



The Intensive Connection



Master Class Programme

Mechanical Ventilation – State of the Art 2018

Mechanical ventilation – State of the Art Part I: Modules 1 & 2
Mechanical ventilation – State of the Art Part II: Modules 3, 4 & 5

Day 1 (June 5, 2018)

Module 1 - Respiratory physiology: What you really need to know

13.30-14.00: Welcome & registration

14.00-14.30: Gas exchange

14.30-15.00: Basic lung mechanics

15.00-15.45: Transpulmonary pressure measurement

D Gommers

H Roze

C Guérin

15.45-16.15: Coffee break

16.15-17.00: Advanced lung mechanics: COPD, ARDS & Obesity

17.00-18.00: Lung imaging

18.00-18.30: Not sure I understand... may I ask you?

L Heunks

D Chiumello

D Chiumello, L Heunks,

D Gommers C Guérin,

H Roze Day 2 (June 6, 2018)

Module 2 - From respiratory physiology to mechanical ventilation

08.00-10.00: Respiratory physiology Workshop (small group rotations)

- Pressure-volume curves
- Understanding respiratory monitoring
- Transpulmonary pressures
- Lung imaging

D Chiumello

A Mercat

H Roze

C Guérin

10.00-10.30: Coffee break

10.30-11.10: Patient-ventilator asynchrony

11.10-11.50: Diaphragmatic function: How to explore & preserve?

11.50-12.30: Ventilator-induced lung injury

12.30-13.00: Mechanical Power for dummies

A Mercat

L Heunks

D Gommers

A Mercat

13.00-14.00: Lunch & registration



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Day 2 (June 6, 2018)

Module 3 Mechanical ventilation for ARDS

14.00-14.30: Setting PEEP in ARDS patients

A Mercat

14.30-15.00: Assisted-breathing in ARDS: pro & cons

D Gommers

15.00-16.00: Clinical case-based discussion

JD Chiche

16.00-16.30: Coffee break

16.30-17.30: Prone position: Why and how?

C Guérin

17.30-18.30: Extracorporeal support & adjunctive therapies

JD Chiche

Optional – Meet and greet the Faculty – Dinner

Day 3 (June 7, 2018)

Module 4 - Delivering mechanical ventilation

08.00-08.45: Non-invasive ventilation & High flow nasal canula

JD Chiche

08.45-10.45: Mechanical Ventilation Workshop (small group rotations)

- PEEP selection strategies & driving pressure optimisation

D Gommers

- Prone position

C Guérin

- From auto-modes to closed loop ventilation

JD Chiche

- Non-invasive ventilation & High flow therapy

H Roze

10.45-11.00: Coffee break

11.00-11.30: Ventilatory modes: what's new?

JD Chiche

11.30-12.15: Mechanical ventilation for COPD & asthma

C Guérin

12.15-13.00: Clinical case-based discussion

JD Chiche

13.00-13.45: Lunch

Day 3 (June 7, 2018)

Module 5 - Caring for the ventilated patient

13.45-14.15: Weaning from mechanical ventilation

L Heunks

14.15-14.45: Tracheostomy: Why and how?

D Chiumello

14.45-15.15: Haemodynamics & mechanical ventilation

JD Chiche

15.15-15.30: Coffee break

15.30-16.30: Round table - 60 min - Just Ask Me Anything – JAMA session

JD Chiche D Chiumello,

D Gommers C Guérin, &

L Heunks

16.30-16.45: Course conclusion



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Specific Learning Objectives

At the end of the course, it is expected that participant will...

Respiratory physiology part 1. Gas exchange

- Understand the basic normal physiologic principles of pulmonary gas exchange
- Understand the difference between shunt, ventilation/perfusion mismatch and dead space
- Know how to interpret exhaled CO₂ curves and to calculate physiological dead space
- Know how to clinically manage gas exchange impairments

Respiratory physiology part 2. Basic lung mechanics

- Know how to calculate and understand the significance of the compliance of the respiratory system and of the driving pressure in ARDS
- Know how to calculate and understand the significance of resistance of the respiratory system, and understand the determinants and consequences of intrinsic PEEP

Respiratory physiology part 3. Transpulmonary pressure measurement

- Know the required set-up for transpulmonary pressure measurement
- Know the validation of the balloon position
- Know the optimal balloon filling method
- Know the difficulties and limitations of transpulmonary pressure measurement
- Understand the targets

Respiratory physiology part 4. Advanced lung mechanics (COPD, ARDS, obesity)

- Understand the methods of assessment of PEEP induced lung recruitment in ARDS

Lung imaging

- Understand the basic principles of lung CT scan
- Understand the basic principles of lung ultrasound
- Know the clinical applications of lung CT scan and ultrasound
- Understand the pathophysiology of ARDS & estimate lung recruitment by lung CT scan and ultrasound
- Understand the basic principles and application of electrical impedance tomography

Pressure-volume curves

- Know how to obtain pressure volume curves
- Understand the basic physiology of pressure volume curves
- Know the difference between PV curves of pulmonary, chest wall and the respiratory system
- Know how to interpret pressure volume curves and how to use this information.



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Patient-ventilator asynchrony

- Know how to recognize the main asynchronies
- Understand the pathophysiology of the main asynchronies during invasive ventilation
- Understand the pathophysiology of the main asynchronies during non invasive ventilation
- Know the consequences of the main asynchronies
- Understand how to optimize ventilator settings to prevent asynchronies

Diaphragmatic function: How to explore & preserve?

- Know how to explore diaphragm function via pressure measurement
- Know how to explore diaphragm function via ultrasound
- Know how to explore diaphragm function via EMG
- Understand protection basis of diaphragm function
- Understand effects of mechanical ventilation on diaphragm function

VILI & Lung protective strategies

- Understand the underlying mechanisms that contribute to VILI
- Understand the concepts of atelectrauma and barotrauma
- Understand the role of PEEP and driving pressure to reduce VILI
- Understand how spontaneous breathing can affect VILI
- Understand the rationale for ventilation with further (<6 mL/kg) reduction in VT, plateau (Pplat) and driving (ΔP) pressures

Mechanical power

- Understand the notions of stress and strain
- Understand the concept of mechanical power and its relationship with VILI
- Understand how ventilatory settings can affect mechanical power

Setting PEEP in ARDS patients

- Understand the effects of PEEP on gas exchange and hemodynamics
- Understand the methods proposed for assessment of recruitment and overdistension induced by PEEP
- Understand the methods proposed for individual titration of PEEP
- Know the results of the large RCTs on PEEP titration in ARDS
- Know current recommendations on PEEP setting in ARDS

Prone position: Why and how?

- Understand the rationale of proning
- Understand the effects of proning on oxygenation
- Understand the effects of proning on VILI prevention
- Understand the haemodynamic effects of proning
- Understand the current indication and effects on survival of proning

Extracorporeal support & adjunctive therapies

- Know the principles and indications of widely available adjunctive therapies (muscle relaxants, inhaled NO, other vasodilators and almitrine)



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- Know the expected benefits and potential risks of ultra-protective ventilation
- Understand the principles of extracorporeal CO₂ removal techniques
- Know the current indications and results of ultra-protective ventilation strategies with ECCO₂R
- Know the principles, expected benefits and potential risks of veno-venous ECMO
- Understand the basic principles of mechanical ventilation during ECMO
- Know the current indications and clinical results of ECMO for ARDS
- Know the principles and current indications of other adjunctive therapies

Ventilatory modes: what's new?

- Understand differences between old and new ventilatory methods
- Understand the recent concepts about modes with spontaneous/assisted ventilation
- Understand the potential advantages with new modes of ventilation (ASV, APRV, NAVA, SmartCare)

Mechanical ventilation for COPD and asthma

- Understand the mechanism of hyperinflation
- Know the goals of mechanical ventilation in COPD and asthma
- Understand the rationale of settings during invasive mechanical ventilation in COPD & asthma
- Understand the rationale of settings during assisted modes in COPD and asthma
- Know the essentials of monitoring of mechanical ventilation in COPD and asthma

Non-invasive ventilation & High-flow oxygenation

- Understand the basic physiologic principles that govern the use of NIV
- Understand the characteristics and efficiency of the interfaces
- Understand the various fields of application
- Understand the best and precise solutions for different patients
- Understand timing of application and location of NIV resources

Haemodynamics & mechanical ventilation

- Understand the basic physiologic principles that govern heart-lung interaction during mechanical ventilation
- Understand the hemodynamic effects of PEEP in mechanically ventilated patients
- Understand consequences of ventilatory settings on right & left heart performance
- Understand the principles of hemodynamic evaluation in mechanically ventilated patients

Weaning from mechanical ventilation

- Understand the concepts of simple and difficult weaning
- Know the different mechanical techniques to wean the patient
- Know the principles of clinical management to facilitate weaning
- Know the influence of sedation protocols on weaning
- Know the role of delirium during weaning

Tracheostomy: Why and how?

- Identify the criteria for tracheostomy



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- Identify the best methodology
- Understand the correct timing
- Understand the right patients
- Know the complications and impact on short- and long-term outcome