



EM CASES SUMMARY

Episode 83 – Critical Care Controversies

With Dsr. Mark Forrest, Chris Hicks, Chris Nickson & Scott Weingart

Prepared by Dr. Anton Helman, July 2016

5 Critical Care Controversies and concepts:

1. How to best prepare your team for a resuscitation
2. Optimum fluid management in sepsis
3. Direct vs. video laryngoscopy as first line tool for endotracheal intubation
4. Early vs. late trauma intubation
5. Whether or not to attempt a thoracotomy in non-trauma centres

#1: How to Prepare Your Team for a Critical Event

While the basic logistics of a resuscitation are relatively straight forward, some critical events require complex logistical co-ordination that needs to be in-sync with your resuscitation strategy. Scott Weingart talks extensively on logistics for the *solo* provider (EMCrit on [The Mind of a Resus Doc: Logistics over Strategy](#)). Not only is preparing the gear for airway management, central line placement, drawing up medications etc. important, but so is *mental* preparation. Mental preparation, including *visualization* of complex tasks and *deep breathing exercises* to help focus, has been expounded in solo preparation for a critical event (EMCrit on [The Value of Meditation in Critical Care](#)). However, there is very likely value in preparing your *team* in the few minutes prior to the patient arriving in your ED based on the little information you have garnered from the EMS call, so that this complex logistical co-ordination can occur as an efficient flow.

Team-Based Preparation: 4 Discussion Points

1. What do we *know*?

- the stem that you receive from the EMS call

2. What do we *expect to see*/What are the *possibilities*?

- run through the most likely immediate life-threatening issues/injuries

3. What do we *do*? And discuss *contingencies* if those actions fail (similar to airway preparation back up plans).

- what is your response if the initial plan fails or does not produce expected results?
- teams respond more efficiently and decidedly if they have *anticipated* failure rather than failure of a plan surprising them

4. *Role assignment*

- Assign logistical tasks to team members

The Rally Point

A few minutes into the resuscitation the team stops and evaluates the situation in a very deliberate manner: a summary of new information garnered, what has been accomplished and what the next steps are. These stop points can be considered to be *cognitive check-points* to help prevent the cognitive biases inherent in predicting diagnoses and responses to treatment.

#2: Fluid Responsiveness, Fluid Tolerance and Timing of Vasopressors

Fluid responsiveness is an increase of stroke volume of 10-15% after receiving half a litre of crystalloid over 10-15 minutes. Fluid responsiveness can be estimated by such bedside tests as the **passive leg raise test** and **end-expiratory occlusion test**. While fluid responsiveness can help guide further fluid administration, our experts agree that it has little value at the bedside when resuscitating a shocky septic patient for example. Rather than spend your time assessing for fluid responsiveness,

our experts recommend rapidly administering crystalloid, and using basic clinical parameters such as level of awareness, urine output, tachycardia and tachypnea, as well as lactate trending to assess how well the patient is responding to fluids.

The notion of *fluid tolerance* may be more useful than *fluid responsiveness*: give fluids until the patient can't tolerate any more! Use basic clinical indicators of fluid overload to guide you, and consider using POCUS serially to (i) assess for IVC collapse (stop fluids when there is little or no collapse) (ii) assess the lungs for pulmonary edema (iii) assess the heart for hyper/hypo dynamics. Do note, however, that POCUS to assess fluid tolerance may be inaccurate, depends highly on operator skill and has never been shown to change patient-oriented outcomes.

Timing of Vasopressors in Septic Shock

Our experts agree that vasopressors should be started *early* in resuscitation after 1 or 2 or 3 litres of crystalloid in the septic patient, via a peripheral line if

central venous access has not yet been secured. While the safety of running vasopressors through a peripheral line has been demonstrated, it is prudent to monitor carefully for tissue extravasation, and to switch to a midline or central line within 6 hours if continued vasopressors are required.

#3: Direct Laryngoscopy vs Video Laryngoscopy

Most experts agree that providers should be proficient at both Video Laryngoscopy (VL) *and* Direct Laryngoscopy (DL), and if not, use what you are most comfortable with. Performance by experts has been shown to be similar between DL and VL.

Advantages of VL over DL

- VL allows for a team approach to endotracheal intubation because team members can visualize the entire procedure and make corrections/suggestions such as providing suction, BURP, repositioning etc.

- VL allows for improved teaching and real-time feedback for trainees
- some VL tools such as the C-MAC VL can be used as DL as well
- VL minimizes chest compression interruptions to a greater degree compared to DL

Advantage of DL over VL

- fogging and fluids do not hamper visualization like they do in VL

#4: Timing of Trauma Endotracheal Intubation: Resequencing the Trauma Airway

Consistent with the adage "resuscitate before you intubate", resuscitation of obstructive and hypovolemic forms of shock in multi-trauma patients should be done in parallel with airway preparation and be a priority over airway definitive endotracheal intubation in the vast majority of patients.

As apposed to the standard ATLS recommendation that airway is a first priority, consider resequencing your priorities in the multi-trauma patient in shock:

1. Prepare the team (see above)
2. Hang the blood (early transfusion)
3. Decompress the chest
4. Bind the pelvis
5. Endotracheal intubation (drop the dose of induction agent)

*Care of Dr. Andrew Petrosniak (@petrosniak)

#5: Thoracotomy in non-trauma centre

Penetrating injury to the chest with loss of vital signs for less than 10 minutes is a clear indication for a resuscitative thoracotomy according to the Eastern Association for the Surgery of Trauma. In low resource-rich centres, trauma thoracotomy may be challenging because of lack of in-house surgery capability, lack of skill and lack of the appropriate equipment required. Our experts recommend, nonetheless, that a trauma thoracotomy should be attempted in any young patient

with a penetrating injury to the chest and recent loss of vital signs, regardless of the setting. While some cases will require immediate complex surgical skills that ED providers lack once the chest has been opened, others may only require a finger be placed over a hole in the left ventricle. There are case reports of survival of patients with penetrating injuries to the chest and loss of vital signs receiving thoractomies in a non-trauma centre who have been transported with finger occlusion of a cardiac injury.

If trauma thoracotomy is not offered at your hospital currently, consider addressing the issues of required equipment, training, buy-in from other departments in the hospital and inter-facility transport so that you can provide the best care for patients with penetrating trauma to the chest.

Key Resources & References

EMCrit on [The Mind of a Resus Doc: Logistics over Strategy](http://emcrit.org/podcasts/mind-resus-doc-logistics/)
<http://emcrit.org/podcasts/mind-resus-doc-logistics/>

[Rich Levitan's Best Case Ever on Mental Preparedness for airway management](http://emergencymedicinecases.com/tag/mental-preparedness/) <http://emergencymedicinecases.com/tag/mental-preparedness/>

EMCrit on [The Value of Meditation in Critical Care](http://emcrit.org/wee/vipassana-meditation/)
<http://emcrit.org/wee/vipassana-meditation/>

Mike Lauria's notion of rally point discussed on EMCrit [Making the Call](http://emcrit.org/podcasts/motr-mike-lauria/)
<http://emcrit.org/podcasts/motr-mike-lauria/>

[Resuscitation Team Organization for Emergency Departments: A Conceptual Review and Discussion](http://emergencymedicinecases.com/wp-content/uploads/filebase/pdf/TOEMJ-2-18.pdf)
<http://emergencymedicinecases.com/wp-content/uploads/filebase/pdf/TOEMJ-2-18.pdf>

Chad Meyers' [Fluid Tolerance video](https://vimeo.com/62364000) <https://vimeo.com/62364000>

EMcrit on [IVC Ultrasound for fluid tolerance](http://emcrit.org/podcasts/ivc-ultrasound-for-fluid-tolerance-in-spontaneously-breathing-patients/)
<http://emcrit.org/podcasts/ivc-ultrasound-for-fluid-tolerance-in-spontaneously-breathing-patients/>

Dive deep on **[POCUS for fluid responsiveness](#)** with Matt and Mike on the Ultrasound Podcast <http://www.ultrasoundpodcast.com/tag/fluid-responsiveness/>

[Vasopressor and Inotrope Use](#) in Canadian Emergency Departments: Evidence Based Consensus Guidelines
<http://caep.ca/sites/caep.ca/files/caep/PositionStatements/vasopressorgl2015.pdf>

[EM Cases discussion with Scott Weingart and Walter Himmel on Fluid Management in Sepsis](#)
<http://emergencymedicinecases.com/episode-55-weingart-himmel-sessions-2-fluids-in-sepsis-post-intubation-analgesia-sedation/>

Rory Spiegel reviews the literature on **[Midline Catheters](#)** on EM Nerd
<http://emcrit.org/emnerd/adventure-sussex-vampire/>

Chris Nickson's Life in the Fast Lane post on **[Direct vs Video Laryngoscopy](#)** <http://lifeinthefastlane.com/ccc/direct-versus-video-laryngoscopy/>

[R.E.B.E.L. EM reviews the literature on VL vs DL](#)
<http://rebelem.com/video-laryngoscopy-direct-laryngoscopy-trainees/>

The latest 2016 **[RCT comparing VL vs. DL in CPR from Resuscitation](#)**
<http://www.ncbi.nlm.nih.gov/pubmed/27095126>

2015 **[Guidelines for ED thoracotomy - Eastern Association for the Surgery of Trauma Full PDF](#)**
http://emergencymedicinecases.com/wp-content/uploads/filebase/pdf/TA-79-1_Seamon-et-al.pdf

EM Cases **[CritCases 3 - GSW to the chest in a rural setting](#)**
<http://emergencymedicinecases.com/gsw-to-the-chest/>

Life in the Fast Lane post **[ED Thoracotomy: Is it just the first part of the autopsy?](#)** <http://lifeinthefastlane.com/ed-thoracotomy-is-it-just-the-first-part-of-the-autopsy/>