Lecture summaries

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Basic POCUS in Emergency and Critical Care

Point-of-care ultrasound (POCUS) is an essential tool in emergency and critical care medicine, enabling rapid and standardized assessment of unstable patients. Abdominal and thoracic POCUS allow early detection of free fluid, pleural and pericardial effusions, pneumothorax, and pulmonary pathology. These non-invasive, repeatable examinations support triage, monitoring, and clinical decision-making in both traumatic and non-traumatic conditions. POCUS provides clinically meaningful information, improves patient management, and can be reliably performed by non-imaging clinicians in emergency and intensive care settings.

Learning goals

1. Understand the principles and indications of POCUS in emergency and critical care.
2. Perform a structured abdominal and thoracic POCUS examination.
3. Recognize normal and abnormal POCUS findings.
4. Interpret POCUS results within the clinical context.
5. Use POCUS for triage, monitoring, and follow-up.

Needles with Vision: Interventional POCUS

Vascular access and arterial cannulation are essential procedures in veterinary medicine, yet they can be challenging in many clinical situations, particularly in critically ill, hypotensive, obese, or small patients. Repeated blind attempts not only delay treatment but also increase the risk of complications. Point-of-care ultrasound (POCUS) offers a practical solution by allowing real-time visualization of vessels and needle placement, transforming traditional landmark-based techniques into safer, image-guided procedures.

This 45-minute fundamental lecture introduces the core principles of **Interventional POCUS** applied to vascular access and arterial cannulation in veterinary patients. Participants will learn how to identify veins and arteries using basic ultrasound features such as vessel wall characteristics, compressibility, and Doppler flow. The session will also cover the practical concepts of **in-plane** and **out-of-plane** needle guidance techniques, highlighting their advantages, limitations, and appropriate clinical applications.

The lecture is designed for veterinarians with limited or no prior experience in interventional ultrasound and focuses on building a clear conceptual framework rather than advanced technical skills. Emphasis will be placed on clinical indications, common pitfalls, and safety considerations to help participants understand when and how ultrasound guidance can improve procedural success.

By the end of the session, participants will have a solid understanding of how interventional POCUS can be integrated into everyday clinical practice to enhance patient care, reduce complications, and increase confidence during vascular access procedures.

Learning goals:

At the end of this 45-minute fundamental lecture, participants will be able to:

1. Describe the basic ultrasound principles used to identify veins and arteries for vascular access in veterinary patients.
2. Differentiate veins from arteries using sonographic characteristics including compressibility and wall appearance.
3. Identify appropriate clinical indications for ultrasound-guided vascular access and arterial cannulation.
4. Explain the principles, advantages, and limitations of in-plane and out-of-plane needle guidance techniques.
5. Select an appropriate needle guidance approach based on vessel characteristics and clinical context.

AI Assisted Imaging: Is There a Place in POCUS Yet?

Artificial intelligence (AI) is increasingly integrated into point-of-care ultrasound (POCUS), mainly through probe guidance, image quality feedback, automated measurements, and focused detection tasks such as cardiac function assessment and B-line quantification. Current evidence shows that AI-assisted POCUS can improve accessibility, consistency, and efficiency, particularly in acute care and cardiopulmonary applications. However, performance remains highly dependent on image quality, model generalizability, and clinical validation. Available data, including veterinary emergency and critical care studies, support AI as a complementary decision-support tool rather than a replacement for clinician expertise.

Learning goals

1. Describe current AI applications in POCUS, including guidance, automation, and interpretation support.
2. Understand the potential benefits of AI-assisted POCUS in emergency and critical care.
3. Identify the main limitations and risks associated with AI use in POCUS.
4. Summarize available clinical and veterinary evidence supporting AI-assisted POCUS.
5. Define the appropriate role of AI as an adjunct to clinician-performed POCUS.