CAEP EMERGENCY ULTRASOUND COMMITTEE
WINTER NEWSLETTER 2023

CAEP Emergency Ultrasound Updates

Welcome to the winter edition of the CAEP EUC newsletter. As spring approaches, there are many great POCUS events to look out for. Also make sure to check out prior recorded sessions that you may have missed through the CAEP website.

In this newsletter, we have provided a case of a rare but important diagnosis that can be made quickly at the bedside by integrating POCUS and your clinical findings.

Trying to establish archiving at your centre but running into some roadblocks? Check out on the article on archiving below with some helpful tips.

Canadian POCUS researchers have been busy with lots of new exciting POCUS publications. Scroll down and check them out.

Happy reading!

Talia Burwash- Brennan

Newsletter Highlights

A Case of a Blue Limb

By Talia Burwash-Brennan

A 20-year-old female presented to the emergency department at midnight with acute severe pain, swelling and blue discoloration of the left lower limb. The symptoms had rapidly progressed over 24 hours. There was no history of trauma. She had no past medical history and her only medication was a combined estrogen and progesterone contraceptive patch. Vitals on arrival were T36.7C, HR 120, RR 25, BP 109/66, and O2 94% on room air. She was notably in significant pain with a tense left lower limb including swelling from the thigh to the ankle. There was also cyanosis of the leg noted. She had reduced but present left pedal pulses. The emergency physician performed a rapid 3-point compression point-of-care ultrasound evaluation at the bedside as seen below.

FIGURE 1. COMPRESSION AT THE COMMON FEMORAL VEIN (LEFT) AND ARTERY (RIGHT)

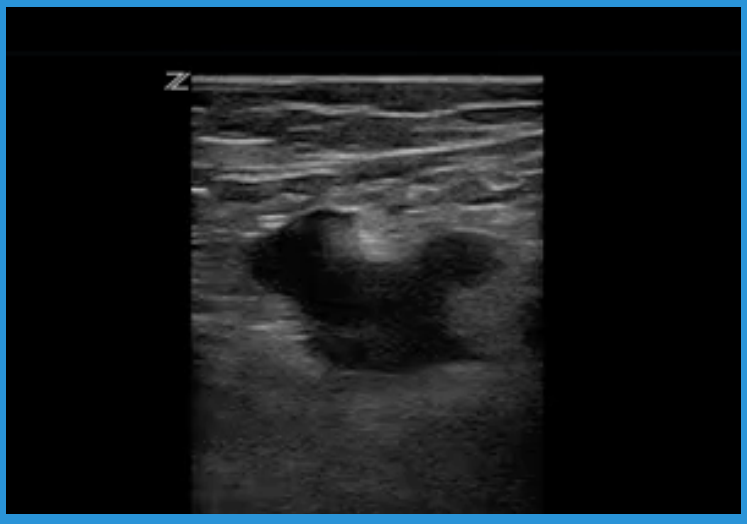


FIGURE 2. SAPHENOFEMORAL JUNCTION

FIGURE 3. COMPRESSION AT THE SAPHENOFEMORAL JUNCTION

FIND VIDEOS ATTACHED IN THE EMAIL

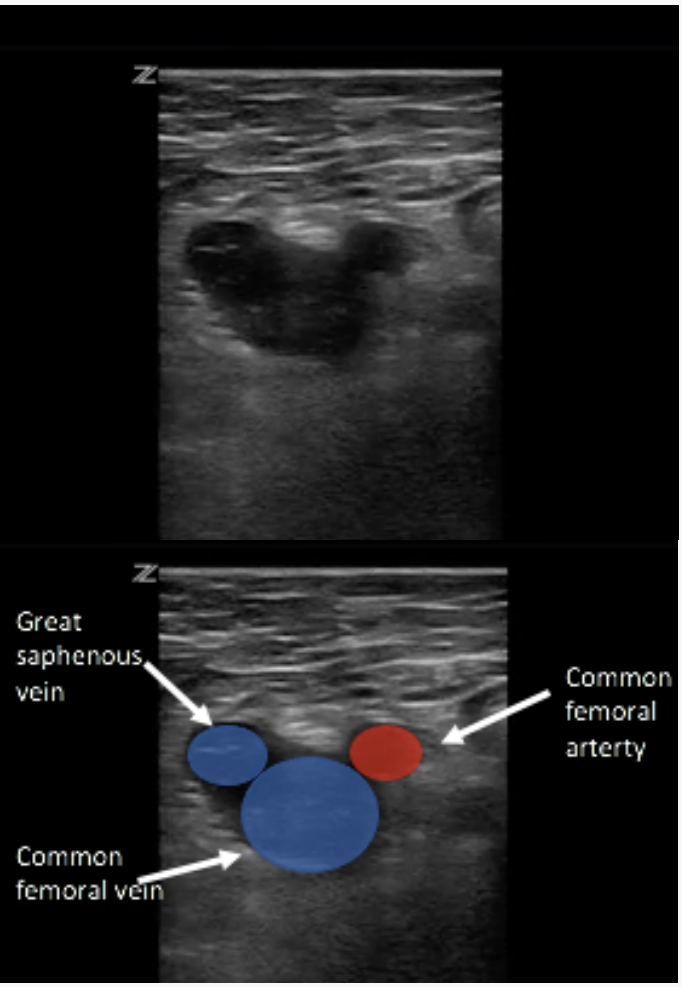


FIGURE 3. NON-COMPRESSIBLE THROMBUS IN THE FEMORAL AND GREAT SAPHENOUS VEIN

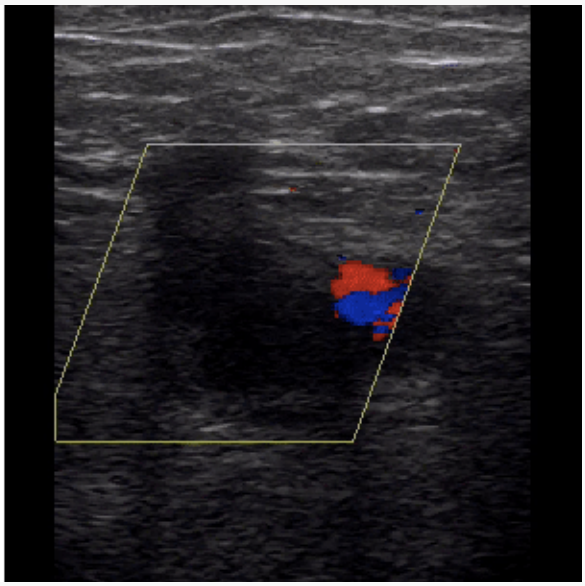


FIGURE 4. COLOR DOPPLER PRESENT IN THE COMMON FEMORAL ARTERY NOT THE COMMON FEMORAL VEIN OR GREAT SAPHENOUS VEIN

POCUS Case (continued):

As you can see in Figure 3, the common femoral vein and great saphenous vein were non-compressible. A hypoechoic thrombus is also seen in the lumen of the common femoral vein. This therefore demonstrates the presence of a proximal deep vein thrombosis (DVT) in the common femoral vein as well as a thrombosis in the superficial great saphenous vein. Additional features include the complete absence of color flow in the common femoral vein, as we see in Figure 4. There is also an increased diameter of the femoral vein with a decreased size of the femoral artery due to the compression, however in Figure 4., there is still flow in the common femoral artery.

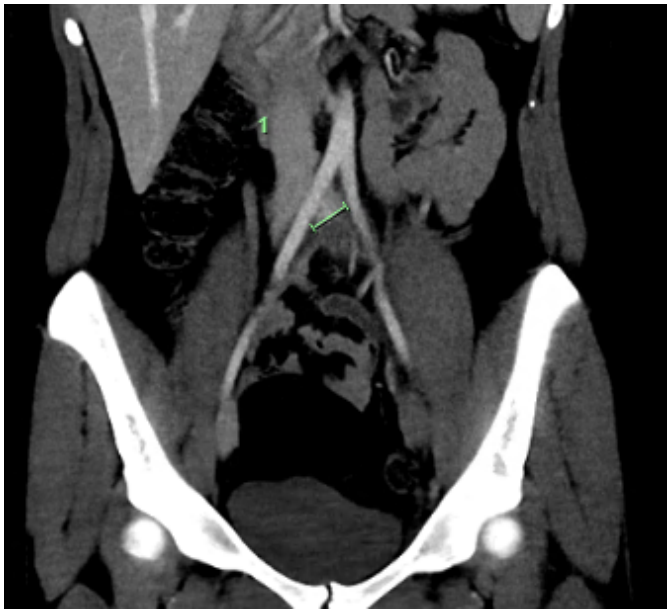
We know that from multiple previous studies, emergency physicians demonstrate high accuracy in identifying a DVT using point-of-care ultrasound with a sensitivity of 90-95% and a specificity of 91-85% (1,2,3,4). In the case of a "blue" limb, the rapid identification of a proximal DVT can confirm the diagnosis of the rare *phlegmasia cerulea dolens* (5). The spectrum of disease caused by an extensive deep vein thrombosis includes *phlegmasia alba dolens* which presents as a edematous "white" limb caused by a proximal obstruction of the deep venous system but sparing of the collateral veins (5). *Phlegmasia cerulea dolens* is a more advanced stage of the disease with thrombosis of the complete superficial and deep venous system thus causing severe venous congestion and a precursor for venous gangrene (5). Early identification of the disease is important in the rapid management to restore venous flow.

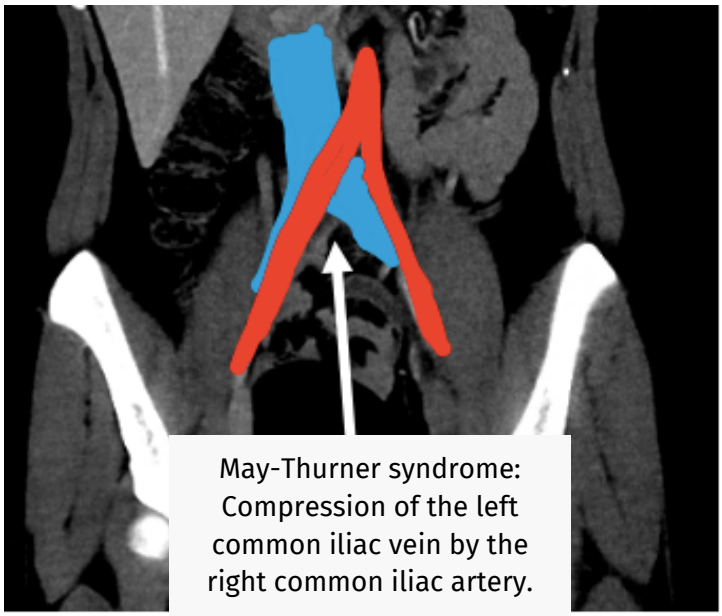
POCUS Case (continued):

Case Resolution:

With the POCUS findings, a diagnosis of *phlegmasia cerulea dolens* was made and vascular surgery as well as interventional radiology were rapidly consulted. A CT angiography was performed which demonstrated the presence of a large proximal DVT with mechanical compression of the left iliac vein by the right iliac artery, or a "May-Thurner Syndrome". The patient underwent a catheter-directed thrombolysis and thrombectomy by interventional radiology. She also had an endovascular iliac stent placed to treat her May-Thurner syndrome as the precursor to her proximal DVT. She was subsequently anticoagulated with low molecular heparin for 6 weeks in conjunction with clopidogrel for 3 months and eventually transitioned to treatment with apixaban.

This case demonstrates the value of POCUS in a suspected proximal DVT causing complete venous obstruction or *phlegmasia cerulea dolens*. The rapid identification of this diagnosis by POCUS can allow you to provide emergent management of this limb-threatening and life-threatening condition.





May-Thurner syndrome: Compression of the left common iliac vein by the right common iliac artery.

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2. Pedraza García J, Valle Alonso J, Ceballos García P, Rico Rodríguez F, Aguayo López MÁ, Muñoz-Villanueva MDC. Comparison of the Accuracy of Emergency Department-Performed Point-of-Care-Ultrasound (POCUS) in the Diagnosis of Lower-Extremity Deep Vein Thrombosis. J Emerg Med. 2018 May;54(5):656-664. doi: 10.1016/j.jemermed.2017.12.020. Epub 2018 Jan 3. PMID: 29306580.
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5. Gardella L, Faulk J. Phlegmasia Alba And Cerulea Dolens. 2022 Oct 3. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan–. PMID: 33085284.

POCUS and Archiving

By Colin Bell

POCUS archiving practices in Canada are heterogenous, with a large number of scans going undocumented. This continues to limit the utility and integration of POCUS across medicine. It is ideal that both the POCUS images and interpretations are readily available to all physicians caring for the patient. CAEP recommends image storage in a picture archiving and communication system (PACS), dedicated POCUS image archiving software called middleware, or as a last resort, printed in the paper chart.

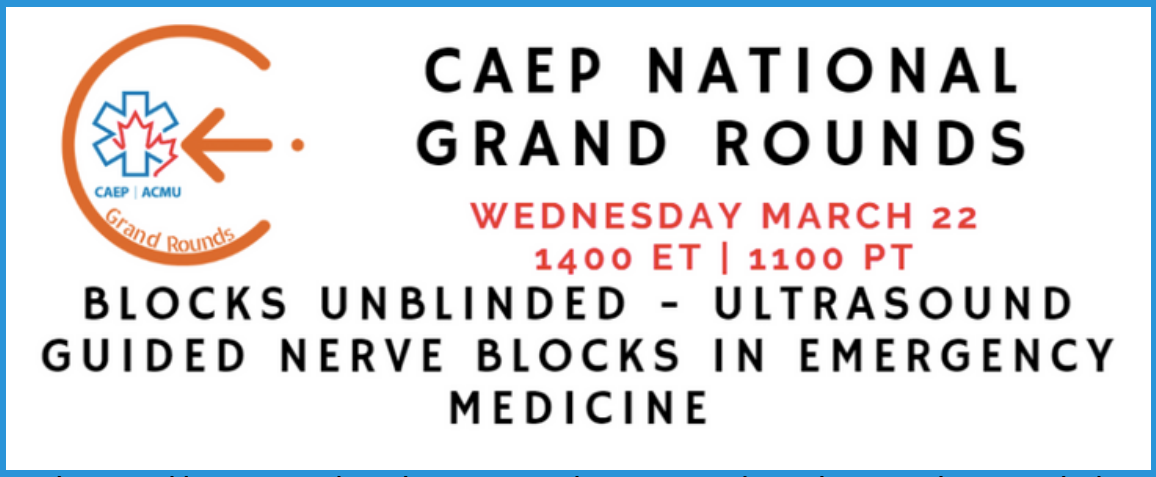
QPATH remains the dominant image archiving middleware for those who have it, but the price can be prohibitive and the appetite for capital projects from departmental leadership may be lacking during this time of stress. Furthermore, the shock of adding yet another stand-alone software program may prevent uptake and utilization. For those considering making the jump to a PACS or middleware system, there are a many useful resources. It is imperative that anyone who is considering implementing a digital archiving solution must consult their hospital IT team. Poor integration of these systems remains a tremendous barrier to their use and greatly limits their utility.

There are a variety of ways to accomplish digital image archiving and the solution may look different for each department. Helpful resources include websites pocusworkflow.com and pocusalliance.com, as well as *Ultrasound Program Management: A Comprehensive Resource for Administrating Point of care, Emergency and Clinical Ultrasound* by Tayal et al (1). There are also several excellent articles on how to accomplish this such as “Impact of an epic-integrated point of care ultrasound workflow on ultrasound performance, compliance and potential revenue” by Rong et al. and “Towards quality assurance: implementation of a POCUS image archiving system in a high-volume community emergency department” by Aspler et al. (2,3).

These resources along with having discussions with centers who have successfully implemented an archiving system can provide you with some of the important tools needed to implement your POCUS archiving system.

1. Tayal, Vivek & Blaivas, Michael & Foster, Troy. (2018). Ultrasound Program Management: A Comprehensive Resource for Administrating Point-of-Care, Emergency, and Clinical Ultrasound. 10.1007/978-3-319-63143-1.
2. Rong K, Chimileski B, Kaloudis P, Herbst MK. Impact of an epic-integrated point-of-care ultrasound workflow on ultrasound performance, compliance, and potential revenue. Am J Emerg Med. 2021 Nov;49:233-239. doi: 10.1016/j.ajem.2021.06.009. Epub 2021 Jun 7. PMID: 34146922.
3. Aspler A, Wu A, Chiu S, Mohindra R, Hannam P. Towards quality assurance: implementation of a POCUS image archiving system in a high-volume community emergency department. CJEM. 2022 Mar;24(2):219-223. doi: 10.1007/s43678-021-00228-2. Epub 2021 Dec 29. PMID: 34964933.

Recent and Upcoming POCUS Events



https://caep.ca/cpd-courses/caep-national-grand-rounds/

ACEP/SAEM Ultrasound Journal Club: Probing the Literature.

Tuesday, March 21st at 11a PST/12p MST/1p CST/2p EST

https://www.saem.org/about-saem/academies-interest-groups-affiliates2/aeus/meeting-and-events/probing-the-literature-journal-club

Registration now open for the SONO-Olympiad and closes May 20th 2023. To register your team email: jgale@caep.ca

More information: https://caepconference.ca/sono-olympiad/

What'd You Miss?

Check out the recorded POCUS educational activities below

FIND THE RECORDING AT:

HTTPS://WWW.PATHLMS.COM/CAEP/COURSES

FIND THE RECORDING AT:

HTTPS://ECME.ACEP.ORG/DIWEB/CATALOG/ITEM?ID=11123793

Virtual Grand Rounds - Advanced Ultrasound-Guided Nerve Blocks: The Future of Optimal Pain Management in Emergency Care

ROYAL COLLEGE
OF PHYSICIANS AND SURGEONS OF CANADA
COLLÈGE ROYAL
DES MÉDECINS ET CHIRURGIENS DU CANADA

There are now 6 Accredited Areas of Focused Competence (Diploma) programs for Acute Care Point-of-Care Ultrasonography in Canada.
If you want to apply for a diploma via the "Practice Eligibility Route" go to:
https://www.royalcollege.ca/rcsite/credentials-exams/exam-eligibility/afc/apply-afc-practicing-e

Recent Canadian Emergency Medicine POCUS Research

March 2023

Gaudreau-Simard M, Kilabuk E, Halman S, Wooller K, **Woo MY,** Arntfield R, Ma I, Forster AJ. Start spreading the news: a deliberate approach to POCUS program development and implementation. Ultrasound J. 2023 Mar 9;15(1):13. doi: 10.1186/s13089-023-00309-6. PMID: 36892686; PMCID: PMC9998745.

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Recent Canadian Emergency Medicine POCUS Research (continued)

November 2022

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Recent Canadian Emergency Medicine POCUS Research (continued)

July 2022

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June 2022

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What was the ultrasound image on page 1 of this newsletter?

Transvaginal ultrasound of a molar pregnancy with multiple anechoic cystic-like structures creating a "bunch of grapes" appearance.

Hwang J, Negrete L. Bunch of grapes - I saw the sign. Clin Imaging. 2023 Apr;96:23-25. doi: 10.1016/j.clinimag.2023.01.010. Epub 2023 Jan 30. PMID: 36738666.