.

Measurements and Main Results: Among 93 patients evaluated using the CAM-ICU, 44 patients (47%) developed delirium (CAM-ICU+) for ≥1 day while in the intensive care unit. Twenty-two patients (24%) had no episodes of delirium recorded (CAM-ICU−), and 27 (29%) remained comatose until extubation or death. A statistically greater number of patients with delirium (CAM-ICU+) received continuous infusions of midazolam (59% vs. 32%, $p < .05$) or fentanyl (57% vs. 32%, $p < .05$) and physical soft-limb restraints (77% vs. 50%, $p < .05$) compared with patients without delirium (CAM-ICU−).

Conclusions: The identification of delirium using the CAM-ICU was associated with greater use of continuous sedation infusions and physical restraints. Additional studies are required to determine how the use of these specific interventions influences the occurrence and the natural history of delirium among critically ill patients. (Crit Care Med 2005; 33:1260–1265)
I-CAN-SLEAP

- 2008-2009 observational study
- 51 Academic and community ICUs across Canada
- 711 patients

- **Sedation protocol** associated with less restraint use (OR 0.57, 95% CI 0.35, 0.93)
- **Daily sedation interruption** associated with more restraint use (OR 1.84, 95% CI 1.27, 2.67)
Predictors of physical restraint use in Canadian intensive care units

Elena Luk1, Barbara Sneyers2, Louise Rose1, Marc M Perreault3, David R Williamson3, Sangeeta Mehta4, Deborah J Cook5, Stephanie C Lapinsky6 and Lisa Burry4

I-CAN-SLEAP:

- 374 of 711 (53%) patients restrained; mean 4.1 days (SD 4.0), range 1-26 days

Characteristics associated with restraints

- Higher daily benzodiazepine dose - OR 1.05
- Higher daily opioid dose – OR 1.04
- Antipsychotic use – OR 3.09
- SAS>4 - OR 3.73
- Continuous sedative infusions (vs bolus) – OR 3.09

- University-affiliated ICUs – OR 0.32

Characteristics associated with more days of PR: Higher benzodiazepine dose, daily sedation interruption, antipsychotic drugs, accidental device removal

No patient characteristics associated with PR use

  age, gender, APACHE II, admission diagnosis, substance use, psychiatric diagnosis
Secondary data analysis of SLEAP trial

Cox proportional hazards model of associations with restraint application

- Time independent + time dependent covariates
- Time dependent
  - previous days’ values matched with next days’ restraint use
### RESULTS

328/430 (76%) patients
Restrained for median (IQR) 4 (1,7) days

Baseline characteristics similar in restrained and unrestrained patients EXCEPT

<table>
<thead>
<tr>
<th></th>
<th>Restrained n=328</th>
<th>Never restrained N=93</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>APACHE II, mean</td>
<td>↓ 23</td>
<td>27</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Neurological condition, %</td>
<td>↑ 17%</td>
<td>14%</td>
<td>0.05</td>
</tr>
<tr>
<td>Tobacco use, %</td>
<td>↑ 23%</td>
<td>12%</td>
<td>0.05</td>
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</table>
### RESULTS: OUTCOMES

<table>
<thead>
<tr>
<th></th>
<th>Restrained ( n = 328 )</th>
<th>Never restrained ( n = 93 )</th>
<th>( P ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renal replacement therapy</td>
<td>17%</td>
<td>32%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Coma</td>
<td>25%</td>
<td>58%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>ICU mortality</td>
<td>20%</td>
<td>39%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Hospital mortality</td>
<td>27%</td>
<td>42%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Incidence of delirium</td>
<td>59%</td>
<td>33%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Reintubation</td>
<td>8%</td>
<td>1%</td>
<td>0.01</td>
</tr>
<tr>
<td>Device removal</td>
<td>26%</td>
<td>3%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Tracheostomy</td>
<td>24%</td>
<td>27%</td>
<td>0.55</td>
</tr>
<tr>
<td>Duration of MV, days, med</td>
<td>9</td>
<td>11</td>
<td>0.38</td>
</tr>
<tr>
<td>ICU stay, days, med</td>
<td>10</td>
<td>9</td>
<td>0.17</td>
</tr>
<tr>
<td>Hospital stay, days, med</td>
<td>20</td>
<td>20</td>
<td>0.25</td>
</tr>
<tr>
<td>Drug</td>
<td>Restrained n = 328</td>
<td>Never restrained n = 93</td>
<td>P value</td>
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<tr>
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<tr>
<td><strong>Midazolam equivalents</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patients, %</td>
<td>89%</td>
<td>84%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Dose/patient/day, mg, mean (SD)</td>
<td>105 (339)</td>
<td>41 (99)</td>
<td></td>
</tr>
<tr>
<td><strong>Fentanyl equivalents</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patients, %</td>
<td>92%</td>
<td>98%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Dose/patient/day, µg, mean (SD)</td>
<td>1524 (3512)</td>
<td>919 (1549)</td>
<td></td>
</tr>
<tr>
<td><strong>Haloperidol</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patients, %</td>
<td>23%</td>
<td>12%</td>
<td>0.04</td>
</tr>
<tr>
<td><strong>Atypical antipsychotics</strong></td>
<td></td>
<td></td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Patients, %</td>
<td>17%</td>
<td>4%</td>
<td></td>
</tr>
</tbody>
</table>

Higher doses of drugs for restrained patients
## RESULTS: SAS/RASS SCORES

<table>
<thead>
<tr>
<th></th>
<th>Restrained</th>
<th>Never restrained</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SAS score, mean (SD)</strong></td>
<td>3.4 (0.6)</td>
<td>2.7 (1.0)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td><strong>Within sedation target, n</strong></td>
<td>227 (97%)</td>
<td>39 (57%)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>(SAS 3 to 4, RASS 0 to -3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oversedated, n</strong></td>
<td>8 (3%)</td>
<td>29 (43%)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>(SAS 1 to 2, RASS -4 to -5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Undersedated, n</strong></td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>(SAS 5 to 7, RASS +2 to +4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RN VAS score</strong></td>
<td>4.2 (1.3)</td>
<td>3.3 (1.2)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td><strong>RT VAS score</strong></td>
<td>3.7 (1.6)</td>
<td>3.7 (1.9)</td>
<td>0.91</td>
</tr>
</tbody>
</table>

77,856 (restrained) and 20,891 (never restrained) sedation scores recorded
# RESULTS: RESTRAINT APPLICATION

<table>
<thead>
<tr>
<th>Factor</th>
<th>Univariate HR 95% CI</th>
<th>Multivariable HR 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, 10 yr increments</td>
<td>1.06 (0.93, 1.21)</td>
<td>1.01 (1.00, 1.03)</td>
</tr>
<tr>
<td>Males</td>
<td>1.07 (0.76, 1.49)</td>
<td>1.49 (0.71, 3.13)</td>
</tr>
<tr>
<td>Admission category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>medical</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>surgical/trauma</td>
<td>1.39 (1.02, 1.90)</td>
<td>1.46 (0.80, 2.67)</td>
</tr>
<tr>
<td>APACHE II score, 5 point increments</td>
<td>0.83 (0.70, 0.99)</td>
<td>1.02 (0.99, 1.06)</td>
</tr>
<tr>
<td>Current smoker</td>
<td>1.64 (0.99, 2.71)</td>
<td>1.86 (0.92, 3.75)</td>
</tr>
<tr>
<td>History of alcohol use (≥2 drinks per day)</td>
<td><strong>0.27 (0.10, 0.76)</strong></td>
<td><strong>0.22 (0.08, 0.58)</strong></td>
</tr>
<tr>
<td>History of any neurological condition</td>
<td>1.71 (1.08, 2.72)</td>
<td>0.63 (0.37, 1.08)</td>
</tr>
<tr>
<td>History of psychiatric condition</td>
<td>1.47 (1.11, 2.00)</td>
<td>1.04 (0.60, 1.78)</td>
</tr>
<tr>
<td>Sepsis</td>
<td>0.70 (0.42, 1.16)</td>
<td>0.76 (0.20, 2.84)</td>
</tr>
<tr>
<td>Randomization group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>protocol only</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>daily interruption</td>
<td>0.78 (0.52, 1.17)</td>
<td>0.49 (0.22, 1.06)</td>
</tr>
<tr>
<td>Total benzodiazepine dose before restraint</td>
<td>1.00 (1.00, 1.00)</td>
<td>1.00 (1.00, 1.01)</td>
</tr>
<tr>
<td>Total opioid dose before restraint</td>
<td>1.00 (1.00, 1.00)</td>
<td>1.00 (1.00, 1.00)</td>
</tr>
<tr>
<td>Unplanned extubation/Device removal</td>
<td>3.92 (0.48, 32.04)</td>
<td>4.04 (0.29, 56.16)</td>
</tr>
<tr>
<td>Antipsychotic before restraint</td>
<td>0.69 (0.42, 1.13)</td>
<td>1.22 (0.49, 3.05)</td>
</tr>
<tr>
<td>Delirium before restraint</td>
<td>1.62 (0.97, 2.69)</td>
<td>1.42 (0.59, 3.39)</td>
</tr>
</tbody>
</table>
Consequences
Adverse consequences of physical restraint

**Physical**
- Hypertension, tachycardia
- Impaired circulation
- Nerve and skin injury
- Edema
- Fractures
- Delayed mobilization
- Self-extubation
- Cardiac arrest
- Death from asphyxia

**Psychological**
- Infringe on patients rights
- Increased anxiety, agitation
- Feelings of anger, fear
- Delirium
- Risk of PTSD
Patients’ recollections of stressful experiences while receiving prolonged mechanical ventilation in an intensive care unit*

Armando J. Rotondi, PhD; Lakshmipathi Chelluri, MD, MPH; Carl Sirio, MD; Aaron Mendelsohn, PhD; Richard Schulz, PhD; Steven Belle, PhD; Kelly Im, MS; Michael Donahoe, MD; Michael R. Pinsky, MD

• 43/96 (44.8%) remembered being restrained

• Bothered...
  – None or little 6 (14%)
  – Moderately to extremely 37 (86%)

Critical Care Medicine 2002
Psychological sequelae following ICU admission at a level 1 academic South African hospital

Department of Nursing Education, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg

Cindy Hatchett, RN, RM, NEd, ChN, BACur, BA (Hons) Psych, MSc (Nursing)
Gayle Langley, MSc (Nursing), MPhil, PhD
Shelley Schmollgruber, CCRN, BNurs, MSc (Nursing)

**Purpose.** The purpose of this research was to determine the extent to which anxiety symptoms, depressive symptoms and post-traumatic stress (PTS) symptoms were experienced by a sample of patients after discharge from intensive care units (ICUs). The participants had a mean stay of 3 days in ICUs in a level 1 academic hospital in Gauteng, South Africa.

**Methods.** A prospective, quantitative, cross-sectional, descriptive design was used to investigate these variables. A preliminary record review of the hospital’s ICU bed occupancy for the previous year was 1 596. The total study sample was 98 (N=98) to ensure that a power of at least 95% accuracy was acquired for the 0.05 level of significance testing. The instruments used in the structured interview were the Hospital Anxiety and Depression Scale (HADS) developed by Zigmond and Snaith (1983) and the Experience after Treatment in Intensive Care 7-Item scale (ETIC-7) developed by Scragg, Jones and Faovel (2001). Data were analysed using STATA 10.

**Findings.** Just under half the sample population (48%) had symptoms of anxiety, more than a quarter had symptoms of depression (28%), and 32% had symptoms of PTS. Furthermore, it was elicited that 58% of the sample had combined anxiety and depressive symptoms severe enough to have a ‘possible clinical disorder’. An unexpected finding of this study was that patients who had memory of physical restraints in the ICU were six times more likely to develop symptoms of PTS than those with no memory of physical restraint.
Unplanned Endotracheal Extubeations in the Intensive Care Unit: Systematic Review, Critical Appraisal, and Evidence-Based Recommendations

Paulo Sergio Lucas da Silva, MD, MSc,* and Marcelo Cunio Machado Fonseca, MD, MSc†

BACKGROUND: In this study, we updated the state of knowledge on unplanned tracheal extubations in the intensive care unit. We focused on the following topics: incidence, risk factors, reintubation after unplanned extubation, outcomes, and prevention. Based on this review, recommendations were made for preventing unplanned extubations.

METHODS: Electronic databases were searched for relevant publications from January 1, 1950 through June 30, 2011 on the MEDLINE, EMBASE, CINAHL, SciELO, LILACS, and Cochrane systems. Fifty articles were eligible for data abstraction. Study quality was assessed using the Newcastle-Ottawa Scale. Grades of recommendation were assessed according to the Oxford Centre for Evidence-Based Medicine.

RESULTS: Unplanned extubations occur at a rate of 0.1 to 3.6 events per 100 intubation days. Risk factors associated with unplanned extubations included male gender (odds ratio [OR] 4.8), APACHE score ≥17 (OR 9.0), chronic obstructive pulmonary disease, restlessness/agitation (OR 3.3–30.6), lower sedation level (OR 2.0–5.4), higher consciousness level (OR 1.4–2.0), and use of physical restraints (OR 3.1). Reintubation rates ranged from 1.8% to 88% of unplanned extubations. Thirteen studies assessed preventive measures for avoiding unplanned extubations. These studies focused on data collection tools, standardization of procedures, staff education, staff surveillance, and identification and management of high-risk patients. These studies reported reductions in unplanned extubation rate from 22% to 53%. The best methods of securing the endotracheal tube and use of physical restraints remain controversial issues.

CONCLUSIONS: Despite numerous publications on unplanned extubation, few studies assess preventive strategies for adverse events, and few clinical trials have assessed unplanned extubations. Recommendations are proposed based on the currently available literature. (Anesth Analg 2012;114:1003–14)
- 4 hospitals, 523 patients
- “The use of physical restraints before the onset of delirium showed a very high risk (OR 33.84). The 95% CI (11.19 to 102.36), however, is very wide leaving this factor not appropriate for multivariate analysis”
Incidence, risk factors and outcomes of delirium in mechanically ventilated adults: Results from the SLEAP Trial

S Mehta, D Cook, JW Devlin, Y Skrobik, M Meade, D Fergusson, M Herridge, M Steinberg, J Granton, N Ferguson, M Tanios, P Dodek, R Fowler, K Burns, M Jacka, K Olafson, R Mallick, S Reynolds, S Keenan, L Burry, for the SLEAP Investigators and the Canadian Critical Care Trials Group

• Time dependent multivariate analysis

• Independently associated with delirium onset
  - Restraint use        HR 1.87       P=0.0003
  - Antipsychotic use   HR 1.67       P=0.047
  - Midazolam           HR 0.998      P=0.049

Crit Care Med 2014- In press
Guidelines and Alternatives
Agitation and Sedation

…..Efforts to reduce anxiety and agitation, including maintenance of patient comfort, provision of adequate analgesia, frequent reorientation, and optimization of the environment to maintain normal sleep patterns, should be attempted before administering sedatives [and before using restraints]
• ‘CNO endorses the least restraint approach’
• ...all possible alternative interventions are exhausted before deciding to use a restraint. This requires assessment and analysis of what is causing the behaviour. When the reason for the behaviour is identified, interventions can be planned...

• A policy of least restraint indicates that other interventions have been considered and/or implemented to address the behavior
Quality Practice Settings (CNO)

Organizations that are committed to achieving quality practice settings create and maintain supports for professional nursing practice, including:

1. **Fostering excellent nursing practice and safe client care.** Practice settings that support a policy of least restraint provide a safe workplace for staff and clients.

2. **Involving nurses in the development of a least restraint policy,** including identifying specific resources to support nurses in achieving restraint-free environments.

3. **Providing resources** that include appropriate staffing levels, tools to identify clients at risk of restraint and an environment that’s supportive of alternatives to the use of restraints.

4. **Providing staff education** about the assessment, planning, implementation, support and evaluation of least restraint practices and client rights.

5. **Implementing mechanisms to evaluate the impact of staff education** and the need for continued support or alternative strategies to assist staff in implementing a least restraint policy.

Gerald A. Maccioli, MD, FCCM; Todd Dorman, MD, FCCM; Brent R. Brown, MD; John E. Mazuski, MD, PhD, FCCM; Barbara A. McLean, MN, CCRN, CCNS-NP, FCCM; Joanne M. Kuszaj, MSN, RN, CCRN; Stanley H. Rosenbaum, MD, FCCM; Lorry R. Frankel, MD, FCCM; John W. Devlin, PharmD, BCPS, FCCM; Joseph A. Govert, MD; Brian Smith, RCP, RRT; William T. Peruzzi, MD, FCCM

Objective: To develop clinical practice guidelines for the use of restraining therapies to maintain physical and psychological safety of adult and pediatric patients in the intensive care unit.

Participants: A multidisciplinary, multispecialty task force of experts in critical care practice was convened from the membership of the American College of Critical Care Medicine (ACCM), the Society of Critical Care Medicine (SCCM), and the American Association of Critical Care Nurses (AACN).

Evidence: The task force members reviewed the published literature (MEDLINE articles, textbooks, etc.) and provided expert opinion from which consensus was derived. Relevant published articles were reviewed individually for validity using the Cochrane methodology (http://hiru.mcmaster.ca/cochrane/ or www.cochrane.org).

Consensus Process: The task force met as a group and by teleconference to identify the pertinent literature and derive consensus recommendations. Consideration was given to both the weight of scientific information within the literature and expert opinion. Draft documents were composed by a task force steering committee and debated by the task force members until consensus was reached by nominal group process. The task force draft then was reviewed, assessed, and edited by the Board of Regents of the ACCM. After steering committee approval, the draft document was reviewed and approved by the SCCM Council.

Conclusions: The task force developed nine recommendations with regard to the use of physical restraints and pharmacologic therapies to maintain patient safety in the intensive care unit. (Crit Care Med 2003; 31:2665–2676)

Key Words: agitation; analgesia; chemical; delirium; ethical; evidence-based medicine; guidelines; intensive care unit psychosis; monitoring; moral; nursing assessment; pain; pharmacologic therapy; physical; restraints
Recommendations
Level of Evidence C

1. Institutions should create the least restrictive but safest environment for patients in regard to restraint use. This is in keeping with the goals of maintaining the dignity and comfort of our patients while providing excellence in medical care.

2. PR should be used only in clinically appropriate situations and not as a routine component of therapy. When PR used, the risk of untoward treatment interference events must outweigh the physical, psychological, and ethical risks of their use.

3. Patients must be evaluated to determine whether treatment of an existing problem would obviate the need for PR. Alternatives to PR should be considered.

4. The choice of restraining therapy should be the least invasive option capable of optimizing patient safety, comfort, and dignity.
Recommendations
Level of Evidence C

5. The rationale for PR use must be documented in the medical record. Orders for restraining therapy should be limited to a 24-hr period. The potential to discontinue/reduce restraining therapy should be considered at least every 8 hrs.

6. Patients should be monitored for the development of complications from PR at least every 4 hrs. Each assessment should be documented in the medical record.

7. Patients and their significant others should receive ongoing education as to the need for and nature of restraining therapies.

8. Analgesics, sedatives, and neuroleptics used for the treatment of pain, anxiety, or psychiatric disturbance should be used to mitigate the need for PR and not overused as a method of chemical restraint.

Gerald A. Maccioli, MD, FCCM; Todd Dorman, MD, FCCM; Brent R. Brown, MD; John E. Mazuski, MD, PhD, FCCM; Barbara A. McLean, MN, CCRN, CCNS-NP, FCCM; Joanne M. Kuszaj, MSN, RN, CCRN; Stanley H. Rosenbaum, MD, FCCM; Lorry R. Frankel, MD, FCCM; John W. Devlin, PharmD, BCPS, FCCM; Joseph A. Govert, MD; Brian Smith, RCP, RRT; William T. Peruzzi, MD, FCCM

<table>
<thead>
<tr>
<th>Environmental</th>
<th>Therapy</th>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alter environmental stimuli</td>
<td>Manage pain and hypoxemia, evaluate ventilator settings</td>
<td>Maximize communication</td>
</tr>
<tr>
<td>Keep objects necessary for daily living close at hand</td>
<td>Maximize activities of daily living</td>
<td>Provide communication aids</td>
</tr>
<tr>
<td>Use support devices that are not so restrictive</td>
<td>Eliminate bothersome treatments as soon as possible</td>
<td>Provide reality links and reorientation cues</td>
</tr>
<tr>
<td>Decrease bed rail use if patient is climbing over them</td>
<td>Begin oral feedings as soon as possible</td>
<td>Involve patient in care planning if possible</td>
</tr>
<tr>
<td>Use more frequent or constant supervision</td>
<td>Remove catheters as soon as possible</td>
<td>Use anxiety reduction techniques</td>
</tr>
<tr>
<td>Increase the caregiver supervision ratio</td>
<td>Review medications for any possible contributors to delirium or anxiety</td>
<td>Involve family and others in care planning</td>
</tr>
<tr>
<td>Use one-to-one supervision</td>
<td>Encourage physical exertion, exercise, mobility</td>
<td></td>
</tr>
</tbody>
</table>
Early pharmacologic treatment of delirium may reduce PR use

- Single center retrospective study
- 200 intubated patients with positive ICDSC
  - 98 received pharmacologic treatment (AP or dexmedetomidine) within 24 hrs prior to + ICDSC
  - 102 did not
- Treated patients: shorter time in restraints (3 vs 6 days), shorter median time to extubation, ICU LOS and hospital LOS

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Peter E. Spronk

Tie your mother down?

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patients tied down, even though they seem to be perfectly at rest, or are even deeply comatose or even paralysed? These authors show that 29 % of the participating ICUs would appear to tie down 50 % of ICU patients despite these patients being in an awake, calm, and cooperative state; 81 % of participating centers would appear to adapt the tightness of the PR to the patient’s condition. Almost 80 % of participating ICUs stated that they do not believe that the use of PR in mechanically ventilated patients could be discontinued. Moreover, in only 56 % of the ICUs was the reason for using PR explained to the relatives, possibly leading to conflicts and disputes with the ICU team. This state of affairs seems hardly acceptable in
Conclusions

• Physical restraint common in critically ill patients
  – despite legislation, guidelines, accreditation
    standards calling for minimization of restraint
  – varies across countries from 0 to 100%

• Restraints may not prevent...

• Restraint may increase psychological morbidity

• Restraint-free care is possible
Thank-you!

geeta.mehta@utoronto.ca

*The Scream. Edvard Munch*
Figure 1. Causes and Interactions of Pain, Agitation, and Delirium.

Drugs and other treatments for pain, agitation, and delirium form an “ICU triad” cognitive management analogous to the “triat of anesthesia,” which highlights interactions among hypnotics, analgesics, and muscle relaxants to encourage balanced anesthesia. The “ICU triad” concept highlights that changing one element is unlikely to be as effective as a coordinated approach.
## RESULTS: RESTRAINED PATIENTS

<table>
<thead>
<tr>
<th>Category</th>
<th>Univariate HR 95% CI</th>
<th>Multivariable HR 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, 10 year increments</td>
<td>0.98 (0.92, 1.05)</td>
<td>1.01 (1.00, 1.02)</td>
</tr>
<tr>
<td>Males</td>
<td>1.27 (1.04, 1.55)</td>
<td>1.24 (1.01, 1.53)</td>
</tr>
<tr>
<td>Admission category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>medical</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>surgical/trauma</td>
<td>1.19 (0.90, 1.58)</td>
<td>1.12 (0.67, 1.88)</td>
</tr>
<tr>
<td>APACHE II score, 5 point increments</td>
<td>0.94 (0.88, 1.01)</td>
<td>0.99 (0.98, 1.01)</td>
</tr>
<tr>
<td>Current smoker</td>
<td>1.54 (1.26, 1.87)</td>
<td>1.38 (1.07, 1.79)</td>
</tr>
<tr>
<td>History of alcohol use (≥2 drinks per day)</td>
<td>1.06 (0.73, 1.53)</td>
<td>1.04 (0.83, 1.30)</td>
</tr>
<tr>
<td>History of any neurological condition</td>
<td>1.17 (0.99, 1.38)</td>
<td>0.92 (0.65, 1.30)</td>
</tr>
<tr>
<td>History of psychiatric condition</td>
<td>1.04 (0.89, 1.22)</td>
<td>0.85 (0.67, 1.09)</td>
</tr>
<tr>
<td>Sepsis</td>
<td>1.15 (0.85, 1.55)</td>
<td>1.22 (0.96, 1.54)</td>
</tr>
<tr>
<td>Randomization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>protocol only</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>daily interruption</td>
<td>0.98 (0.89, 1.08)</td>
<td>0.92 (0.79, 1.06)</td>
</tr>
<tr>
<td>Duration of ventilation</td>
<td>0.99 (0.99, 1.00)</td>
<td>0.99 (0.98, 1.00)</td>
</tr>
<tr>
<td>Total benzodiazepine dose in ICU</td>
<td>1.00 (0.99, 1.00)</td>
<td>1.03 (0.99, 1.06)</td>
</tr>
<tr>
<td>Total opioid dose in ICU</td>
<td>1.00 (1.00, 1.00)</td>
<td>1.00 (1.00, 1.01)</td>
</tr>
<tr>
<td>Unplanned extubation/device removal</td>
<td>2.00 (1.54, 2.59)</td>
<td>1.47 (1.19, 1.83)</td>
</tr>
<tr>
<td>Antipsychotic in ICU</td>
<td>1.67 (1.33, 2.08)</td>
<td>1.42 (1.11, 1.81)</td>
</tr>
<tr>
<td>Delirium in ICU</td>
<td>1.65 (1.32, 2.06)</td>
<td>1.31 (1.11, 1.54)</td>
</tr>
</tbody>
</table>
CONCLUSIONS

- High rate of restraint use
- Non-restrained patients received less chemical restraint
- **BUT:**
  - Were more likely to be over-sedated
  - Experienced coma
  - Were sicker and more died
- Variables considered a priori as potential predictors of restraint application were not associated with restraint