Lecture summaries

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Tips for using Doppler ultrasound in our cases

This lecture will explore practical applications of Doppler echocardiography in the emergency and critical care (ECC) environment. It covers colour and spectral Doppler techniques, including pulse wave and continuous wave Doppler, with emphasis on their uses, limitations, and common pitfalls. Different approaches to assessing cardiac output and the challenges of performing these measurements in patients in an ECC setting are discussed. The session will also highlight disease-specific applications such as MMVD, CHF differentiation, HCM with SAM, pulmonary hypertension, and common outflow tract and shunt lesions, focusing on clinically useful, rapid assessments.

Learning goals:

1. Understand the principles, uses, and common pitfalls of colour and spectral Doppler, including pulse wave and continuous wave Doppler, in clinical echocardiography.
2. Select appropriate Doppler modalities and echocardiographic views to answer specific clinical questions efficiently, particularly in the ECC setting.
3. Apply Doppler techniques to assess cardiac output and recognize the practical limitations of these measurements in critically ill patients.
4. Use Doppler echocardiography to identify and interpret common cardiac diseases, including MMVD, CHF, HCM with SAM, pulmonary hypertension, and obstructive or shunt lesions.
5. Differentiate clinically useful Doppler findings from less impactful measurements, prioritizing rapid, decision-making–focused assessments.

Arrhythmias: What is your diagnosis and how will you treat?

This lecture focuses on a practical approach to arrhythmia recognition and management in the emergency and critical care setting. It reviews the fundamentals of electrocardiography interpretation and applies them to real-world emergency and critical care (ECC) scenarios. Participants will explore common bradyarrhythmias and tachyarrhythmias, emphasising accurate diagnosis, identification of artefact and lead placement errors, and selection of appropriate first-line treatments. Case-based examples are used to reinforce clinical reasoning and decision-making in patients within the ECC environment.

Learning goals:

1. Develop a structured approach to basic ECG interpretation, including heart rate assessment, rhythm identification, and verification of lead placement errors.
2. Apply ECG interpretation principles to the ECC setting, prioritising rapid diagnosis and clinically relevant decision-making.
3. Differentiate common bradyarrhythmias and tachyarrhythmias encountered in emergency and critical care patients using ECG features.

4. Formulate appropriate first-line treatment plans for arrhythmias based on rhythm diagnosis, patient stability, and underlying pathophysiology.
5. Recognise when additional diagnostics are required (e.g. electrolytes, echocardiography) to identify reversible or contributing causes of arrhythmias.

Clinical cardiology cases - What would you do?

This case-based lecture explores common and high-impact cardiology presentations encountered in emergency and critical care practice. Using real-world clinical scenarios and case examples, participants will apply point-of-care diagnostics such as thoracic ultrasound, ECG, and blood pressure measurement to guide decision-making. The session emphasises rapid differentiation of cardiogenic versus non-cardiogenic disease, prioritisation of stabilisation strategies, and recognition of situations where standard interventions may be ineffective or inappropriate. The goal is to strengthen clinical reasoning and confidence when managing emergency cardiac cases.

Learning goals:

1. Apply point-of-care diagnostics (POCUS, ECG, blood pressure) to rapidly assess and triage emergency cardiology cases in the ECC setting.
2. Differentiate cardiac and non-cardiac causes of respiratory distress, including pericardial effusion, pleural effusion, and pulmonary oedema.
3. Select appropriate initial stabilisation strategies based on pathophysiology rather than default treatments.
4. Recognise when cardiac disease may mimic non-cardiac presentations, such as seizures or altered mentation.
5. Identify patients who may not benefit from standard therapies, including supplemental oxygen, and understand the underlying physiological reasons.

Wet Lab: ECHO POCUS

This practical laboratory session provides hands-on training in thoracic and cardiac point-of-care ultrasound for emergency and critical care patients. Participants will perform focused ultrasound examinations to obtain and interpret key thoracic, abdominal, and cardiac views. Emphasis is placed on rapid identification of effusions, lung pathology, pneumothorax, and assessment of volume status. The lab also provides guidance on basic right- and left-sided cardiac structural and functional analyses. Additionally, there will be a focused approach to identifying patients with possible pulmonary hypertension.

Learning goals:

1. Acquire appropriate thoracic and cardiac POCUS views to identify pericardial, pleural, and peritoneal effusions.
2. Recognise normal and abnormal lung ultrasound findings, including pneumothorax and common pulmonary pathologies.
3. Assess intravascular volume status using focused evaluation of the abdominal aorta and caudal vena cava.
4. Perform basic right- and left-sided cardiac assessments, identifying key structural and functional indices relevant to ECC practice.
5. Evaluate cardiac findings to estimate the probability of pulmonary hypertension using focused POCUS techniques.