Do No Harm
“Ventilate Gently”

INVASIVE MECHANICAL VENTILATION COURSE

Middle East Critical Care Assembly
1/9/2015

http://www.mecriticalcare.net
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Contents
INVASIVE MECHANICAL VENTILATION COURSE ................................................................. 2
COURSE OVERVIEW ...................................................................................................... 2
OBJECTIVES .................................................................................................................. 2
TARGETED AUDIENCE ................................................................................................. 2
COURSE DESIGN .......................................................................................................... 3
COURSE MODULES ....................................................................................................... 3
WORKSHOP OBJECTIVES (BASICS) ........................................................................... 4
COURSE ORGANIZATION ............................................................................................. 5
COURSE FACULTY ......................................................................................................... 6
COURSE REQUIREMENTS ........................................................................................... 6
PRESENTATIONS & SCENARIOS .................................................................................. 7
EDUCATIONAL MATERIALS ......................................................................................... 7
COURSE CONDUCTION PROCESS .............................................................................. 7
ADVERTISEMENT & PROMOTION .................................................................................. 8
PROGRAM .................................................................................................................... 8
STUDENT GROUPS ....................................................................................................... 10
GROUP I .......................................................................................................................... 10
GROUP II ....................................................................................................................... 11
EVALUATION .................................................................................................................. 11
STUDENT EVALUATION ............................................................................................... 11
STAFF EVALUATION .................................................................................................... 11
STUDENT CERTIFICATION AND CME ....................................................................... 12
DISCLAIMER ................................................................................................................ 12
APPROVALS .................................................................................................................. 12
INVASIVE MECHANICAL VENTILATION COURSE

Critical care medicine encompasses the diagnosis and treatment of a wide variety of clinical problems representing the extreme of human disease. Critically ill patients require intensive care by a coordinated team. The critical care specialist needs to be competent not only in a broad range of conditions common among critically ill patients but also with the technological procedures and devices used in the intensive care setting.

This course provides the intensivist with the required knowledge to understand and effectively operate different mechanical ventilators in various clinical settings. It enhances practitioners’ and critical care physicians’ skills in the ventilatory management of different critical illnesses through practical applications and simulation.

COURSE OVERVIEW

The course will focus heavily on interactive workshops, live demonstration, simulation and case studies to augment lectures reviewing fundamentals of this important life sustaining technology. The course will deliver key messages that will guide the clinician towards evidence based application of mechanical ventilation. In addition, a variety of different devices will be available to allow participants to actually set up novel approaches and various feedback loops.

OBJECTIVES

This course will provide a practical demonstration of basic and clinical aspects of mechanical ventilation. At the end of the course, the participant will be able to:

1. Understand respiratory failure and indications of mechanical ventilation
2. Understand the basic principles of mechanical ventilation
3. Understand and comprehend the basic and advanced modes of mechanical ventilation
4. Discuss basic principles of mechanical ventilation related to disease management
5. Interpret basic flow, volume and pressure scalars and loops obtained from the mechanical ventilator
6. Understand mechanical ventilation application in ARDS, severe airflow obstruction and in other special clinical situations
7. Understand the basic monitoring on Mechanical ventilation
8. Identify and discuss essential adjunctive therapies for the patient receiving mechanical ventilation
9. Understand the different mechanical ventilation complications and prevention strategies
10. Understands and practice of the weaning process and best mode for weaning from mechanical ventilation.
11. Identify trouble-shooting techniques.
12. In-depth understanding of mechanical ventilation principles, modes, monitoring, application and complications in the advanced level.

TARGETED AUDIENCE

This program is intended for clinicians who have responsibility for the mechanical ventilatory management of critically ill or injured patients. These clinicians include the following:

1. All physicians working in pediatric and adult intensive care units and dealing directly with ventilated and critically ill patients.
2. Critical care and pulmonary fellows.
3. Internal medicine, pediatrics, anesthesia, surgery and emergency room residents in training.
4. Respiratory therapists, critical care nurses, anesthesia technicians or practitioners

COURSE DESIGN
The course is designed in a structural way with two tracks that can accommodate one large homogeneous group of participants or two different groups of different levels (basic and advanced) or different domains (Pediatrics and adults or nursing and physicians).

The basic level is intended for nurses, respiratory therapist, physicians or technicians with limited or no knowledge about theory and application of mechanical ventilation. The advanced level is intended for practitioners, therapists and physicians who have basic mechanical ventilation concept and practice and would like to enhance their knowledge with in-depth understanding of the science of mechanical ventilation and learn non-conventional modes of ventilation.

<table>
<thead>
<tr>
<th>Track I</th>
<th>Track II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic</td>
<td>Advanced</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>Adults</td>
</tr>
<tr>
<td>Nurses</td>
<td>Physicians</td>
</tr>
</tbody>
</table>

The course objectives are fulfilled through many interactive and practical sessions, the module may take any of the following formats depends on the content of the module and the best way of delivery method that enhances learning:

1. Interactive sessions covering comprehensive critical care topics
2. Interactive case studies with (audience response system when available)
3. Hands-on workshops
4. Interactive case study and scenarios
5. Simulation sessions
6. Interactive waveform analysis
7. Medical jeopardy contest

COURSE MODULES
The course has a modular design and the curriculum is presented as a series of largely independent modules. This allows emphasis or de-emphasis of some modules according to the existing knowledge base of the participants and the available ventilator brand. All courses will have the basic modules (light green) and the clinical modules (dark blue). Advanced modules (dark green), special modules (red), or other modules (light blue) will be selected based on the level and the type of the audience.
### WORKSHOP OBJECTIVES (BASICS)

#### Workshops

- **No-invasive ventilation**
- **Airways**
- **Interface**

#### Objectives

**No-invasive ventilation**

- □ Provide a basic strategic plan for identifying appropriate candidates for noninvasive ventilation.
- □ Assemble the equipment necessary for noninvasive positive pressure ventilation (NPPV).
- □ List diagnoses for which NPPV may be an appropriate therapy.
- □ Discuss the contraindications to NPPV.
- □ Describe techniques to facilitating patient acceptance of NPPV.

**Airways**

- □ Demonstrate the different oxygen devices: Nasal cannula, simple mask, venturi masks, non-re-breather mask.
- □ Demonstrate the use of oropharyngeal and nasopharyngeal airways.
- □ Demonstrate the ability to assemble a bag-valve-mask system.
- □ Demonstrate manual ventilation using a bag-valve-mask system.
- □ Describe historical and physical findings suggesting a potentially difficult airway.
- □ Discuss at least 2 agents utilized for induction of the patient prior to intubation.
- □ Cite the indications for use of a paralytic with intubation and risks associated with these agents.
- □ Demonstrate the use of direct laryngoscopy in orotracheal intubation.
- □ Demonstrate methods for confirming tube position and securing the endotracheal tube.
- □ Demonstrate the use of a laryngeal mask airway (LMA) or tracheosophageal combitube.

**Interface**

- □ Understand the basics component of a mechanical ventilation.
- □ Understand the ventilator circuit and connection.
- □ Preparing the ventilator and self-tests.
- □ Maintenance of the ventilator.
- □ Understand the different buttons and setting of ventilator.
- □ Demonstrate the following: Inspiratory filter, Inspiratory limb, Water trap, Y-piece, Heated humidifier and HME devices, Flow sensor, Expiratory limb, Expiratory filter, Nebulization and MDI adaptors.
- □ Demonstrate a Ventilator Self-test.
- □ Show how to set up the different settings.
Workshop | Objectives
--- | ---
 | □ Demonstrate the importance of alarms and how to set them
CPAP/PS | □ Understand the difference between CPAP, PEEP and PSV
 | □ Know the breath types with PSV: supported breaths
 | □ Know the phase variables of the supported breath: flow triggered, pressure-limited and flow-cycled
 | □ Understand the ETS cycling mechanisms: flow
 | □ Setting the Level of Pressure Support
 | □ Adjustment of pressure support
 | □ Using PSV with different modes: SIMV
 | □ Using PSV for weaning
 | □ Advantages and disadvantages of PSV
SIMV | □ Understand the different breath types with SIMV: controlled, assisted (synchronized), spontaneous (supported)
 | □ Know the Phase variables of the different breath types: trigger/limit/cycle
 | □ Know the breath sequence with SIMV
 | □ Controlled variables: PC-CMV vs VC-CMV
 | □ Understand the synchronization mechanism and windows
 | □ Initial settings of SIMV
 | □ Adjustment of SIMV
 | □ Indications, advantages and disadvantages
CMV | □ Know the difference between controlled ventilation and assist/control
 | □ Control variables: PC-CMV vs VC-CMV
 | □ Phase variables: trigger/limit/cycle
 | □ Know the breath types
 | □ Know the breath sequence
 | □ Settings and adjustment
 | □ Indications, advantages and disadvantages
PRVC | □ Understand the dual control concept
 | □ Understand the pressure regulation mechanism in PRVC
 | □ Demonstration of PRVC
 | □ Settings and adjustment with Servo i and Dragger
 | □ Indications, advantages and disadvantages

**COURSE ORGANIZATION**
The course is structured based on set standards and assured that each conducted course follows these standards. In order to conduct the course, at least one director and 6 instructors are required for each course. One respiratory therapist is required for technical support and assistance. The number of attendees can range from 32 to 64 for each course depending on the available venue. No more than 8 students in each workshop with total of 4 workshops simultaneously conducted with a simulation session with total of 32 students.
COURSE FACULTY
The course is directed by an approved consultant from the Middle East Critical Care Assembly (MCCA) who should be a critical care physician in a good standing membership with MCCA and has directed at least one MCCA mechanical ventilation course. Six instructors are required, each instructor should be MCCA member in good standing and is certified by the director of the course.
The Course Director assumes faculty leadership and assures the course is conducted according to MCCA standards and has full responsibility for course quality in addition to:
1. Determines pass/fail standards for skill stations.
2. Assure attendance and other aspects of course.
3. Presents introductory lecture reviewing objective of course and expectations of participants (75% correct on post-test; satisfactory passing of skill stations).
4. Is present for entire course and participates in a substantial portion.
5. Presents final decision during any conflicts throughout the course and is liaison to MCCA for any appeals/grievance initiated by participants.
6. Assumes responsibility for approving pre-course planning, course coordination, arrangements, and other course logistics.
7. Prepare the course final report including scores and feedback analysis and submit it to MCCA educational committee.

COURSE REQUIREMENTS
The course will require the following to be conducted:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secretary</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Auditorium</td>
<td>32 person capacity</td>
<td></td>
</tr>
<tr>
<td>Workshop rooms</td>
<td>4 with capacity of 10-12 persons</td>
<td>large room may function as a multi-station rooms and workshops can be conducted in the corners of the room</td>
</tr>
<tr>
<td>Dining room</td>
<td>Capacity of 40 people</td>
<td>Lunch and breaks</td>
</tr>
<tr>
<td>Audience response system</td>
<td>40 keypads</td>
<td>Optional</td>
</tr>
<tr>
<td>Audiovisuals</td>
<td>Equipment and technical support</td>
<td>Preferable in each workshop</td>
</tr>
<tr>
<td>Printing &amp; stationary materials</td>
<td>Syllabus: 60 pages</td>
<td>For total of 32 students</td>
</tr>
<tr>
<td></td>
<td>Course program: 2 pages</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre and post-tests: 6 pages</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Writing pads, pencils, CD and folders</td>
<td></td>
</tr>
<tr>
<td>Food and refreshment</td>
<td>2 lunches, 4 coffee breaks</td>
<td>For 2 day course</td>
</tr>
<tr>
<td>Simulation</td>
<td>Software program</td>
<td>For simulation session in auditorium</td>
</tr>
<tr>
<td>Ventilators</td>
<td>Total of 4 machines</td>
<td>Graphic display is required</td>
</tr>
<tr>
<td></td>
<td>Circuitry tubing with interface for test lung</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gas source(s) as required to power ventilator</td>
<td></td>
</tr>
</tbody>
</table>
### Test Lung
- Capable of altering resistance and compliance
- At least in two workshops

### Airway Station Equipment
- Nasal cannula
- Simple mask
- Venturi masks
- Non-rebreather mask
- Airway mannequins (2)
- Oro and nasopharyngeal WS1
- Endotracheal tubes
- Syringes, stylets, Magill forceps
- Laryngoscope(s) and blades (1 curved and 1 straight per mannequin)
- Resuscitation bags and masks
- Needle and surgical cricothyrotomy kits (optional)
- Tube holder or adhesive tape to demonstrate taping endotracheal tube
- Adjunctive airway devices: tracheoesophageal combitube, laryngeal mask airway (LMA)
- CO2 detectors (optional)
- Oxymeters (optional)
- Required only if airway station is present

### PRESENTATIONS & SCENARIOS
All presentations and scenarios are provided to the instructors. Minimal modification is allowed without deviating from the objectives of each workshop. Allocated time for each presentation or workshop is 30 minutes.

### EDUCATIONAL MATERIALS

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD</td>
<td>Lectures, Guidelines, Literatures</td>
<td></td>
</tr>
<tr>
<td>Booklets</td>
<td>Understanding mechanical ventilation waveforms, Principles of mechanical ventilation</td>
<td></td>
</tr>
<tr>
<td>Websites</td>
<td><a href="http://www.mecriticalcare.net">www.mecriticalcare.net</a></td>
<td></td>
</tr>
</tbody>
</table>

### COURSE CONDUCTION PROCESS
The following process is strictly enforced for the conduction of any course:
1. 3 month planning is required for each course
2. 1 director and at least 6 other instructors are required
3. Course director is responsible for course logistics/conduction
4. Budget is recalculated for each course and fees determined based on the budget
5. CME hours application
6. Advertisement & promotion (see section)
7. At least 32 registrants with secured payments are needed to conduct the course
8. Registration is opened at least 2 months prior to the course
9. Course materials forwarded to all registrants on the day of registration
10. Course conducted
11. MCCA issues Certificate of Successful Completion to all participants.
12. Final course data submitted to MCCA

ADVERTISEMENT & PROMOTION

Advertisement of the course will take place through different means:

1. MCCA will advertise for the course in the education calendar on MCCA website
2. Electronic Brochure and flyer is designed for the course and will be sent to all MCCA emails in the database
3. Hard copy flyer is sent concerned institutions and hospitals
4. Social media as required.

PROGRAM

<table>
<thead>
<tr>
<th>Time</th>
<th>Program/Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30</td>
<td>Registration and Coffee</td>
</tr>
<tr>
<td>8:00</td>
<td>Introduction and Pre-Test</td>
</tr>
<tr>
<td>8:30</td>
<td><strong>Presentation</strong>: Acute Respiratory Failure and Indication of Mechanical Ventilation</td>
</tr>
<tr>
<td>9:15</td>
<td>Workshops and Simulation</td>
</tr>
<tr>
<td>Time</td>
<td>Program/Activity</td>
</tr>
<tr>
<td>-------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>8:00</td>
<td>Registration and co</td>
</tr>
<tr>
<td>8:30</td>
<td><strong>Case Studies</strong>: Application of Scalars in Clinical Practice</td>
</tr>
<tr>
<td>9:15</td>
<td>Workshops and Simulation</td>
</tr>
</tbody>
</table>

**Day 2**
### Workshops (rooms) | Simulation (auditorium)
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop</td>
<td>Smart Care</td>
</tr>
<tr>
<td>Moderator</td>
<td></td>
</tr>
<tr>
<td>Ventilator</td>
<td></td>
</tr>
<tr>
<td>9:30</td>
<td>A1</td>
</tr>
<tr>
<td>10:00</td>
<td>B1</td>
</tr>
<tr>
<td>10:30</td>
<td>Break</td>
</tr>
<tr>
<td>10:45</td>
<td>C1</td>
</tr>
<tr>
<td>11:15</td>
<td>D1</td>
</tr>
<tr>
<td>11:45 Break</td>
<td></td>
</tr>
<tr>
<td>12:00</td>
<td>Simulation: Application of Ventilator Loops in Clinical Practice</td>
</tr>
<tr>
<td>12:45</td>
<td>Lunch Break</td>
</tr>
<tr>
<td>13:45</td>
<td>Workshops and Simulation</td>
</tr>
<tr>
<td></td>
<td>Workshops (rooms)</td>
</tr>
<tr>
<td>Workshop</td>
<td>Smart Care</td>
</tr>
<tr>
<td>Moderator</td>
<td></td>
</tr>
<tr>
<td>Ventilator</td>
<td></td>
</tr>
<tr>
<td>13:45</td>
<td>A2</td>
</tr>
<tr>
<td>14:15</td>
<td>B2</td>
</tr>
<tr>
<td>14:45 Break</td>
<td></td>
</tr>
<tr>
<td>15:15</td>
<td>C2</td>
</tr>
<tr>
<td>15:45</td>
<td>D2</td>
</tr>
<tr>
<td>16:15 Break</td>
<td></td>
</tr>
<tr>
<td>16:30</td>
<td>Simulation: MV for Severe Airflow Obstruction</td>
</tr>
<tr>
<td>17:00</td>
<td>Post Test</td>
</tr>
</tbody>
</table>

**STUDENT GROUPS**

Students are divided into two groups, each is 32 students, each group is divided into for workshop groups with total of 8 students in each group.

**GROUP I**

<table>
<thead>
<tr>
<th>A1</th>
<th>B1</th>
<th>C1</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
EVALUATION

STUDENT EVALUATION
Students are evaluated with pre and posttests, variation of the scores is used to evaluate student progression.

STAFF EVALUATION
The course is evaluated in general by the attendees with the following questions:

1. The course material is well organized.
2. The course content is at a level appropriate for my needs.
3. The course met my learning objectives.
4. The course improved my knowledge.
5. I will be able to use what I have learned on this course.

In addition, every instructor is evaluated by all attendees with the following questions:

1. The instructor displayed good subject knowledge.
2. The instructor was well prepared.
3. The instructor’s explanations were clear.
4. The instructor provided adequate opportunity for questions and discussions.
5. Students were encouraged to ask questions.
6. Students were encouraged to share their ideas and experience.
STUDENT CERTIFICATION AND CME
Students who attend the course successfully will be issued an attendance certificate with the name of the Middle East Critical Care Assembly along with the applicable CME. (see disclaimer).

DISCLAIMER
MCCA will issue a Certificate of Successful Completion for the course. Neither MCCA nor the ventilator course instructors certify competency or any level of knowledge or procedural skill following the provider course. It is highly recommended that you also avoid such terminology in your discussions with participants and through your marketing. The recommended terminology avoids the terms "certified or competency" but emphasizes the benefits of new knowledge and limited exposure to selected procedures. The course participants must be aware that the course is not intended to provide expertise in the care of mechanically ventilated patients, but to provide some knowledge and skills to assist them to be better prepared to understand the practice and application of mechanical ventilation. MCCA also cannot be responsible for any curriculum material added to the course by individual instructors or course directors.

APPROVALS