Preventing Muscle Wasting in Intensive Care Patients

Matt Thomas
Bristol Royal Infirmary
Judith Edwards, Dr Sanjoy Shah
Spring 2010

- Volcanic ash over Europe
- Discussing how to mobilise patients on ICU
Early physical and occupational therapy in mechanically ventilated patients: Early intensive care unit mobility therapy in the treatment of acute respiratory failure

Peter E. Morris, MD; Amanda Goad, RN; Clifton Thompson, RN; Karen Taylor, MPT; Bethany Harry, RN; Leanne Passmore, MS; Amelia Ross, RN, MSN; Laura Anderson; Shirley Baker; Mary Sanchez; Lauretta Penley; April Howard, RN; Luz Dixon, RN; Susan Leach, RN; Ronald Small, MBA; R. Duncan Hite, MD; Edward Haponik, MD
Figure 2: Probability of return to independent functional status in intervention and control groups

Number at risk

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<tr>
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<th>Control</th>
<th>Intervention</th>
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$p = 0.048$
Prone Positioning in Severe Acute Respiratory Distress Syndrome

Claude Guérin, M.D., Ph.D., Jean Reignier, M.D., Ph.D., Jean-Christophe Richard, M.D., Ph.D., Pascal Beuret, M.D., Arnaud Gacouin, M.D., Thierry Boulain, M.D., Emmanuelle Mercier, M.D., Michel Badet, M.D., Alain Mercat, M.D., Ph.D., Olivier Baudin, M.D., Marc Clavel, M.D., Delphine Chatellier, M.D., Sarnir Jaber, M.D., Ph.D., Sylvène Rosselli, M.D., Jordi Mancebo, M.D., Ph.D., Michel Sirodot, M.D., Gilles Hilbert, M.D., Ph.D., Christian Bengler, M.D., Jack Richcoeur, M.D., Marc Gainnier, M.D., Ph.D., Frédérique Bayle, M.D., Gael Bourdin, M.D., Véronique Leray, M.D., Raphaèle Girard, M.D., Loredana Baboi, Ph.D., and Louis Ayzac, M.D., for the PROSEVA Study Group*
Eureka!
Electrical Muscle Stimulation
Medicine man: Ireland full back Rob Kearney uses an electrical muscle stimulator to speed up his recovery

Neuromuscular electrical stimulation prevents muscle function deterioration in exacerbated COPD: A pilot study

Santiago Giavedoni, Andrew Deans, Paul McCaughey, Ellen Drost, William MacNee, Roberto A. Rabinovich
Autumn 2010

- Is it a realistic trial
Background

Electrical muscle stimulation prevents critical illness polyneuromyopathy: a randomized parallel intervention trial

Christina Routsi, Vasiliki Gerovasili, Ioannis Vasileiadis, Eleftherios Karatzanos, Theodore Pitsolis, Elli Tripodaki, Vasiliki Markaki, Dimitrios Zervakis and Serafim Nanas*
• Different populations
• Different EMS-settings/durations/muscles
• Small numbers (45 largest)
• Blinded/unblinded/cohort
• Different outcome measures
Are you lonely?

Tired of working on your own?
Do you hate making decisions?

HOLD A MEETING!

You can —
• See people
• Show charts
• Feel important
• Point with a stick
• Eat donuts
• Impress your colleagues

All on company time!

MEETINGS

THE PRACTICAL ALTERNATIVE TO WORK
Assemble the team
Spring 2011

- Intensive Care Foundation research prioritisation exercise
- Research for Patient Benefit Grant
Patient Public Involvement
78+ pages of Grant Writing
A good compromise leaves everybody mad.
May 2011

- Applications submitted
- The waiting begins
July 2011

- Shortlisted to 14 by ICF
- Present in London to experts and the competition
- We are selected for the final six,
December 2011

• Final six present to the Intensive Care Society
If there are no ups and downs in your life
It means you are dead
SNOWMEN

expectation

reality
HOT CHOCOLATE

expectation

reality
Firemen

Expectations

Reality
February 2012

- Meetings meetings
- Need more money
- Ethical approval
Beg for Money

NEED $ FOR ALCOHOL RESEARCH!
August 2012 Success
Ethics approval
Bristol Royal Infirmary ICU

- 19 bed unit
- 1200 patients each year
- 1000 receive mechanical ventilation (breathing support) for at least 24 hours
- 9% (109) are on extended periods of mechanical ventilation

- Mechanical ventilation is associated with muscle wasting
Muscle wasting over 1 week

Poulson 2011
Physical Function - Short term

At ICU discharge:

– Body weight decreased by 18% (1.5 stone)
– Global weakness
– Fatigue
– Impaired physical ability
Physical Function – Long term

• At 1 year
  • Weakness, fatigue, wasting
  • Walking distance reduced by a third
  • 50% returned to work

• At 5 years
  • Weakness, fatigue, wasting
  • Walking distance 75%
  • 77% returned to work
E-Vent Study

- Intensive Care Foundation - £50,000
- David Telling Grants - £6500
- CLRN Research Capability - £15000
Randomised Controlled Trial

• Daily EMS to quadriceps and biceps

• Sham control
  – After hours of discussion the following was agreed
OUTCOME
Ultrasound Muscle Mass

Thigh Muscle

Thigh Bone

RF
Biomarkers

- Urea
- Creatinine
- CPK
- Urinary 3-Methyl Histidine
Objective Measure of Strength

Muscle Strength

Handgrip Strength

6 Minute Walk Test

Timed-Up-and-Go-Test
Quality of Life Outcomes

• SF-36
• EQ-5D
• ADLs at 3 months
Results

- Further NIHR grant application
- Publish
- Inform ICUsteps patient/carers group
How’s it Going?

IT’S ALL GOING
VERY WELL
NO PROBLEMS
AT ALL

IT’S GOING VERY BADLY
IT’S A TERRIBLE DISASTER
What to take away

• Muscle loss in critical care is real
• It *probably* has a very detrimental effect on quality of life
• It happens early in the stay
• Prevention is better than treatment

• Nutrition and exercise are all we can do to prevent it
Thank You!