Rehabilitation and follow up from Intensive care

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Intensive care unit admission is associated with a high mortality, a poor physical quality of life and a low quality adjusted life years gained compared to the general population for 5 years after discharge.
High incidence of Psychological (23-39%) and Neurocognitive problems (upto 66%)
Definition of *rehabilitation* in English:

**rehabilitation**

**NOUN**

[mass noun]

1. The action of restoring someone to health or normal life through training and therapy after imprisonment, addiction, or illness.

‘*she underwent rehabilitation and was walking within three weeks*’
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Lack of sleep

Sedation

Positive pressure ventilation

Hemodynamic instability

Fluids/Inotropes

Prolonged ICU stay/Immobility

Muscle weakness

Delirium/Cognitive dysfunction

Respiratory failure

Sepsis

Hemodynamic instability

Fluids/Inotropes

Prolonged ICU stay/Immobility

Delayed weaning

Muscle weakness

Poor Physical & Mental recovery
“Rehabilitation should commence right from the time the patient is admitted to ICU”
we cannot solve our problems with the same thinking we used when we created them

~ Albert Einstein
Put simply….how small improvements in a number of different aspects of what we do can have a huge impact to the overall performance of the team.’ – Dave Brailsford
Overview of the Surviving Sepsis Campaign

The International Sepsis Campaign

EFFECT OF VAP BUNDLE CARE

**VAP RATE**

**VAP BUNDEL**

- HOB elevation
- DVT prophylaxis
- Stress ulcer prophylaxis
- Daily interruption
- Daily oral care

**VAP BUNDEL**

1. Effective hand hygiene for all procedures relating to CVC
2. Use 0.5% chlorhexidine gluconate in 70% alcohol as skin antisepsis
3. Strict use of barrier/aseptic precautions on insertion
4. Implement CVC dressing change every seven days and when soiled
5. Effective use of ANTT2 when accessing or manipulating CVC
6. Daily review of line necessity

The central venous catheter care bundle

1. Alternatively use povidone iodine if chlorhexidine gluconate contraindicated
2. Aseptic non-touch technique
3. With subsequent removal of unnecessary lines

Adapted from IHI 2006
REHABILITATION BUNDLE

Targeted sedation/SAT

SBT/Early extubation/NIV

Early mobilization

Remove lines/Catheters/Tubes

Oral nutrition/Fluid balance

Delirium prevention/Sleep hygiene

Good pain Mgt/Avoid opioids/Regional Anaesthesia

？Early Trache

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Early mobilization
Muscle thickness decreased 1.6%/day.
Energy balance made not difference to rate of wasting.
Consequences of delayed mobilisation

• Muscle atrophy- ICU Acquired weakness
• Pressure ulcers
• Atelectasis, Pneumonia- Increased Ventilator days
• Deep vein thrombosis
• Osteoporosis
• Prolonged hospital stay
Early mobilization of patients receiving mechanical ventilation was uncommon. More than 50% of patients discharged from the ICU had developed ICU-acquired weakness, ICU-AW was associated with death between ICU discharge and day-90.
Mobilised patients were out of bed early, had lower length of ICU, hospital stay.
No untoward events

Greater return to independent functional status at hospital discharge
Shorter duration of delirium and Ventilator free days at 28 days
Risks

- Injuries
- Instability
- Disconnection
- Increased VO2

Barriers

- Education
- ETT/Ventilation
- Sedation
- Staffing/MDT
- Delirium
- Instability-CVS/RS
- Lines
- Pain
- Weakness
- Cooperation
Good pain management- Regional Anaesthesia
Good Sedation practices

Spontaneous Awakening Trials
Targeted Sedation
Pain-Agitation-Delirium (PAD) Guidelines

- Is patient comfortable and at the set sedation & pain goal?
  - NO: Reassess goal daily. Titrate to maintain goal. Daily interruption of sedation & spontaneous breathing trials
  - YES: Reassess goal. Aim NRS<4 or CPOT<2
- Analgesic management: Consider regular Paracetamol, assess for neuropathic pain and treat with gabapentin or carbamazepine
  - First line: Fentanyl or Alfentanil or Morphine (intermittent dosing preferred, if more frequent dosing consider infusions of the above drugs)
- Is patient in pain? (NRS)
  - YES: Set goal for sedation. Aim RASS -1 to 0
- Is patient anxious/agitated? (RASS)
  - YES: Optimize pain management before sedation
  - NO: Identify causes, eliminate factors. Non pharmacologic interventions- minimize light, noise, patient interruptions
- Does the patient have delirium? (positive CAM-ICU)
  - YES: Optimize delirium prevention strategies
    - Consider Haloperidol or Atypical antipsychotics (Quetiapine, Risperidone)
- 60/M
- OOHCA- 16 minutes no CPR
- VF when paramedic crew arrived, Single shock, with CPR, ROSC
- Intubated and remained stable
- GCS 3/15
- Angio- Obstructed LAD and RCA, stents to LAD
- ICU- Targeted temperature management
Early extubation/Non invasive ventilation

- Spontaneous Breathing Trials
- Early extubation
- NIV bridge
- Early Tracheostomy
D0: 12 hours after Emergency aneurysm surgery-
Intraoperative 11 Litres fluid, preop lactate: 19
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Fluid balance
Sepsis in European intensive care units: Results of the SOAP study*

Vincent, Jean-Louis MD, PhD, FCCM; Sakr, Yasser MB, BCh, MSc; Sprung, Charles L. MD; Ranieri, V Marco MD; Reinhart, Konrad MD, PhD; Gerlach, Herwig MD, PhD; Moreno, Rui MD, PhD; Carlet, Jean MD, PhD; Le Gall, Jean-Roger MD; Payen, Didier MD

Critical Care Medicine; February 2006 - Volume 34 - Issue 2 - p 344-353

Review of A Large Clinical Series

Association of Cumulative Fluid Balance on Outcome in Acute Lung Injury: A Retrospective Review of the ARDSnet Tidal Volume Study Cohort

Andrew L. Rosenberg, MD, Ronald E. Dechert, DrPH, Pauline K. Park, MD, and Robert H. Bartlett, MD; for the NIH NHLBI ARDS Network

Comparison of Two Fluid-Management Strategies in Acute Lung Injury

The National Heart, Lung, and Blood Institute Acute Respiratory Distress Syndrome (ARDS) Clinical Trials Network*

Vasopressin versus Norepinephrine Infusion in Patients with Septic Shock
Saving the patient

Rescue → Optimization → Stabilization → De-escalation

Save the organs

Volume status

Rescue → Optimization → Stabilization → Deescalation

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“a goal of a zero to negative fluid balance by day 3 and to keep the cumulative fluid balance on day 7 as low as possible (Grade 2B)” (Malbrain et al, 2014)

“diuretics or renal replacement therapy (in combination with albumin) can be used to mobilise fluids in haemodynamically stable patients with intra-abdominal hypertension and a positive cumulative fluid balance after the acute resuscitation has been completed and the inciting issues/source control have been addressed (Grade 2D)” (Malbrain et al, 2014)
- 51/M
- Type 1 respiratory failure
- ARDS post Below Knee amputation for Osteomyelitis
- T2DM with poor control
- Stuck on NIV & 80% FiO2
Early Oral nutrition & hydration
• 35/F
• Poorly controlled T1DM
• Below knee amputation
• Post op VF cardiac arrest in theatre
• CPR approx. 40 minutes (reverted to Sinus after initial 3 cycles of CPR)
• Myocardial stunning on Adrenaline & Noradrenaline infusion
Recognising and Preventing delirium

Monitor for delirium
Search for causes
Rationalise drug management
Search for infection
Alcohol/Opioid withdrawal
Delirium as a Predictor of Mortality in Mechanically Ventilated Patients in the Intensive Care Unit

E. Wesley Ely, MD, MPH; Ayumi Shintani, PhD, MPH; Brenda Truman, et al.


The impact of delirium in the intensive care unit on hospital length of stay

Original Investigation
March 2017

Association of Delirium With Cognitive Decline in Late Life
A Neuropathologic Study of 3 Population-Based Cohort Studies

Daniel H. J. Davis, PhD, MRCP; Graciela Muniz-Terrera, PhD; Hannah A. D. Keage, PhD; et al.

Promoting sleep hygiene

Environmental modification
Noise levels in ICU

WHO recommendation:
< 35dB average background in Hospital
< 40dB at peaks in the Night

Average Noise levels at Frimley ICU

Daytime – 59dB
Quiet time – 56dB
Nocturnal – 59dB

Audit of noise levels in Intensive care. Chana S, Kukreja Y, Narayanan M. 2013
• Exercise
• Minimise monitoring
• Minimise blood sampling
• Eye masks
• Ear plugs
• Music/Noise cancelling headphones
• Music therapy
Light therapy-Circadian rhythm
Communication & Speech

Speech & Language Therapy Involvement
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• Communication tools
Family involvement in the care

Participation
Joint decision making
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Independence, Mental focus and Goal setting

Patient own clothes
What is important for patient??
Going home
Daily goals to achieve
A: Assess, Prevent & Manage pain
B: Both Spontaneous Awakening Trials (SAT) & Spontaneous Breathing Trials (SBT)
C: Choice of Analgesia & Sedation
D: Delirium- Assess, Prevent & Manage
E: Early Mobilization
F: Family engagement & Empowerment
## Rehab Bundle

### Sedation Management/Pain
- **RASS**
- **Current RASS:**
- **Target RASS:**
- **Pain Assessment/Analogies**
- **Sedation hold successful?** Y ☐ N ☐ Comment:
- **Overall Plan**

### Spontaneous Breathing Trials (weaning plan)
- **Airway**
- **Artificial Airway?** Y ☐ N ☐ If yes: ETT ☐ Tracheostomy ☐
- **Current Level of Ventilation**
- **Weaning Parameters [as appropriate]**
  - **SpO₂:**
  - **PaO₂:**
  - **PCO₂:**
  - **pH:**
  - **RR:**
  - **P0.1:**
- **Today's Weaning Plan**

### Communication
- **Able to communicate?**
- **Is a SLT referral required?**
- **Communication aids required**
  - **Glasses:**
  - **Hearing Aids:**
  - **Communication Boards:**
- **Writing:**
  - **Cuff Down Speech:**
  - **PMV:**
- **Patient Diary in use?**
- **CAM-ICU:**
  - **CAM-ICU score:**
  - **Hypotensive:**
  - **Hyperactive:**
  - **Mixed:**
- **Causes:**
- **Is treatment required (consider light box or treatment of agitation)?**
  - **No ☐ Yes ☐**
  - **If yes, what is the management plan:**

### Delirium
- **Is the patient delirious?**
- **If delirious are any potential causes present? (see overleaf)**
- **Causes:**
- **Is treatment required (consider light box or treatment of agitation)?**
  - **No ☐ Yes ☐**
  - **If yes, what is the management plan:**

### Early Mobilisation/Environment
- **Transfers/mobility**
- **Seating Requirements**
- **Bike & Exercise Prescription**
  - **Is it appropriate:**
    - **Y ☐ N ☐**
    - **If No, why not?**
    - **In bed ☐ in chair ☐ Arms ☐ Legs ☐**
    - **Time:**
      - **Active or Passive:**
      - **Resistant (if active):**
- **Environment/Attachments (please discuss with Consultant Intensivist)**
  - **A-Line ☐ CVC ☐ NGT ☐ Urinary Catheter ☐**
  - **Monitoring frequency:**
  - **Blood test frequency:**
- **Patient Attire**
  - **Can the patient be fully dressed/wear pyjamas?** Y ☐ N ☐
- **Sleep (consider factors overleaf)**

### Feeding/Nutrition
- **Speech & Language Therapy**
- **Completed swallow screen:**
  - **Y ☐ N ☐ N/A ☐**
- **Route of Nutrition**
  - **E & O ☐ Enteral Feed ☐ PN ☐ Fluids ☐ NBM ☐**
- **Nutritional Needs**
  - **Nutritional needs fully met?**
  - **Risk of re-feeding:**
    - **Y ☐ N ☐**
    - **Dietitian Involved?**
      - **Y ☐ N ☐**
      - **Nutritional Tip Feeds Y ☐ N ☐**

### Daily Goal (see overleaf for suggestions)

### Signature:
- **Print:**
- **Designation:**

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Where we are now........Sedation
Where we are now........Delirium

• A CAM-ICU assessment was attempted 91%
• Delirium incidence = 41%
• % days with delirium ranged from 0 -100%
• Average days with delirium was 26%

However........

• In 45% of patients (11 of 24) there were instances were CAM-ICU was documented as unable to assess
• Management of modifiable risk factors
Where we are now.......Early mobilisation
Post- Intensive care
Problems after leaving intensive care

- Memory/Sleep/Nightmares/Anxiety/Depression
- PTSD
- Physical Weakness
- Pain
- Social issues- Job, relationship
- Lack of information on Disease
- Lack of Information to access help
- Lack of support
A self help rehabilitation manual supplemented to routine care showed improvement on the Short Form Health Survey physical function scores at 8 weeks and 6 months and there was a trend to a lower rate of depression at 8 weeks.
The incidence of new cases of PTSD was reduced in the intervention group compared to the control patients (5% versus 13%).
The ICU diary showed the best evidence for effectiveness in this systematic review.

It is a potentially effective, low cost, and highly acceptable intervention.
An ICU follow-up service did not improve HRQOL or mental health more than standard care within a year of ICU discharge.
Exercise rehabilitation following intensive care unit discharge for recovery from critical illness (Review)

Connolly B, Salisbury L, O’Neill B, Geneen L, Douiri A, Grocott MPW, Hart N, Walsh TS, Blackwood B, for the ERACIP Group

Heterogenous data, high risk of bias, Low quality of evidence
Wide variability in intervention and outcome measures (Anaerobic threshold, Endurance testing, Self reported Physical function)
Thank you for your attention.