How to Sound Like an Intensivist

- High flow nasal oxygen
- Respiratory failure
- ARDS
- Protective lung ventilation
- Inotropes
- Proning
- ECMO
- CRRT
- Weaning
- Tracheostomy

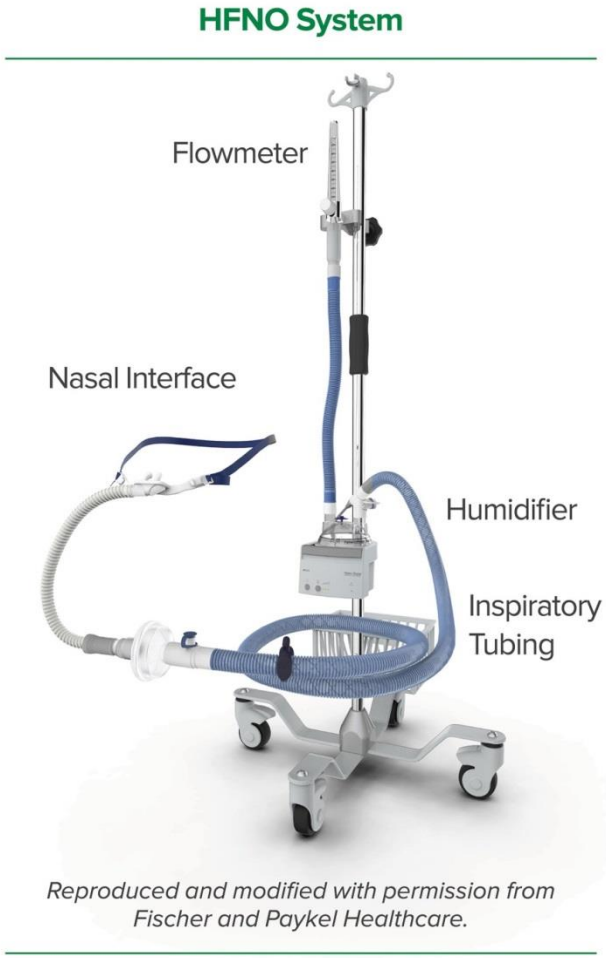
- 75 year old male presented for repair of a complex large upper abdominal incisional hernia under general anaesthesia
- He was otherwise well
- Surgery went well
- Extubated post op with a good working thoracic epidural

- 56 hours later he developed pyrexia, SOB, increased WCC and a climbing lactate
- Examination revealed bilateral lung crackles
- Echo was normal and CXR demonstrated signs of bilateral basal pneumonia
- A clinical diagnosis of HOSPITAL AQUIRED PNEUMONIA was made
- Blood cultures were sent and HIGH FLOW NASAL OXYGEN and Tazocin was commenced

HIGH FLOW NASAL OXYGEN

High flow nasal 02

- Flow rate – up to 60l/min – PEEP 8
- % Oxygen
- Temp 37 c
- 100% humidity



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

High-Flow Oxygen through Nasal Cannula in Acute Hypoxemic Respiratory Failure

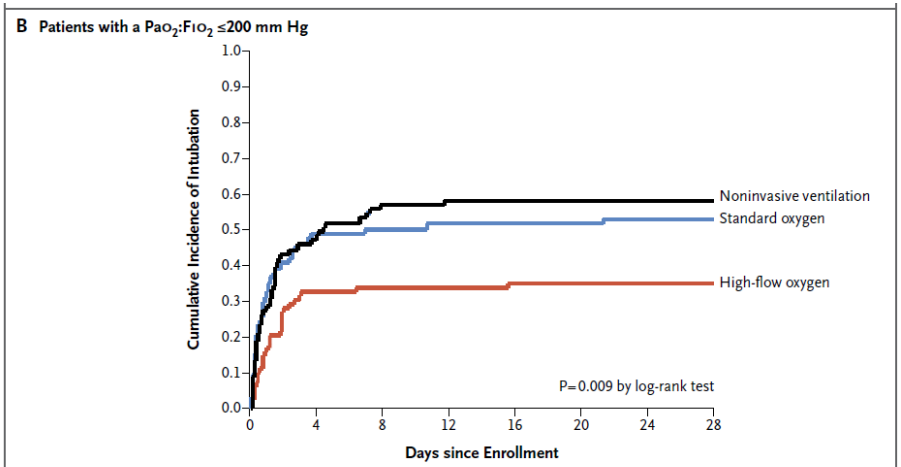


Figure 2. Kaplan–Meier Plots of the Cumulative Incidence of Intubation from Randomization to Day 28.

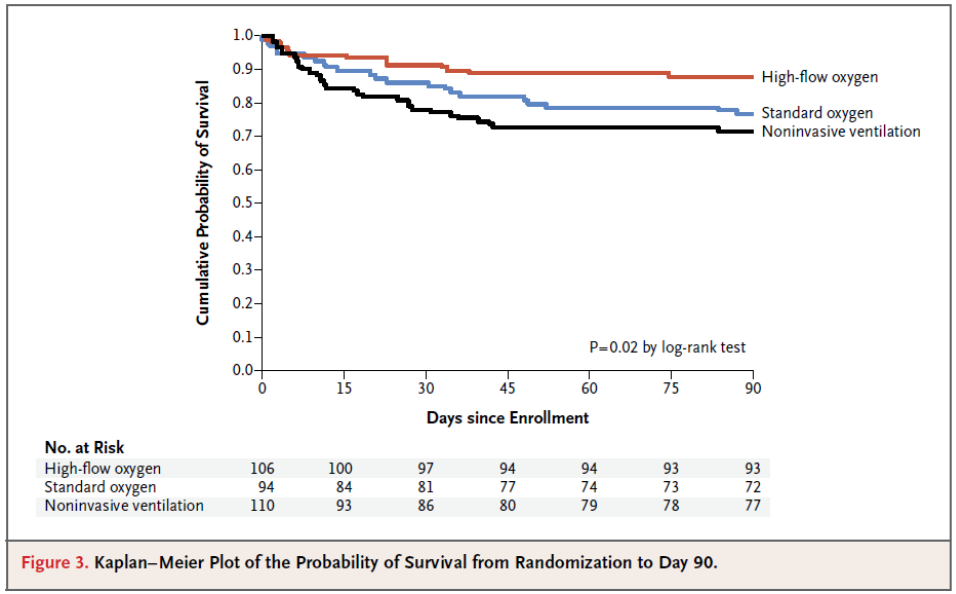


Figure 3. Kaplan–Meier Plot of the Probability of Survival from Randomization to Day 90.

Intubation rates

90 Day Mortality

Open access Research

BMJ Open

Effect of high-flow nasal cannula oxygen therapy compared with conventional oxygen therapy in postoperative patients: a systematic review and meta-analysis

Zhonghua Lu, Wei Chang, Shan-Shan Meng, Xiwen Zhang, Jianfeng Xie, Jing-Yuan Xu, Haibo Qiu, Yi Yang, Fengmei Guo

Adult surgical patients given conventional or HF02 immediately post op

Significant Lower rate escalation oxygen support

Significant Lower intubation rate

No significant difference mortality

- Over the next 24 hours the patients oxygen requirement increases, respiratory rate climbs and the patient became confused and diaphoretic

- He had diffuse bilateral infiltrates on CXR

ABG

- PH 7.2
- CO2 30
- PO2 50
- Lactate 3
- BXS -8
- Fi02 100%

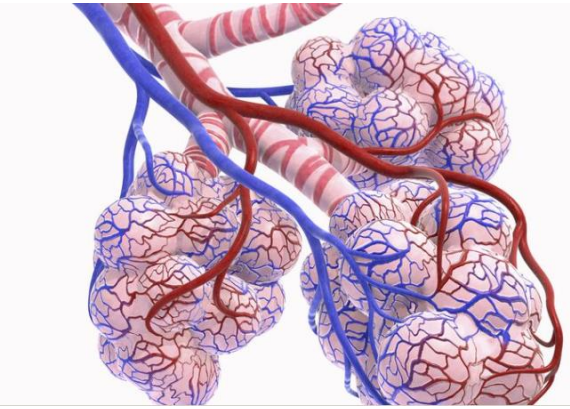
- Metabolic acidosis
- Increased Alveolar arterial gradient
- Type 1 Resp failure

RESPIRATORY FAILURE

Respiratory failure

TYPE 1

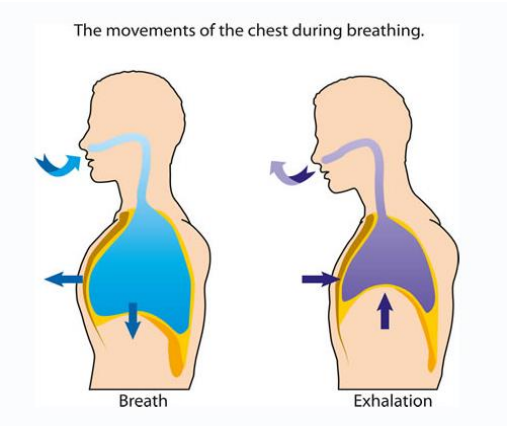
NON VENTILATORY LUNG FAILURE



Hypoxia

TYPE 2

VENTILATORY FAILURE
+/- NON VENTILATORY



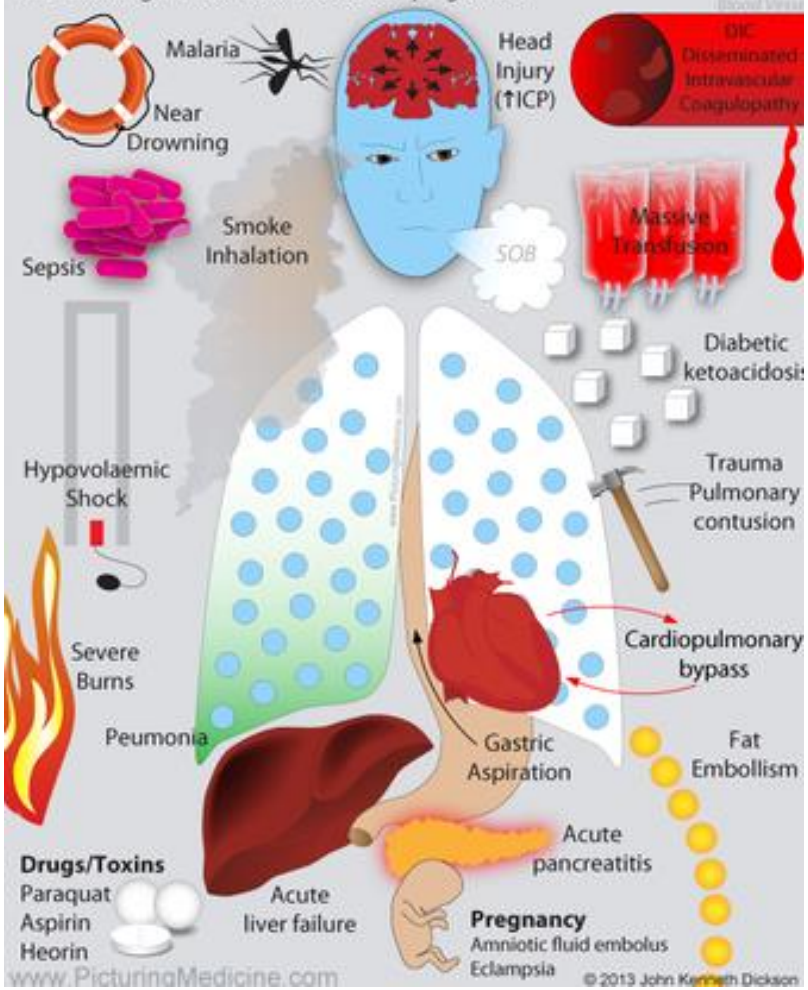
Hypoxia
Hypercarbia

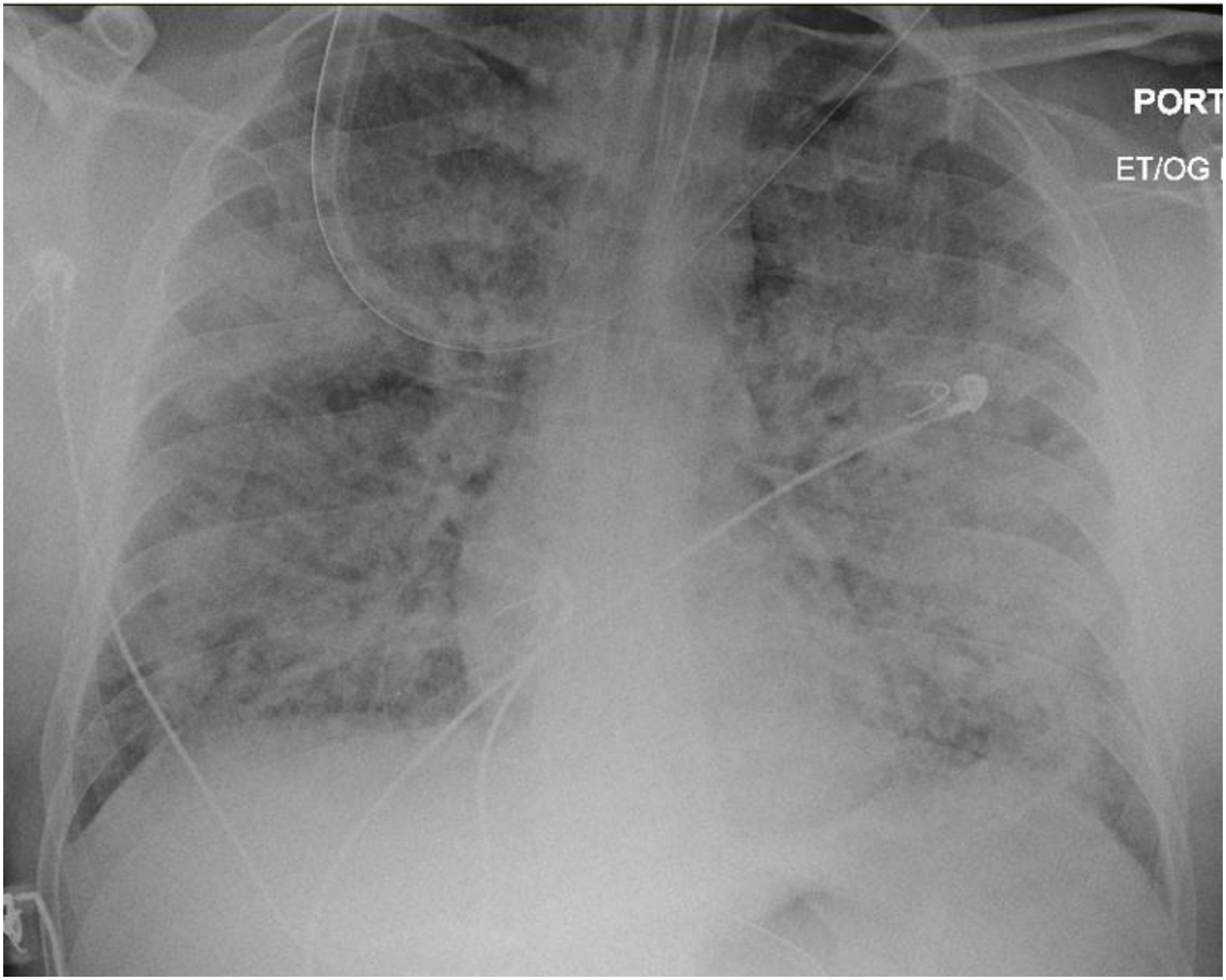
- A diagnosis of ARDS was made

ARDS

Causes of **Acute Respiratory Distress Syndrome (ARDS)**

Increased capillary permeability within the lung leading to oedema.
Often accompanied by multi-organ failure.
Leads to respiratory distress (cyanosis, tachypneoa and tachycardia)
Bilateral fine inspiratory crackles on examination.
Caused by either direct lung injury or secondary to severe systemic illness.
The following are risk factors for developing ARDS.




PORT
ET/OG

Acute Respiratory Distress Syndrome

The Berlin Definition

	ACUTE RESPIRATORY DISTRESS SYNDROME		
Timing	Within 1 week of a known clinical insult of new/worsening respiratory symptoms		
Chest Imaging [a]	Bilateral opacities – not fully explained by effusions, lobar/lung collapse, or nodules		
Origin of Edema	Respiratory failure not fully explained by cardiac failure or fluid overload; Need objective assessment (e.g., echocardiography) to exclude hydrostatic edema if no risk factor present		
	Mild	Moderate	Severe
Oxygenation [b]	$200 < PaO_2/FiO_2 \leq 300$ with PEEP or CPAP ≥ 5 cmH_2O [c]	$100 < PaO_2/FiO_2 \leq 200$ with PEEP ≥ 5 cmH_2O	$PaO_2/FiO_2 \leq 100$ with PEEP ≥ 5 cmH_2O

[a] Chest x-ray or CT scan

[b] If altitude higher than 1000 m, correction should be made: $PaO_2/FiO_2 \times$ (barometric pressure/760)

[c] This may be delivered non-invasively in the Mild ARDS group

The ARDS Definition Taskforce. JAMA 2012;307:2526-2533.

- Decision was made to intubate

- Patient was ventilated with Protective lung ventilatory parameters

PROTECTIVE LUNG VENTILATION

Vent strategy

The New England
Journal of Medicine

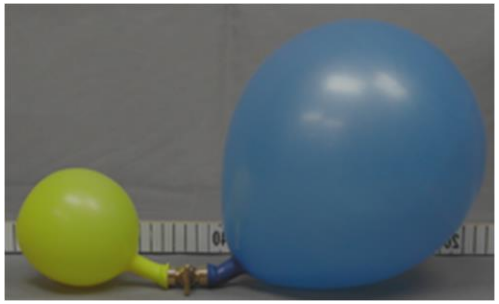
VOLUME 342 MAY 4, 2000 NUMBER 18

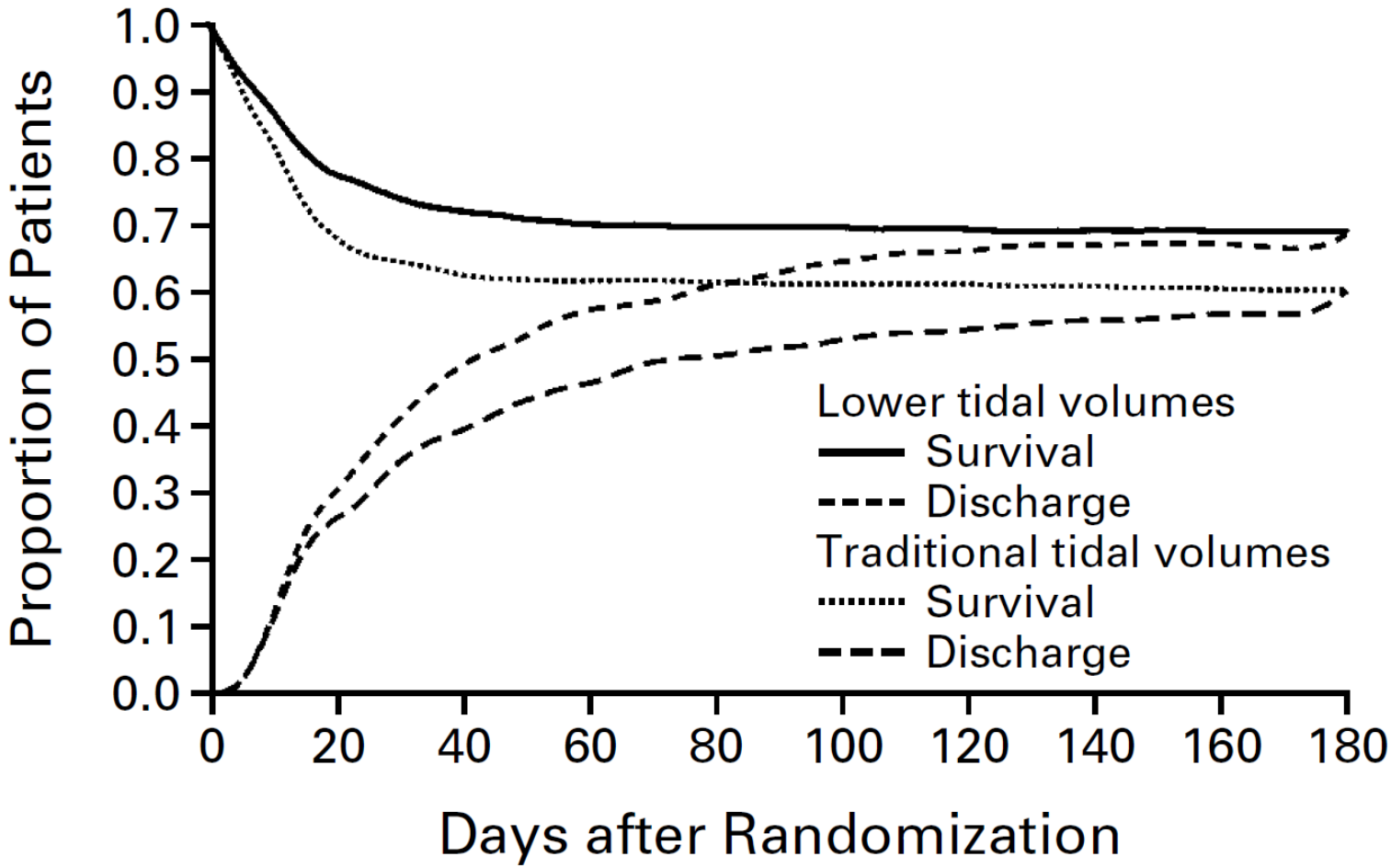
VENTILATION WITH LOWER TIDAL VOLUMES AS COMPARED WITH TRADITIONAL TIDAL VOLUMES FOR ACUTE LUNG INJURY AND THE ACUTE RESPIRATORY DISTRESS SYNDROME

THE ACUTE RESPIRATORY DISTRESS SYNDROME NETWORK*

ARDSNET

- 6ml vs 12ml
- Plateau pressure 30 vs 50
- PEEP titrated to Oxygen




Proportion of Patients
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
20
40
60
80
100
120
140
160
180
Days after Randomization
Lower tidal volumes
Survival
Discharge
Traditional tidal volumes
Survival
Discharge

Standard settings

- TV 6ml/kg IBW
- Plateau pressure < 30
- Permissive hypercapnia
  pH >7.2
- PEEP titrated to Fi02

- Patients BP not responding to fluid boluses so inotropes commenced

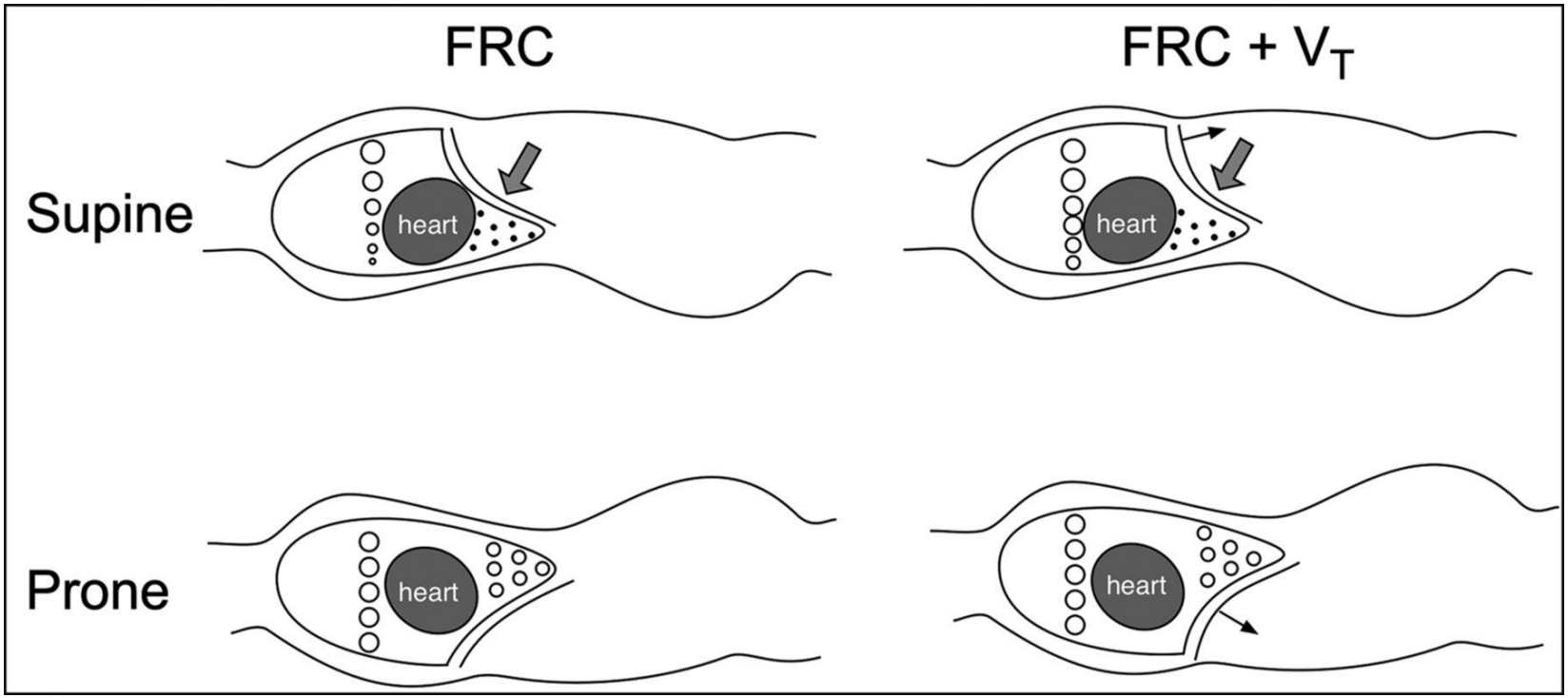
INOTROPES

- Noradrenaline – Sick
- Adrenaline - Sicker
- Vasopressin – Really Really Sick
- Dobutamine – Heart Sick
- Levosimendan – Heart really sick and I want to spend some $$$$

- Over next 24 hours resp function deteriorated further (95% Oxygen / 18 PEEP)
- Consideration was given to the use of neuromuscular blockers and prone ventilation
- Patient was also discussed with ECMO center.

ECMO/PRONING

The effect of prone posture on alveolar size at functional residual capacity (FRC) and FRC plus tidal volume (VT).



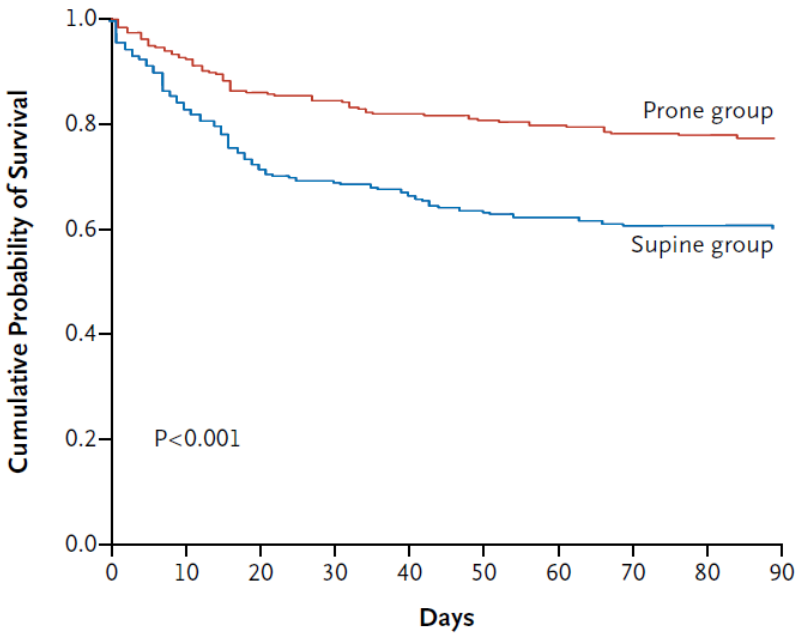
Nicholas J Johnson et al. Respir Care 2017;62:1097-1110

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JUNE 6, 2013 VOL. 368 NO. 23

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., Samir 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 Richecoeur, M.D., Marc Gainnier, M.D., Ph.D., Frédérique Bayle, M.D., Gael Bourdin, M.D., Véronique Leray, M.D., Raphaele Girard, M.D., Loredana Baboi, Ph.D., and Louis Ayzac, M.D., for the PROSEVA Study Group*



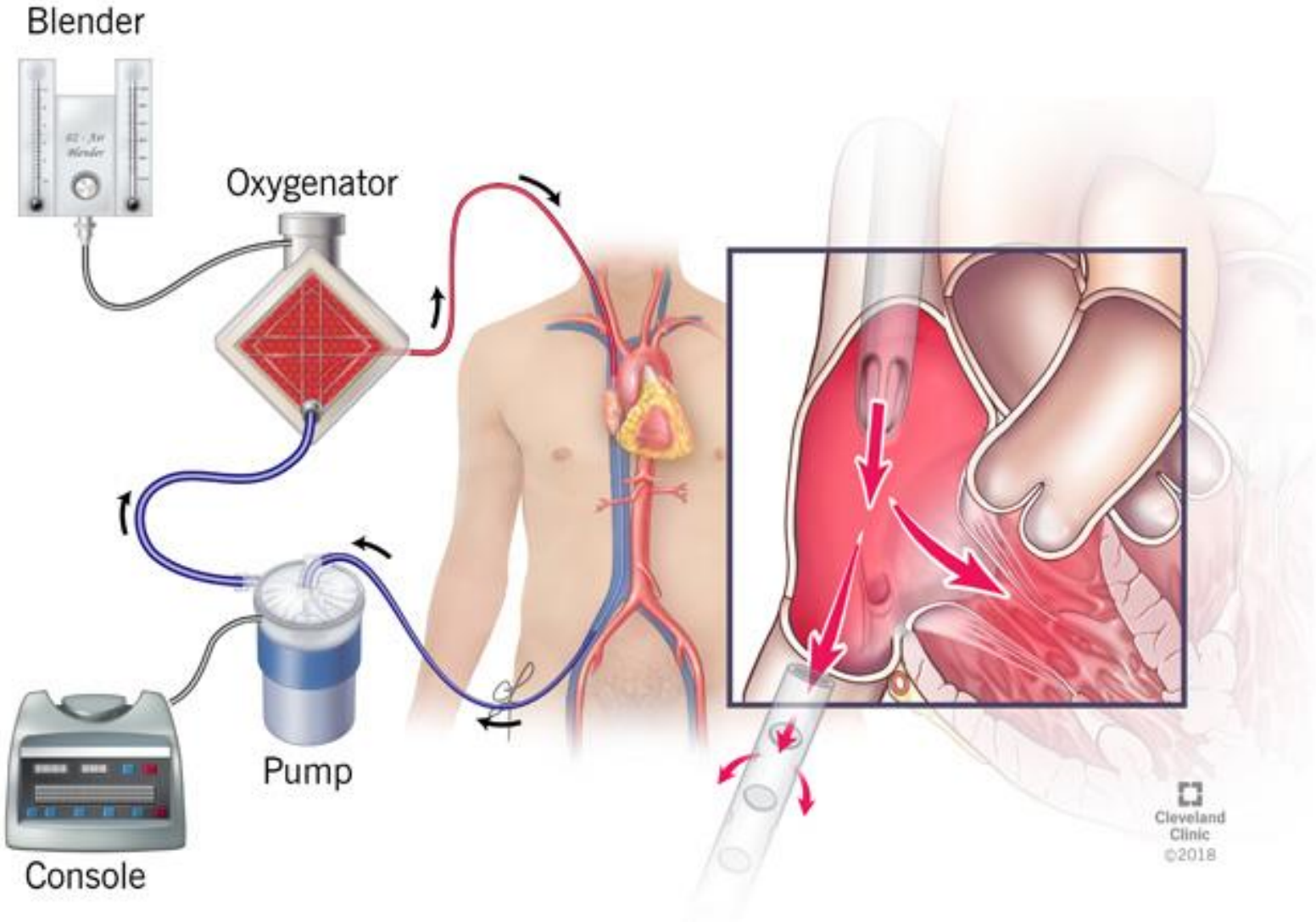
No. at Risk

Prone group	237	202	191	186	182
Supine group	229	163	150	139	136

Figure 2. Kaplan–Meier Plot of the Probability of Survival from Randomization to Day 90.

PRONE CPAP

ECMO



- Once Proned Fi02 fell and compliance improved

- However over the next 48 hours renal function deteriorated and a decision was made to commence CRRT

CRRT

Slow fluid and electrolyte removal

CRRT

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Timing of Renal-Replacement Therapy in Patients with Acute Kidney Injury and Sepsis

N ENGL J MED 379;15 NEJM.ORG OCTOBER 11, 2018

RRT 12 hours vs 48 hours

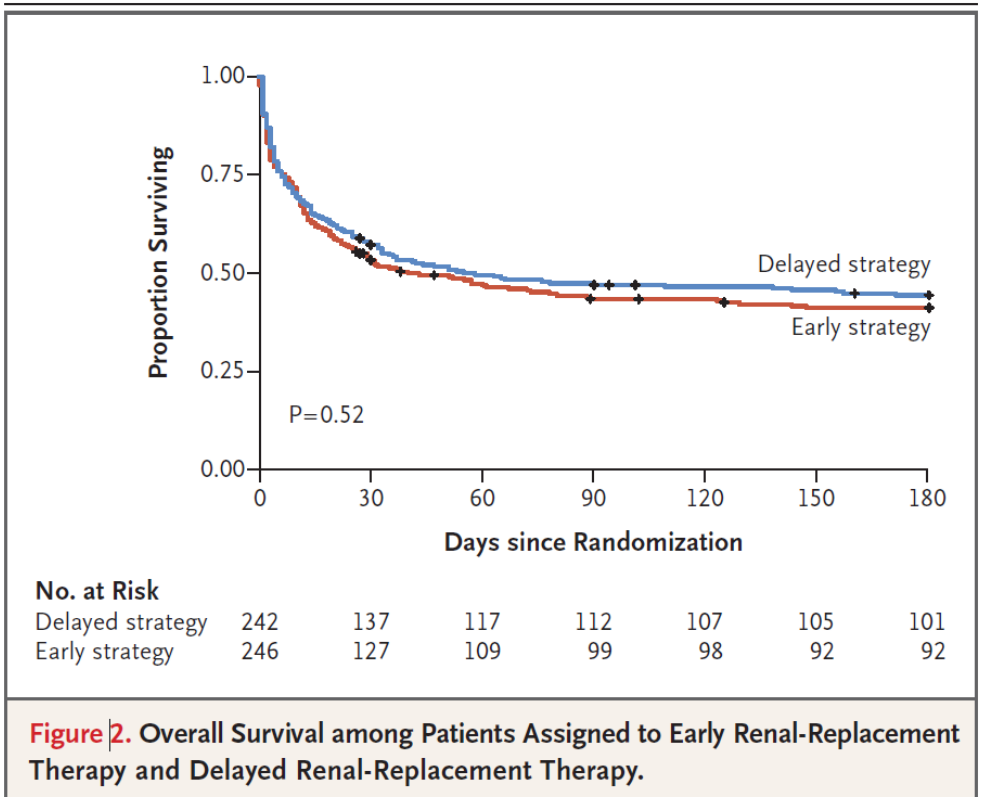


Figure 2. Overall Survival among Patients Assigned to Early Renal-Replacement Therapy and Delayed Renal-Replacement Therapy.

No significant difference mortality

In practice

- Metabolic Acidosis 7.2
- Raised Potassium 7
- Raised Creatinine 600
- Fluid overload litres/oedema

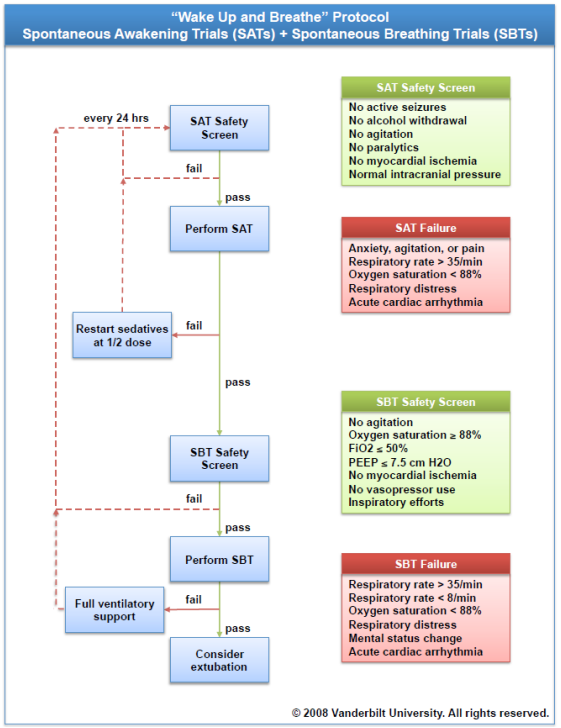
- Over next week the patients inotropes were weaned and his renal function and respiratory function improved

- He underwent daily spontaneous breathing trials and respiratory weaning

WEANING

Physician vs protocolized weaning

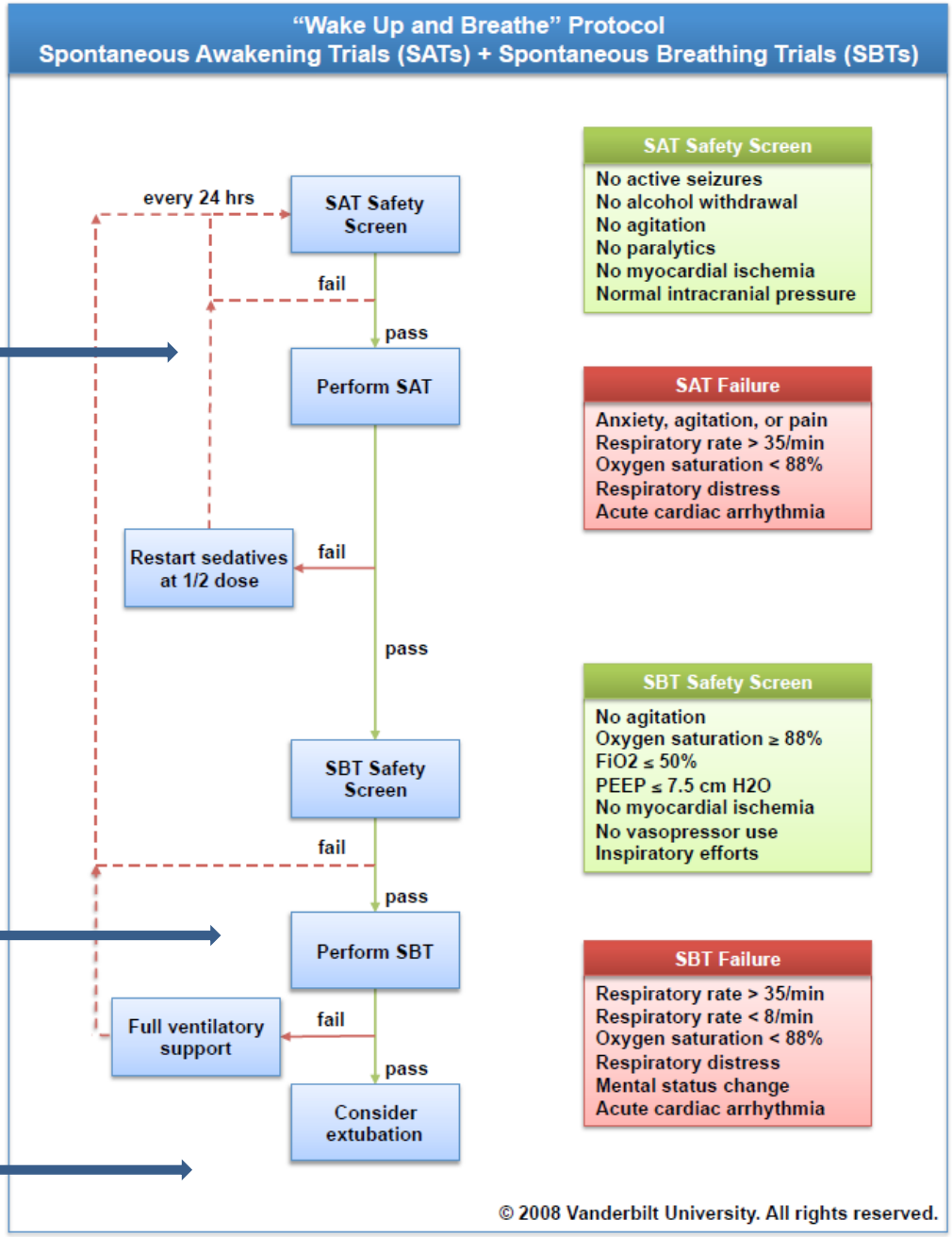
VS



SEDATION OFF AND WAKES UP

BREATHING OK

EXTUBATE



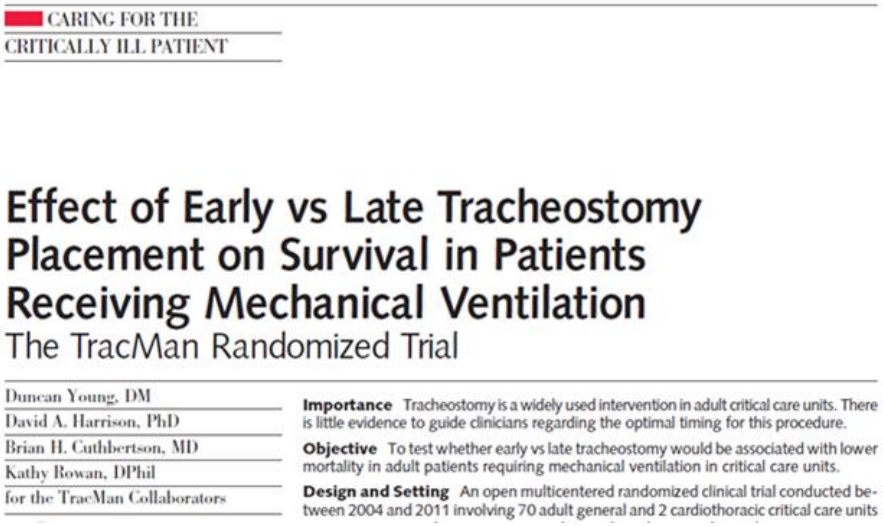
- Weaning was slow and the patient received a Tracheostomy on day 14

TRACHEOSTOMY

tracheostomy

- Stop sedation
- Co-operation with physio
- Communication
- Secretion management

Early vs late Tracheostomy



CARING FOR THE CRITICALLY ILL PATIENT

Effect of Early vs Late Tracheostomy Placement on Survival in Patients Receiving Mechanical Ventilation

The TracMan Randomized Trial

Duncan Young, DM
David A. Harrison, PhD
Brian H. Cuthbertson, MD
Kathy Rowan, DPhil
for the TracMan Collaborators

Importance Tracheostomy is a widely used intervention in adult critical care units. There is little evidence to guide clinicians regarding the optimal timing for this procedure.

Objective To test whether early vs late tracheostomy would be associated with lower mortality in adult patients requiring mechanical ventilation in critical care units.

Design and Setting An open multicentered randomized clinical trial conducted between 2004 and 2011 involving 70 adult general and 2 cardiothoracic critical care units

- 450 patients
- Trachy with in 4 days ventilation vs after 10 days
- No difference in mortality or secondary outcomes

- Patient weaned after a further 5 days and was discharged from hospital 2 weeks later


QUESTIONS
ANSWERS