POCUS JOURNAL

International POCUS Academy

JULY 2025

Non-profit organization of national Point-Of-Care-UltraSound schools

Dear Friends and Colleagues,

Before you is the latest edition of our *POCUS Journal*. In this issue, we look back at the activities from the past six months, share some intriguing new cases and practical articles, and introduce several high-quality ultrasound devices that we've had the pleasure of using and exploring.

In these introductory notes, I often reflect on the challenging times we live in, and on the global situation which, by some grim rule, seems slow to improve. However, this time, I choose a different tone.

Let us instead celebrate the summer - enjoy your health, your work, and, of course, our shared passion: the use of POCUS in medicine.

I would like to extend my sincere gratitude to all contributors whose work helped shape this edition of the Journal. Warm greetings to all POCUS friends across the globe. Our next gathering - on the pages of the POCUS Journal, our website, Facebook page, and hopefully in person - awaits us at the end of this year.

Cheers!

Dr. Ivica Zdravković
General Secretary of IPA
Editor-in-Chief

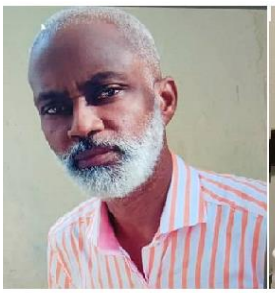
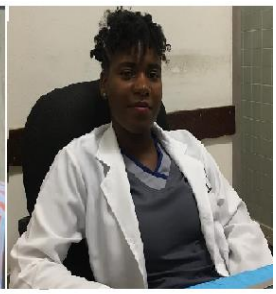
IPA Activities in Haiti: A June 2025 Report

By Gédéon GELIN MD-Msc-Rdms
IPA Haiti Program Director

This report details the activities of the IPA (International Point-of-Care Academy) in collaboration with Geriatric Cardiology and Polyvalent Hospital Medicine University Center in Haiti, as of June 28, 2025.

The IPA program has been actively engaged in training medical professionals in Haïti since December 2017.A significant achievement by the end of June 2025 is the graduation of seven new General Clinical Ultrasound Specialists. This marks a crucial step in strengthening the healthcare workforce in Haiti, particularly in the context of the country's challenges.

IPA-Haïti Program works with CUC-MPH. The pictures below show at the left, Dr Levelt Jean who is the Chair of CUC-MPH, and Dr Sendia Gustave who is the Vice-Chair. At the botom, we see Dr Gédéon Gélin who is the Ultrasound Program Director for IPA-Haïti.


The new graduates are, from left to right at the first row, Dr ST Fleur, at the second row, Dorizan and his wife, Dr Etienne Dorizan, at the third row, Dr Vissières and Dr Saint Phard, and at the fourth, Dr Cabret, and Dr Jasmin.



CENTRE UNIVERSITAIRE DE CARDIO-GERIATRIE
& DE MEDECINE POLYVALENTE HOSPITALIERE(CUC-MPH)

Delmas 60 # 6 Bis & Pernier, Rue Charles Legrand # 7 Pétion-Ville Haïti W.I.

We hereby certify that **ROMEL-MARIE DORIZAN , MEDICAL DOCTOR FROM HAITI STATE SCHOOL OF MEDICINE**, having completed 300 hours of theoretical instruction in general ultrasound and having undertaken supervised practical experience with patients under the guidance of our program director and clinical coordinators, and having successfully passed the Haitian Heart Institute and General Ultrasound School Comprehensive Examination, is hereby awarded the

DIPLOMA OF GENERAL CLINICAL ULTRASOUND SPECIALIST (DGCUS)

Gédéon Gélin MD-Rdms
Program Director

Jean Levelt MD
Chair CUC-MPH

Sendia Gustave MD
Vice-Chair ,CUC-MPH

Date: June,23rd,2025

C/C: Archives CUC-MPH

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We hereby certify that **RACHEL ETIENNE , MEDICAL DOCTOR FROM HAITI STATE SCHOOL OF MEDICINE**, having completed 300 hours of theoretical instruction in general ultrasound and having undertaken supervised practical experience with patients under the guidance of our program director and clinical coordinators, and having successfully passed the Haitian Heart Institute and General Ultrasound School Comprehensive Examination, is hereby awarded the

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Sendia Gustave MD
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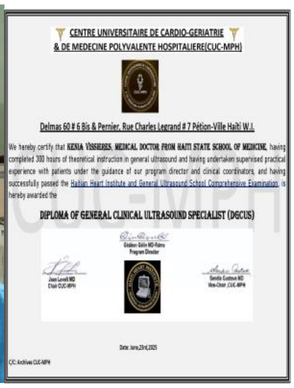

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We hereby certify that **KENIA VISSIERES, MEDICAL DOCTOR FROM HAITI STATE SCHOOL OF MEDICINE**, having completed 300 hours of theoretical instruction in general ultrasound and having undertaken supervised practical experience with patients under the guidance of our program director and clinical coordinators, and having successfully passed the Haitian Heart Institute and General Ultrasound School Comprehensive Examination, is hereby awarded the

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Program Director

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We hereby certify that **EMMANUEL ST-PHARD, MEDICAL DOCTOR FROM UNIVERSITE DE LA FONDATION DR ARISTIDE**, having completed 300 hours of theoretical instruction in general ultrasound and having undertaken supervised practical experience with patients under the guidance of our program director and clinical coordinators, and having successfully passed the Haitian Heart Institute and General Ultrasound School Comprehensive Examination, is hereby awarded the

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Gédéon Gélin MD-Rdms
Program Director

Jean Levelt MD
Chair CUC-MPH

Sendia Gustave MD
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We hereby certify that **WOOD CABRET, MEDICAL DOCTOR FROM UNIVERSITE DE LA FONDATION DR ARISTIDE**, having completed 300 hours of theoretical instruction in general ultrasound and having undertaken supervised practical experience with patients under the guidance of our program director and clinical coordinators, and having successfully passed the Haitian Heart Institute and General Ultrasound School Comprehensive Examination, is hereby awarded the

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Program Director

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Sendia Gustave MD
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C/C: Archives CUC-MPH

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We hereby certify that **PAUL MENAHEL JASMIN, MEDICAL DOCTOR FROM HAITI STATE SCHOOL OF MEDICINE**, having completed 300 hours of theoretical instruction in general ultrasound and having undertaken supervised practical experience with patients under the guidance of our program director and clinical coordinators, and having successfully passed the Haitian Heart Institute and General Ultrasound School Comprehensive Examination, is hereby awarded the

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Gédéon Gélin MD-Rdms
Program Director

Jean Levelt MD
Chair CUC-MPH

Sendia Gustave MD
Vice-Chair ,CUC-MPH

Date: June,23rd,2025

C/C: Archives CUC-MPH

The Haiti ultrasound program has garnered significant respect from the Haitian medical community. Many physicians have expressed their confidence in the program, emphasizing that it is not essential to receive ultrasonography training abroad, as the program adheres to the highest standards. This shift in perspective underscores the program's success in providing high-quality training and fostering local expertise. The program's commitment to rigorous standards has built trust and acceptance among Haitian medical professionals.

2026 Curriculum and Integration of Artificial Intelligence-Practical Training Sites

The IPA is committed to adapting its training programs to the evolving landscape of medical technology. The new curriculum for 2026 will include the integration of Artificial Intelligence (AI) in the training program. This forward-thinking approach aims to equip future healthcare professionals with the skills and knowledge necessary to utilize AI tools effectively in their practice. This integration will likely cover areas such as AI-assisted diagnostics, image analysis, and data interpretation, enhancing the quality of care provided.

Resilience and Leadership

The IPA program has established practical training sites in various regions of Haiti to provide hands-on experience to its trainees. Currently, practical training sites are available in three areas of the country :Gonaïves, Plateau Central, Duchity (Grande Anse). Furthermore, a new site is scheduled to open in the North of the country by the end of July 2025. This expansion of training sites demonstrates the program's commitment to providing accessible and comprehensive training opportunities across Haiti.

Echocardiography Program (January 2026)

Despite the increasing isolation of Haiti on the international stage, the IPA Program Director, Dr. Gedeon GELIN, continues to demonstrate strong resilience and leadership. His dedication to the program's mission is crucial for its continued success and the advancement of healthcare in Haiti. His leadership is particularly important in navigating the challenges and ensuring the program's sustainability.

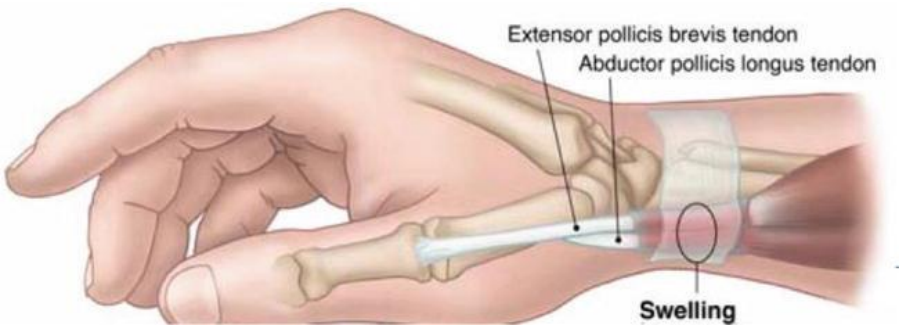
IPA Haiti will launch an 18-month academically rigorous Echocardiography program in January 2026. This program is designed to align with international standards, drawing upon the expertise and guidelines of leading cardiology societies such as the British Society of Cardiology, the French Society of Cardiology, and the American Society of Cardiology. This program aims to train highly skilled professionals in ultrasonography, contributing to improved cardiac care in Haiti. Dr. Gelin emphasizes that the IPA is dedicated to training high-caliber professionals in Ultrasonography.

De Quervain's Tendinopathy

Author: Dr. Vekoslav Zajić, Specialist in Emergency Medicine and POCUS Sonographer
POCUS Academy od Serbia

In 1894, Swiss surgeon Fritz de Quervain was the first to describe a case of tenosynovitis—in December of that year—in a 35-year-old woman suffering from severe pain in the region of the thumb extensor muscle. [1]

De Quervain's tendinopathy (DQT) affects the tendons of the *abductor pollicis longus* (APL) and *extensor pollicis brevis* (EPB) within the first dorsal (extensor) compartment at the radial styloid process. Patients with DQT typically experience difficulties in grasping objects and performing routine daily activities.



It is characterized by pain or tenderness on the radial side of the wrist. Although DQT is frequently attributed to overuse or repetitive movements of the wrist or thumb, its exact cause remains unknown.

Epidemiology

De Quervain's tendinopathy is a common cause of wrist pain in adults and represents the second most frequent tendinopathy of the hand, following trigger finger tendinopathy. It typically occurs in middle-aged individuals and is approximately three times more prevalent in women (~80% of cases). The highest incidence is observed in women between 30 and 50 years of age, including a notable subgroup of postpartum women.

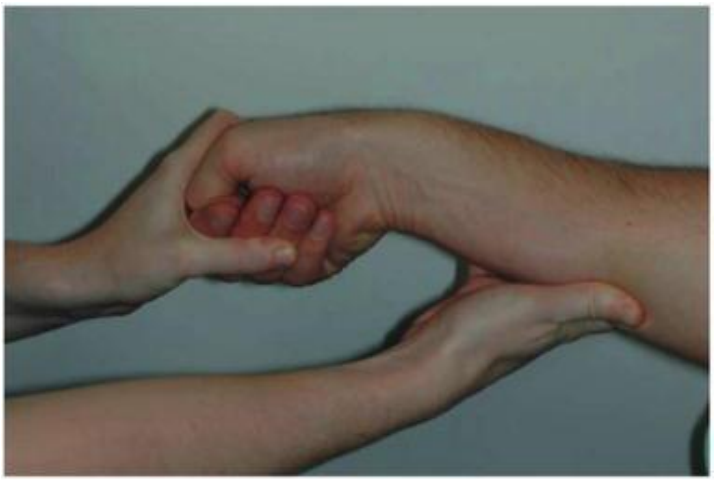
Pathophysiology

The etiology of DQT is not well understood. Historically, it has been attributed to occupational or repetitive activities involving sustained thumb extension and abduction. For instance, new mothers have been considered at increased risk due to the repetitive hand movements required for holding and caring for newborns. Hormonal factors and fluid retention have also been proposed as potential contributing mechanisms.
Histopathological findings do not show classical signs of inflammation but rather myxoid degeneration—characterized by disorganized collagen and an increased extracellular matrix—observed in patients referred for surgical intervention.

Clinical Diagnosis and Examination

Finkelstein's Test is named after Harry Finkelstein (1865–1939), an American surgeon who first described the maneuver in 1930. It is a clinical test used to evaluate the presence of De Quervain's tendinopathy (DQT) in patients presenting with wrist pain. The test is performed by grasping the patient's thumb and moving the hand in an ulnar direction. A sharp pain along the distal radius indicates a high likelihood of DQT.

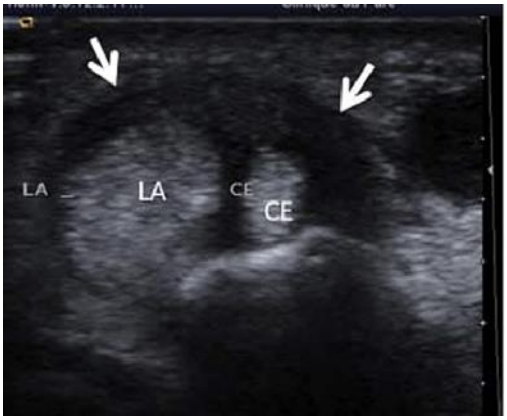
Eichhoff's Test is often mistakenly referred to as Finkelstein's test. In Eichhoff's test, the patient's thumb is enclosed within the fingers while the wrist is ulnarly deviated. The test is considered positive if pain occurs over the radial styloid during ulnar deviation of the wrist.



Diagnosis

Standard radiographs do not confirm the diagnosis of DQT but may show nonspecific findings and help rule out other potential causes of wrist pain, such as fractures, carpometacarpal arthritis, or osteomyelitis.

Ultrasound findings may include:



1. Edematous thickening of the APL (LA in this image) and EPB tendons (CE here) at the level of the radial styloid (in comparison to the contralateral side);
2. Increased fluid within the first extensor tendon compartment or surrounding tendon sheath;
3. Thickening of the synovial sheath;
4. Peritendinous subcutaneous edema producing a hypoechoic "halo" sign;
5. Peritendinous subcutaneous hyperemia on Doppler imaging.

It is essential to evaluate for the presence of an intertendinous septum, which can typically be visualized when present. Ultrasound is frequently used to guide corticosteroid injections into the tendon compartment for therapeutic purposes.

Magnetic resonance imaging (MRI) is highly sensitive and specific, and it is employed when ultrasound findings are inconclusive.

Treatment

Non-surgical management of DQT primarily includes the use of oral nonsteroidal anti-inflammatory drugs (NSAIDs), splint therapy, and corticosteroid injections.

Evidence suggests that multiple corticosteroid injection techniques prior to surgical referral may offer advantages over a single-injection approach. However, corticosteroid administration carries inherent risks and is not entirely benign, requiring careful and judicious use. [2]

According to multiple meta-analyses, ultrasound-guided corticosteroid injections (CSI) combined with thumb immobilization have demonstrated the highest efficacy for short- and intermediate-term functional recovery. [3]

Several studies have shown that **ultrasound-guided percutaneous needle tenotomy**, combined with **platelet-rich plasma (PRP) injection**, can be an effective treatment modality for DQT. [4]

Surgical intervention is indicated only after conservative management fails—often due to individual anatomical variations. The **Le Viet technique** has shown reliable and lasting results with minimal complications and low recurrence rates. [5]

References:

1. De Quervain's Tenosynovitis: Effective Diagnosis and Evidence-Based Treatment, Jenson Mak, 2018.
2. Conservative Management of de Quervain Stenosing Tenosynovitis: Review and Presentation of Treatment Algorithm. Jad Abi-Rafeh et al., 2020.
3. The effects of taping on de Quervain's disease: A systematic review and meta-analysis. Renato C. Drapeza Jr. et al., 2022.
4. Successful treatment of de Quervain tenosynovitis with ultrasound-guided percutaneous needle tenotomy and platelet-rich plasma injection: a case presentation. Evan Peck, Erin Ely, 2013.
5. Results of surgical treatment of De Quervain's tenosynovitis: 80 cases with a mean follow-up of 9.5 years. Johanne J Garçon et al., 2018.

POCUS Journal

International POCUS Academy

POCUS MOSCOW: ACHIEVEMENTS OF THE FIRST HALF OF 2025

The first half of 2025 became a pivotal period in the development of POCUS MOSCOW, establishing new standards of educational activity in the field of Point-of-Care Ultrasound. Over 6 months, the team conducted an unprecedented 49 events, exceeding all preliminary plans by 2.5 times and demonstrating phenomenal growth in educational activities.

KEY PERFORMANCE INDICATORS

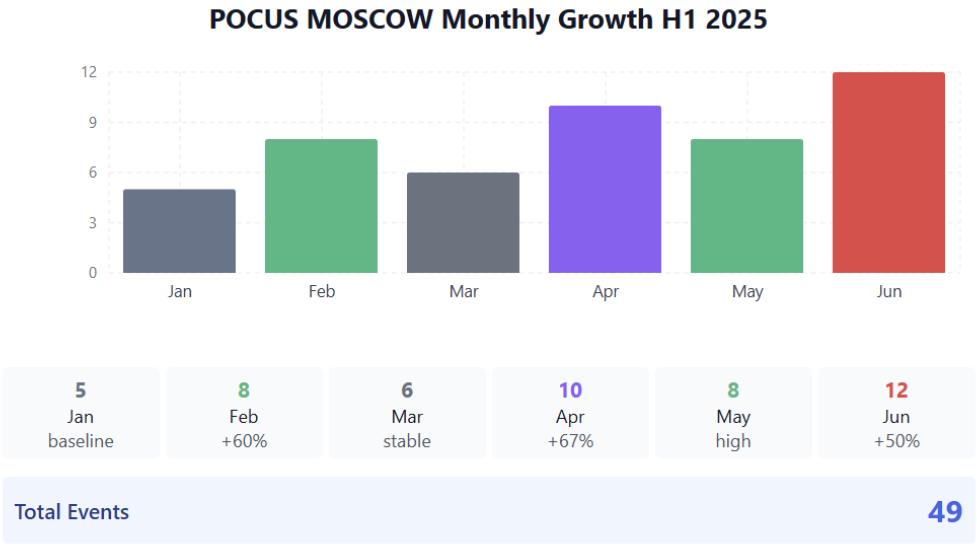
Overall Statistics:

- 49 educational events
- 42 practical courses of various complexity levels
- ~672 academic hours of training
- 7 cities and 2 countries of geographical coverage
- 5 high-fidelity cadaver courses

Monthly Growth Dynamics:

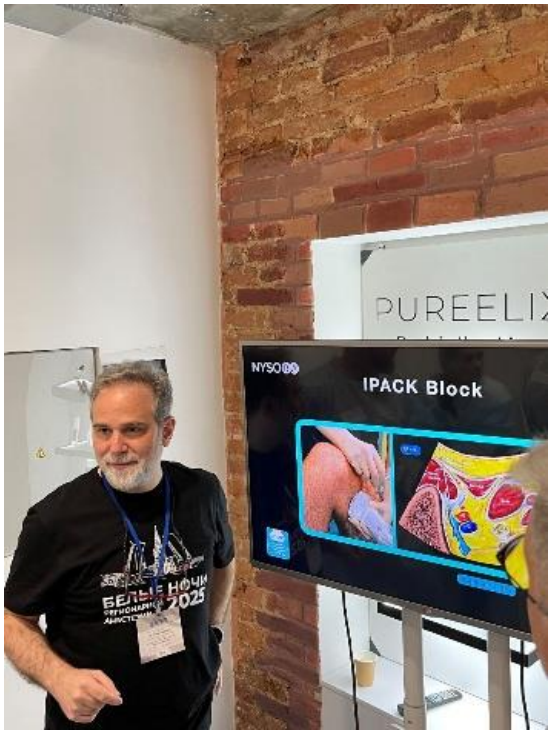
A consistent activity trend showed constant increase in events:

- January: 5 events (baseline level)
- February: 8 events (+60%)
- March: 6 events (stabilization)
- April: 10 events (+67%)
- May: 8 events (maintaining high level)
- June: 12 events (+50%, peak month)



EDUCATIONAL ACTIVITY DIRECTIONS
Ultrasound-Guided Regional Anesthesia (8 courses)

The foundational direction includes training in regional anesthesia for upper and lower extremities, myofascial blocks. Expert cadaver courses in St. Petersburg and Lipetsk held special significance, including the three-day intensive "White Nights of Regional Anesthesia" - another international course from POCUS MOSCOW with the participation of our esteemed friend and colleague Tolga Ergönenç from Turkey, a renowned expert in regional anesthesia who brought his extensive experience and innovative techniques to enhance the educational program.



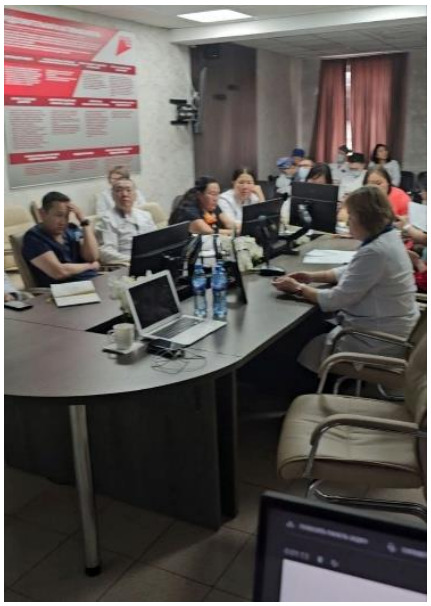
Ultrasound-Guided Vascular Catheterization (6 courses)

Regular monthly program with consistently high demand, successfully integrated into international programs in Kazakhstan.

Emergency Ultrasound Protocols (14 courses)

- **RUSH protocol (6 courses):** Including the first regional course in Ulan-Ude, Buryatia
- **eFAST protocol (5 courses):** Basic and outreach courses
- **SAFE-R protocol (3 courses):** Emergency ultrasound assessment of newborns

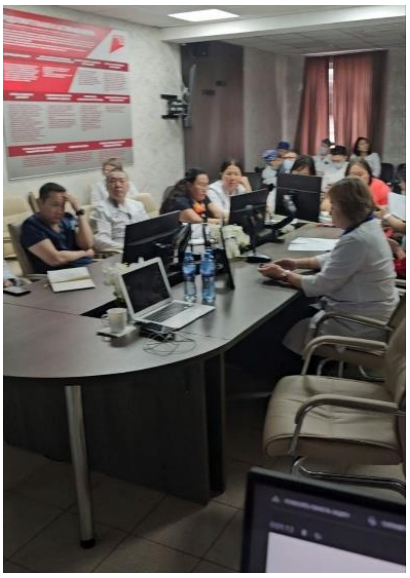


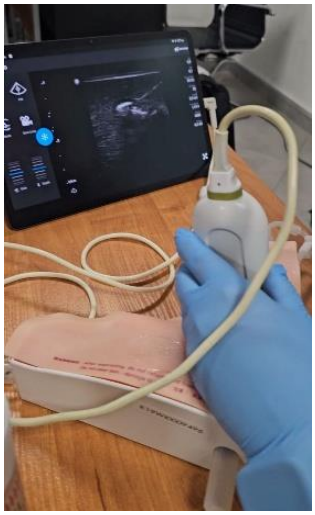


Innovative Achievements (8 events)

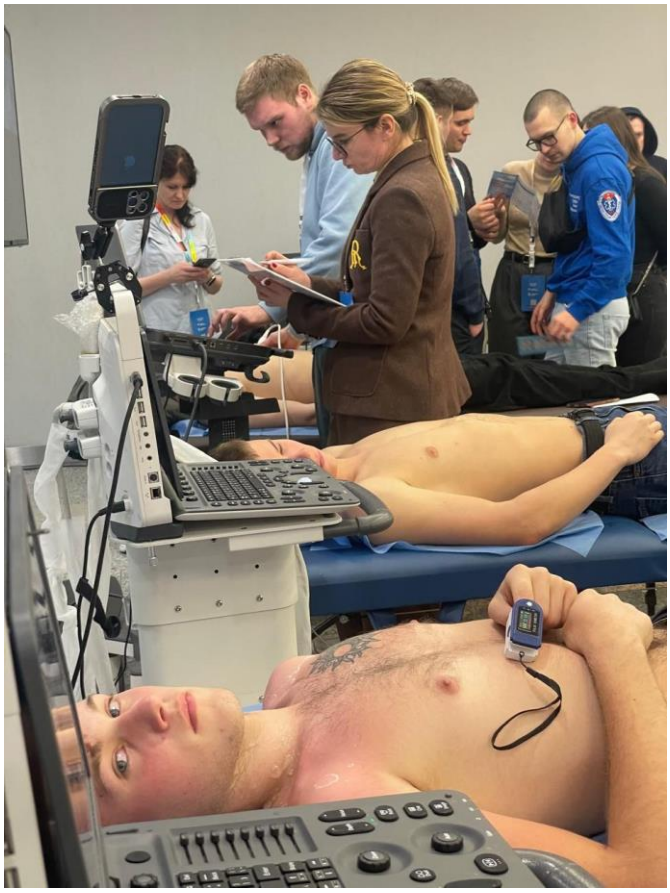
- **FIRST IN RUSSIA** cadaver course for pediatric difficult airways (June)
- Veterinary POCUS - joint project POCUS MOSCOW & VETPOCUS
- Sports competition "Volume Guard"
- Ultrasound navigation in interventional treatment of chronic pain syndromes

Pediatric difficult airways

Sports competition "Volume Guard"

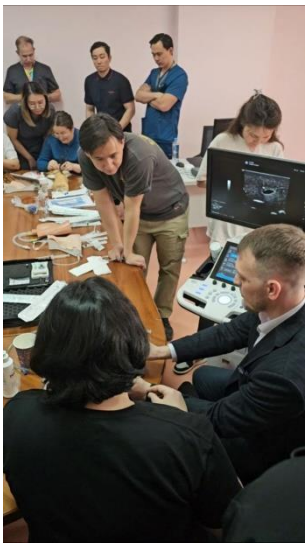


INTERNATIONAL ACTIVITIES

Kazakhstan - Strategic Partnership

4 projects in 4 cities:

- **Astana** - 2 courses: "Point-of-Care Ultrasound: vascular access and regional anesthesia"
- **Ust-Kamenogorsk** - educational cycle
- **Shymkent** - geographical expansion
- **Almaty** - international conference "Healthy Generation - Kazakhstan's Future"



European Integration

Italy - friendly visit to colleagues from Rome for international experience exchange and study of European POCUS standards.

SCIENTIFIC-EDUCATIONAL INTEGRATION

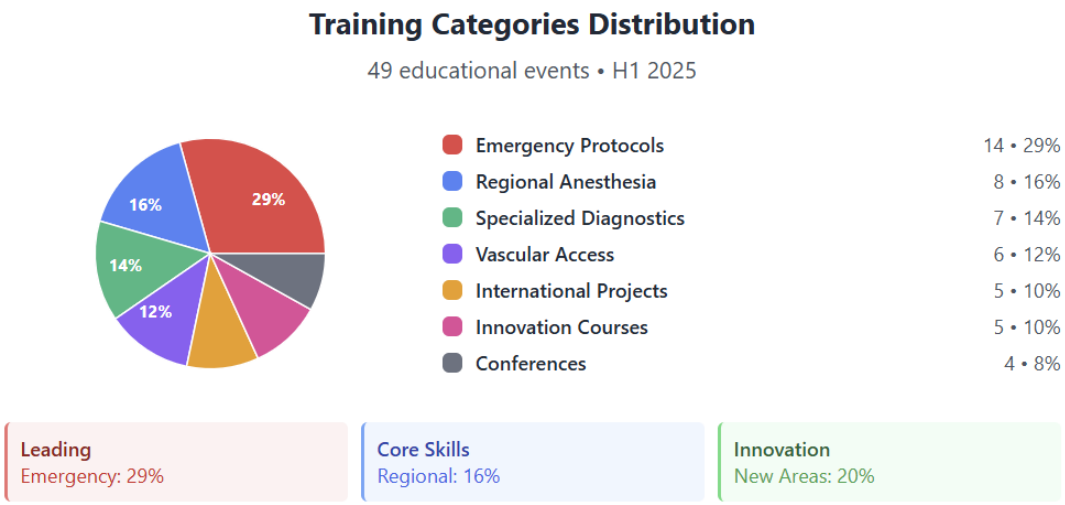
Participation in leading medical forums:

- Conference "Innovations in Emergency Medical Care" (Moscow)
- X Moscow Congress of Anesthesiologists-Intensivists
- Radiology Conference (Skolkovo)
- "Pain Treatment Week" (Ufa)

STATISTICAL ANALYSIS

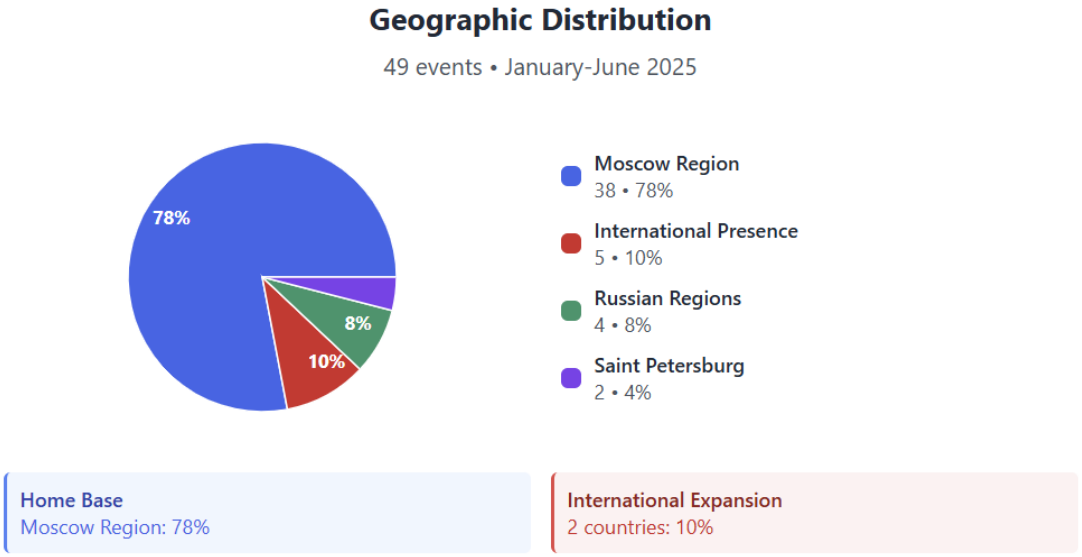
Distribution by Training Categories:

- Emergency protocols: 29%
- Regional anesthesia: 16%
- Vascular catheterization: 12%
- Specialized diagnostics: 14%
- International projects: 10%
- Innovative courses: 10%
- Conferences: 8%



Geographical Distribution:

- Moscow region: 78% (38 events)
- International presence: 10% (5 events)
- Russian regions: 8% (4 events)
- St. Petersburg: 4% (2 events)



EDUCATIONAL INNOVATIONS

Cadaver Technologies

The development of high-fidelity training using cadaver courses became the hallmark of POCUS MOSCOW. Cadaver courses conducted during the half-year included both classical regional anesthesia directions and pioneering courses on pediatric difficult airways.

Multidisciplinary Approach

For the first time in educational practice, an interdisciplinary approach was implemented, combining medicine and veterinary medicine within the joint POCUS MOSCOW & VETPOCUS project.

QUALITATIVE ACHIEVEMENTS
Standardization and Systematization

- Regular repetition of key protocols
- Progressive system: from basic to expert level
- Multi-format approach: theory + practice + cadaver training

Program Adaptability

- Mobile formats for medical institutions
- Regional program adaptation
- Integration into scientific events

TEAMWORK AS THE FOUNDATION OF SUCCESS

Achieving 49 events in half a year was made possible by the coordinated work of POCUS MOSCOW's multidisciplinary team. Our success is based on four key principles:

Synergy of Expertise

The team unites specialists from various medical directions: anesthesiologists-intensivists, emergency physicians, ultrasound diagnostics specialists, and pain management specialists. This allows creation of comprehensive educational programs covering the entire spectrum of POCUS applications.

Distributed Responsibility

Each team member bears responsibility for specific directions: from developing methodological materials to organizing international projects. Such specialization ensures high quality of each event.

Continuous Development

The team constantly improves its skills, studies international experience, and implements innovative training methods. Regular internal training and experience exchange maintain high professional standards.

STRATEGIC VISION: GLOBAL POCUS SCALING

International Expansion

Our strategy extends far beyond Russian borders. Kazakhstan became the first successful example of international partnership, where 4 projects were implemented in 4 cities during the half-year. This experience serves as a model for further expansion into CIS countries and Eastern Europe.

Technological Leadership

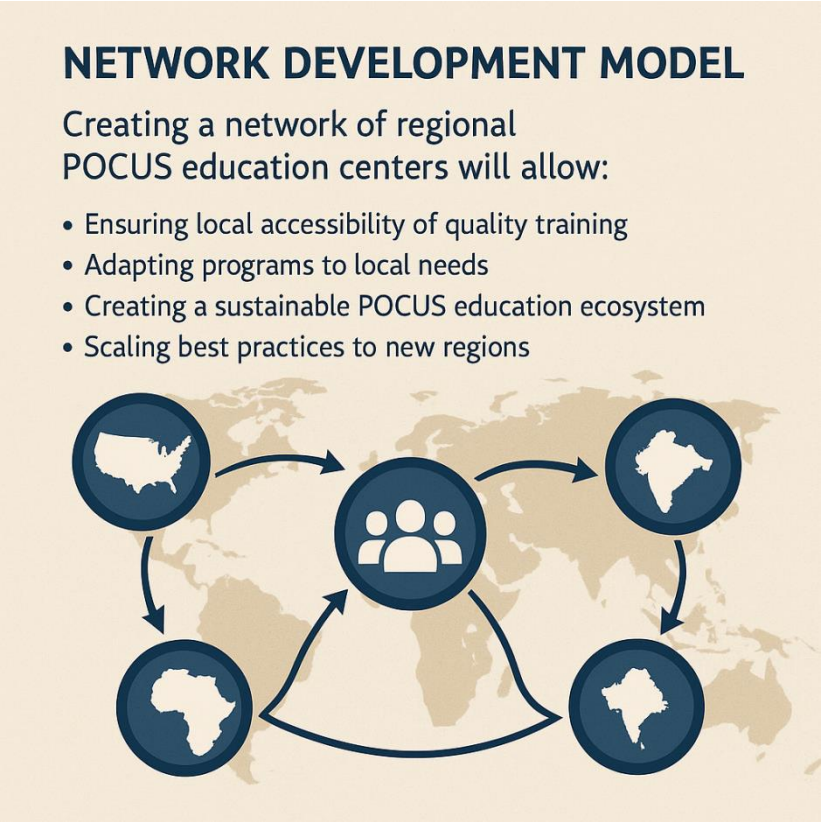
We invest in developing innovative educational technologies:

- Mobile applications for independent study
- Telemedicine solutions for remote mentorship

Network Development Model

Creating a network of regional POCUS education centers will allow:

- Ensuring local accessibility of quality training
- Adapting programs to local needs
- Creating a sustainable POCUS education ecosystem
- Scaling best practices to new regions



GRATITUDE TO OUR COLLEAGUES AND PARTNERS

Value of Collaboration

Our achievements would have been impossible without the support of wonderful colleagues and partners. Each joint event became the result of synergy of professionalism, mutual respect, and shared values in medical education.

International Partners - POCUS KAZAKHSTAN - Strategic Partnership

We express special gratitude to colleagues from Kazakhstan for their openness to innovation and professional support of all 4 projects.

4 projects in 4 cities of Kazakhstan:

- **Astana** - 2 courses: "Point-of-Care Ultrasound: vascular access and regional anesthesia"
- **Ust-Kamenogorsk** - educational cycle
- **Shymkent** - geographical expansion
- **Almaty** - international conference "Healthy Generation - Kazakhstan's Future"

Special gratitude goes to **Andrey Proshunin** for active work in promoting and integrating POCUS ideas in the Republic of Kazakhstan. Thanks to his professionalism and leadership, Kazakhstan is becoming a regional center of POCUS education.

Russian Partners

We sincerely thank:

- Medical centers in St. Petersburg, Lipetsk, Ulan-Ude, Ufa for provided opportunities
- Fellow anesthesiologists-intensivists for professional support of regional projects
- Veterinary specialists for innovative approach in interdisciplinary cooperation
- Pediatric specialists for participation in pioneering projects

Philosophy of Partnership

We believe that success in medical education is built on mutual respect, open knowledge exchange, and pursuit of excellence. Each of our partners makes a unique contribution to POCUS community development, and we highly value this synergy.

CONCLUSION

The first half of 2025 demonstrated that teamwork, strategic vision, and partnership value are the foundation for transforming POCUS MOSCOW from a regional educational center into an internationally recognized leader in ultrasound diagnostics.

Our gratitude to all colleagues and friends who share our vision of POCUS education development creates the foundation for further growth. The unique combination of the team's professional expertise, innovative technologies, and international cooperation positions POCUS MOSCOW as a global player ready to scale best practices worldwide.

New challenges and opportunities await us ahead, and we are confident that through joint efforts with our partners, we can bring POCUS education to a qualitatively new level in the second half of 2025 and beyond.

Contributed by:

LYKHIN VSEVOLOD, MD
Anesthesiologist-Intensivist,
Head of Pain Management Service
Botkin Hospital Moscow,
CEO POCUS MOSCOW,
Director of **International POCUS Academy School** in Russia

POCUS Journal
International POCUS Academy

Use of Ultrasound in Neurosurgery

Asst. Clin. Dr. Jovan Grujić
Clinic of Neurosurgery, University Clinical Center of Serbia

Neurosurgery is a branch of medicine dedicated to the surgical treatment of diseases of the central and peripheral nervous systems. As a complex and sophisticated discipline, its development has been closely tied to technological advances. Two major revolutions in its history were the introduction of the operating microscope and computed tomography (CT).

Due to the fact that the brain and spinal cord are encased within the bony structures of the skull and vertebral column, early radiological diagnostics were limited to indirect visualization of intracranial and intraspinal pathology using pneumoencephalography (**Figure 1**), ventriculography, carotid arteriography, and myelography.

Figure 1. Pneumoencephalography. *Source: Radiopaedia.org. Image originally published by W.E. Dandy in 1919.*

Only with the advent of CT in the 1970s was it possible to directly visualize intracranial pathology, marking a turning point for neurosurgeons. The subsequent development of magnetic resonance imaging (MRI) further enhanced preoperative diagnostics, although it did not have the same revolutionary impact as CT.

Although ultrasound (US) entered clinical practice before CT, its application in neurosurgery was initially limited, as brain tissue is enclosed within bone. Its earliest use was in neonates, utilizing fontanelles as acoustic windows. Over time, with the advancement of high-resolution probes and imaging technology, the application of ultrasound in neurosurgery has expanded considerably.

Unlike the central nervous system, ultrasound has a significantly broader application in the evaluation of peripheral nerve injuries and disorders, where it now represents a standard diagnostic tool.

A modern trend increasingly encourages clinical physicians to acquire basic skills in ultrasound diagnostics, a practice shown to be beneficial across various medical specialties. The earlier notion that ultrasound was reserved solely for radiologists or select specialists—such as cardiologists or gynecologists—is gradually becoming obsolete. The ultrasound probe is becoming a standard tool for the practicing clinician.

Neurosurgeons are already trained to independently interpret CT and MRI scans for the purpose of surgical planning and understanding the spatial relationships of pathological substrates to vital structures. In this context, even though ultrasound is less precise than complex MRI systems, its accessibility and simplicity make it a valuable adjunct in daily neurosurgical practice.

The following sections describe the use of ultrasound in three domains of neurosurgery: cranial, spinal, and peripheral nerve surgery.

Cranial Neurosurgery

In pediatric neurosurgery, ultrasound is frequently used due to the presence of fontanelles and open sutures, which serve as acoustic windows. It is commonly employed to detect intraventricular hemorrhages and hydrocephalus (**Figure 2**).

Figure 2. Grade 3 intraventricular hemorrhage with associated hydrocephalus. *Source: Radiopaedia.org.*

One major advantage is the avoidance of ionizing radiation in early childhood. Although definitive surgical decisions still require CT or MRI, ultrasound serves as an excellent initial diagnostic tool, potentially eliminating the need for immediate CT imaging.

Another highly valuable application is the assessment of intracranial pressure via optic nerve sheath diameter measurement (**Figure 3**).

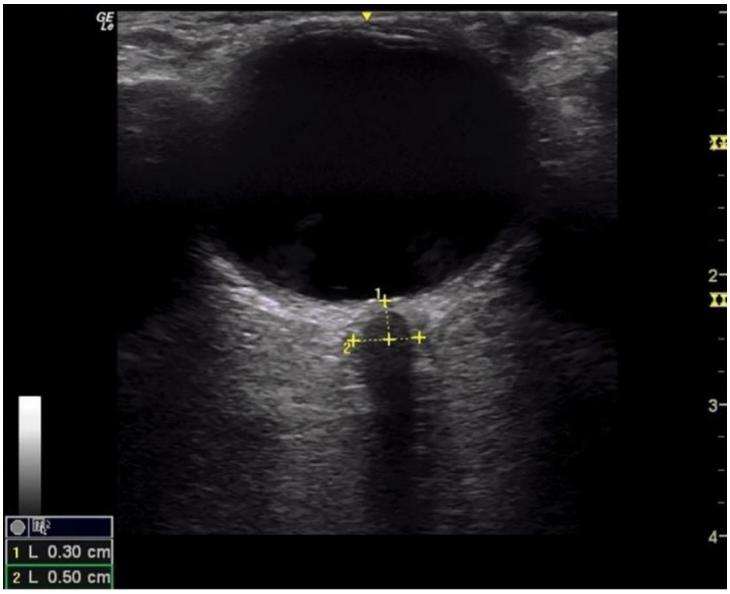


Figure 3. Ultrasound of the optic nerve. *Source: Yic, C.D., Pontet, J., Mercado, M. et al. Ultrasonographic measurement of the optic nerve sheath diameter to detect intracranial hypertension: an observational study. Ultrasound J* **15**, 4 (2023). https://doi.org/10.1186/s13089-022-00304-3

In adults, the use of ultrasound is more limited but still viable. Transcranial Doppler (TCD) is used to assess cerebral circulation, especially for detecting vasospasm following subarachnoid hemorrhage.

During ventriculoperitoneal shunt placement, ultrasound can be used to evaluate ventricular configuration and to select the optimal catheter trajectory. However, this requires a specialized burr-hole probe (**Figure 4**).

Figure 4. Specialized Burr-Hole probe (model 8863) by BK Medical. *Source: BK Medical.*

Intraoperative ultrasound plays a significant role as a supplement or even an alternative to neuronavigation. Neuronavigation is an advanced system that guides the surgeon through brain structures, displaying in real time the position of surgical instruments in relation to preoperative CT or MRI scans. This allows for less invasive approaches and reduces the risk of iatrogenic injury to healthy brain tissue.

The limitation of neuronavigation lies in its static nature: all planning and calculations are based on preoperative imaging. Intraoperatively, events such as cerebrospinal fluid drainage or resection of pathological or brain tissue can shift the brain, rendering the preoperative plan inaccurate. This is where ultrasound becomes essential—it provides real-time dynamic visualization.

It can be used independently for the localization of subcortical lesions without cortical presentation (**Figure 5**) and to assess the extent of tumor resection. Moreover, ultrasound imaging can be integrated with neuronavigation systems, overcoming limitations of static data and maintaining precision throughout the procedure.

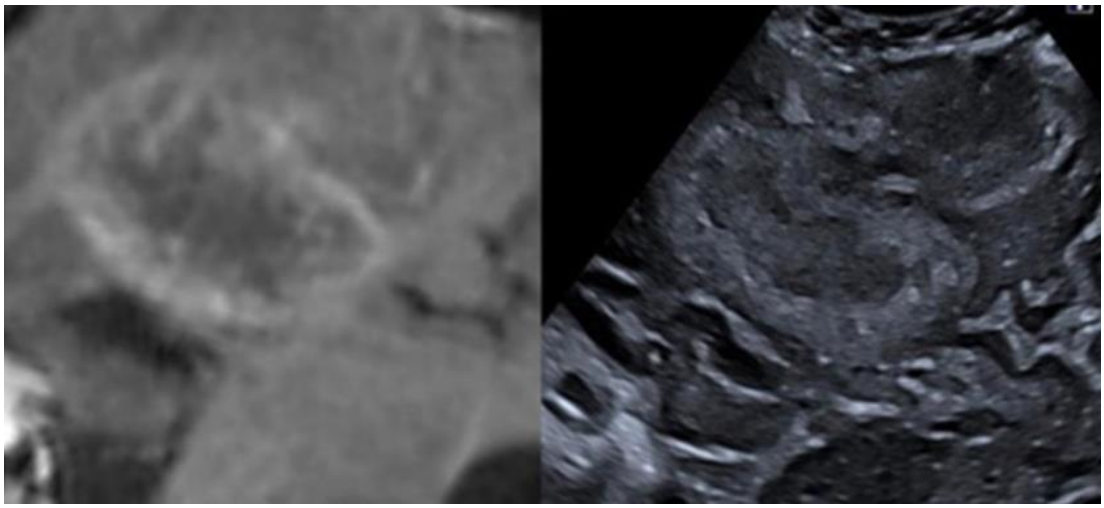


Figure 5. Glioblastoma: comparative view of preoperative contrast-enhanced MRI (T1-weighted) and intraoperative ultrasound. *Source: Dixon L, Lim A, Grech-Sollars M, Nandi D, Camp S. Intraoperative ultrasound in brain tumor surgery: A review and implementation guide. Neurosurg Rev. 2022 Aug;45(4):2503–2515. doi: 10.1007/s10143-022-01778-4. Epub 2022 Mar 30. PMID: 35353266; PMCID: PMC9349149.*

Spinal Neurosurgery

In spinal surgery, ultrasound also has distinct applications. In procedures such as microdiscectomy or stenosis surgery without instrumentation, it can help precisely localize the target level (**Figure 6**), especially in settings where intraoperative X-ray is unavailable.

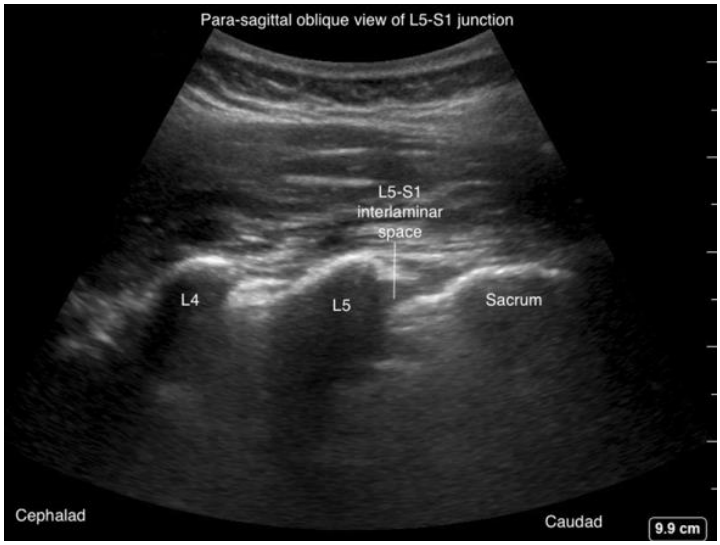


Figure 6. Parasagittal oblique projection of the lumbosacral spine. *Source: Kalagara, H., Nair, H., Kolli, S. et al. Ultrasound Imaging of the Spine for Central Neuraxial Blockade: a Technical Description and Evidence Update. Curr Anesthesiol Rep 11, 326–339 (2021).* https://doi.org/10.1007/s40140-021-00456-3

Ultrasound is particularly valuable for identifying and assessing intradural pathologies, such as tumors, cysts, hematomas, or adhesions. Even prior to dural opening, ultrasound allows visualization of the pathological process in relation to the spinal cord and adjacent structures.

It also complements intraoperative fluoroscopy. For instance, before definitive laminectomy/laminotomy, it can confirm the target level via an interlaminar window and measure the cranio-caudal extension of the pathology (**Figure 7**).

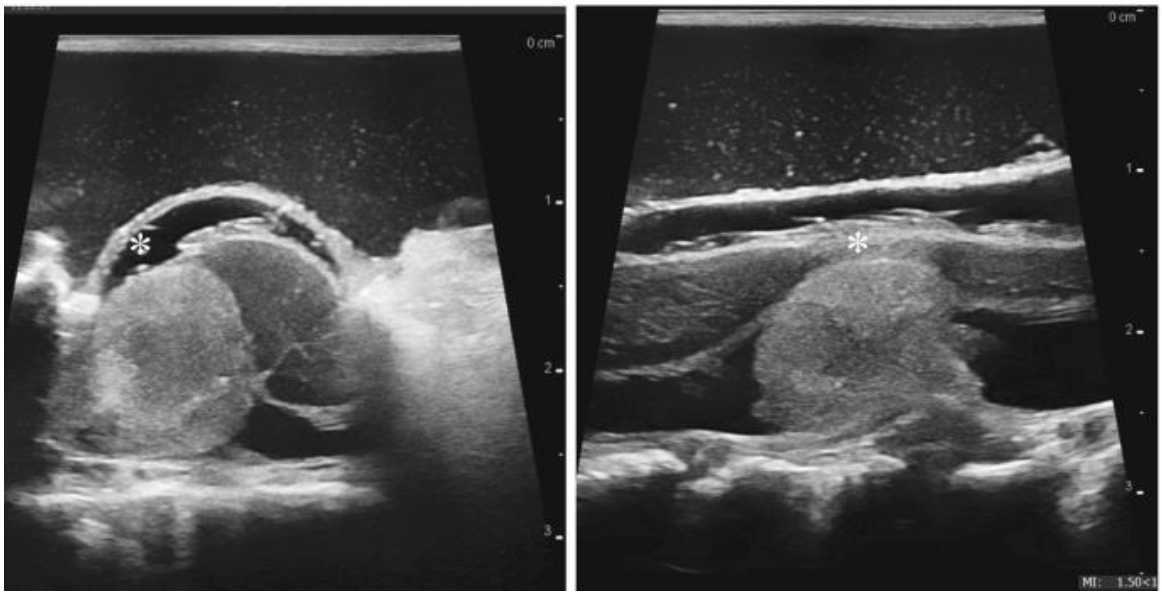


Figure 7. Transdural ultrasound following laminectomy for spinal meningioma: longitudinal and transverse views showing the relationship between the tumor and spinal cord. *Source: Ivanov, M. (2022). Spinal Meningioma. In: Şenköylü, A., Canavese, F. (eds) Essentials of Spine Surgery. Springer, Cham.* https://doi.org/10.1007/978-3-030-80356-8_58

In Chiari malformations, ultrasound can be used to confirm cerebrospinal fluid flow restoration after decompression. In cervical spine surgery, it helps evaluate vertebral artery flow and proximity, enhancing surgical safety.

Peripheral Nerve Surgery

High-resolution ultrasound is an essential tool in evaluating patients with peripheral nerve injuries and disorders. It enables detailed visualization of nerve structure, including fascicles, epineurium, and perineurium, giving a characteristic honeycomb appearance in transverse and longitudinal planes.

In traumatic injuries, ultrasound can distinguish whether the nerve is intact (lesion in continuity), whether a neuroma has formed, or whether there is discontinuity with retraction of nerve ends (**Figure 8**). Surrounding perineural fibrosis or scar tissue can also be visualized.

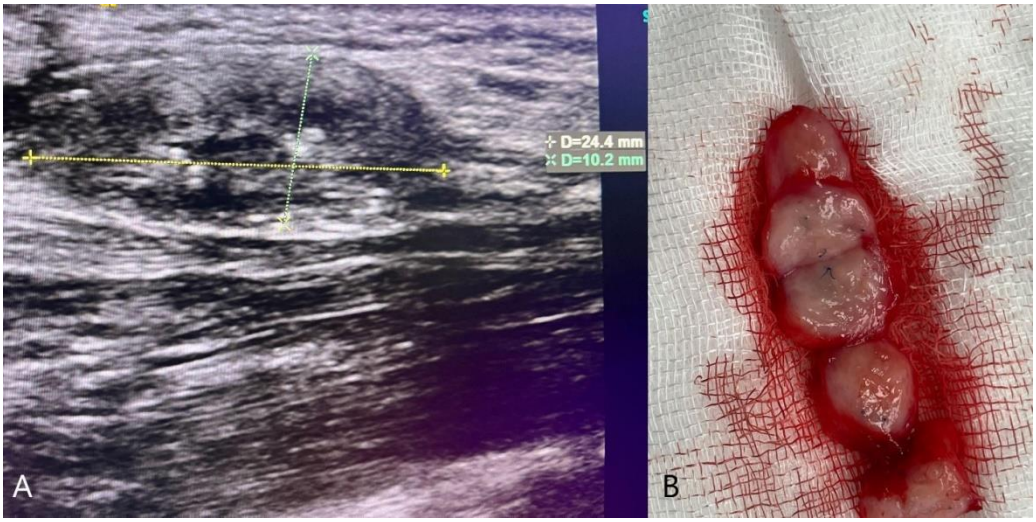


Figure 8.
A) Preoperative ultrasound in a patient with transected ulnar nerve initially treated with direct suture; the image shows neuroma formation at the suture site.
B) Intraoperative view following neuroma resection and prior to grafting the defect.
Source: Original clinical photographs from the Clinic of Neurosurgery, University Clinical Center of Serbia.

For compressive neuropathies, ultrasound offers dynamic assessment of nerve motion during limb movement, aiding in understanding the mechanism of compression. It also allows evaluation of chronic denervation changes in muscles, characterized by increased echogenicity and atrophy.

Ultrasound is also highly useful as a guide for minimally invasive interventions such as diagnostic and therapeutic injections, aspirations, biopsies, and neurolysis.

While MRI remains a standard diagnostic tool in these patients, ultrasound is more accessible, portable, and allows for rapid assessment, especially in the presence of vascular injuries. However, MRI is superior for visualizing deep nerve structures and complex anatomical regions (e.g., brachial plexus), and in the early detection of muscle denervation or diffuse neuropathies.

Therefore, these two methods should be viewed as complementary rather than competitive. A major advantage of ultrasound is that neurosurgeons can independently perform it as part of their clinical evaluation, whereas MRI typically requires radiologist involvement.

Conclusion

Ultrasound has an important role in modern neurosurgery, enhancing both diagnostic capabilities and surgical quality. Younger colleagues should be introduced to this method during their undergraduate training, while experienced neurosurgeons can significantly improve their practice by mastering the basic principles of ultrasound diagnostics.

Role of point-of-care ultrasound (POCUS) in polycystic kidney disease

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INTRODUCTION

Polycystic kidney disease (PCKD) is an inherited disorder. The adult form is autosomal dominant and exists in two types: type 1 and type 2 PCKD. It is considered one of the leading causes of chronic kidney disease (CKD), often progressing to end-stage renal disease (ESRD). Therefore, early diagnosis and regular monitoring are essential.

METHOD

We report the case of a 50-year-old female patient with ESRD secondary to PCKD, currently on maintenance hemodialysis. She had a history of right nephrectomy and presented with complaints of moderate right-sided abdominal pain. Bedside ultrasound revealed multiple cystic lesions of varying sizes occupying a large portion of the liver, likely accounting for the pain.

DISCUSSION

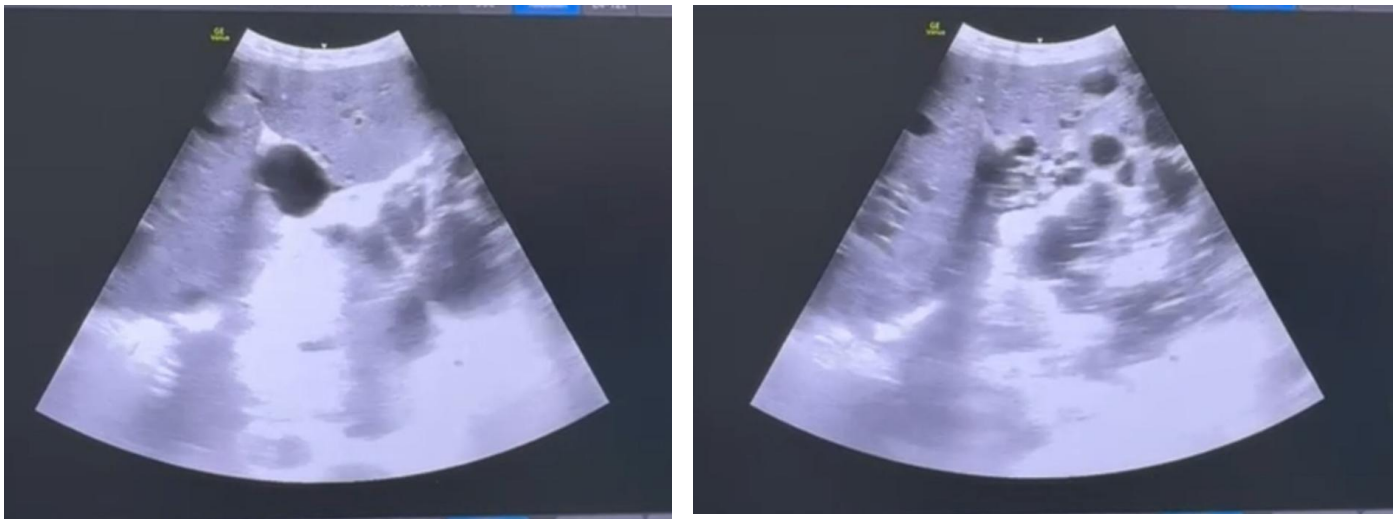
Point-of-care ultrasound (POCUS) is an increasingly utilized imaging modality and has become one of the preferred non-invasive, real-time, and repeatable bedside diagnostic tools. It can be performed in the ward or ICU without transferring the patient, thereby reducing the risk of infection and other complications associated with transport.

Early diagnosis and monitoring of disease progression in polycystic kidney disease (PCKD) are critical for slowing kidney damage and delaying the progression of chronic kidney disease (CKD). In adult PCKD patients, cysts may also involve other organs such as the liver, spleen, lungs, and pancreas. Furthermore, these cysts are prone to multiple complications including pain, rupture, infection, and bleeding. POCUS serves as a valuable bedside tool for the diagnosis of such complications. Additionally, it can guide interventional procedures such as cyst aspiration or drainage.

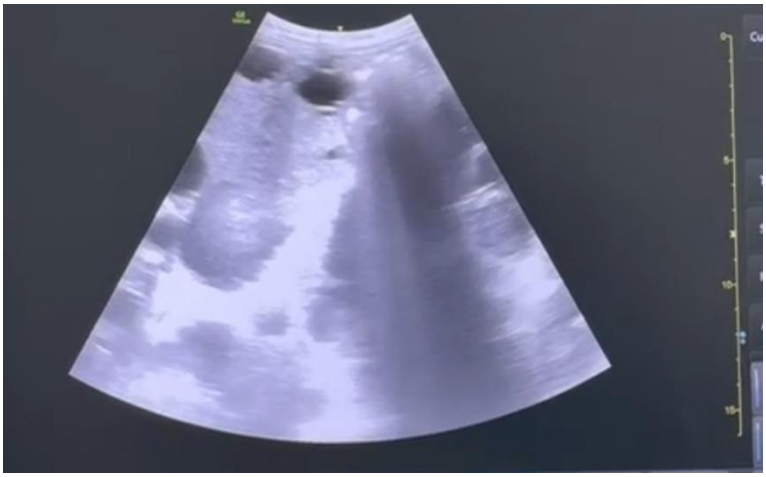
Another important application of POCUS in PCKD is monitoring cyst size and progression, which aids in timely and optimal clinical intervention and management. Compared to other imaging modalities such as CT and MRI, POCUS is more readily available, cost-effective, and safer, as it does not involve radiation exposure or the need for contrast agents.

CONCLUSION

POCUS is now widely accepted and integrated as a diagnostic procedure across various medical specialties. Its utility should be further incorporated into routine medical practice. POCUS plays a crucial role in the comprehensive care of patients with PCKD; however, standardized protocols and diagnostic criteria for monitoring disease progression are needed to optimize its clinical application.



Liver cysts



Spleen cyst

Kidney cyst left side

UTERINE CANCER DETECTED BY POCUS IN A PATIENT WITH NONSPECIFIC CLIMACTERIC SYMPTOMS

Željka Popović, MD, primarius
Health Center Doboj, Bosnia and Herzegovina, Department of Family Medicine

Abstract

Point-of-care ultrasound (POCUS) is increasingly being used as a rapid diagnostic tool in evaluating patients with nonspecific symptoms. This case report presents a 45-year-old female with symptoms suggestive of perimenopause, in whom POCUS enabled the early detection of a serious underlying condition—uterine carcinoma. The case highlights the importance of POCUS in primary care and its potential to guide timely diagnostic and therapeutic decisions.

Keywords: POCUS, uterine cancer, ascites, perimenopause, abdominal bloating, primary care

Introduction

Nonspecific abdominal complaints in women over the age of 40 are frequently attributed to hormonal changes associated with perimenopause. However, vague symptoms such as menstrual irregularities and bloating may mask more serious underlying pathologies, including malignancies. Point-of-care ultrasound (POCUS) offers clinicians a bedside tool to enhance physical examination and detect early pathological changes that may otherwise go unnoticed in initial clinical evaluation [1,2]. This report illustrates the utility of POCUS in identifying free intraperitoneal fluid and prompting further gynecological investigation that ultimately led to the diagnosis of uterine carcinoma.

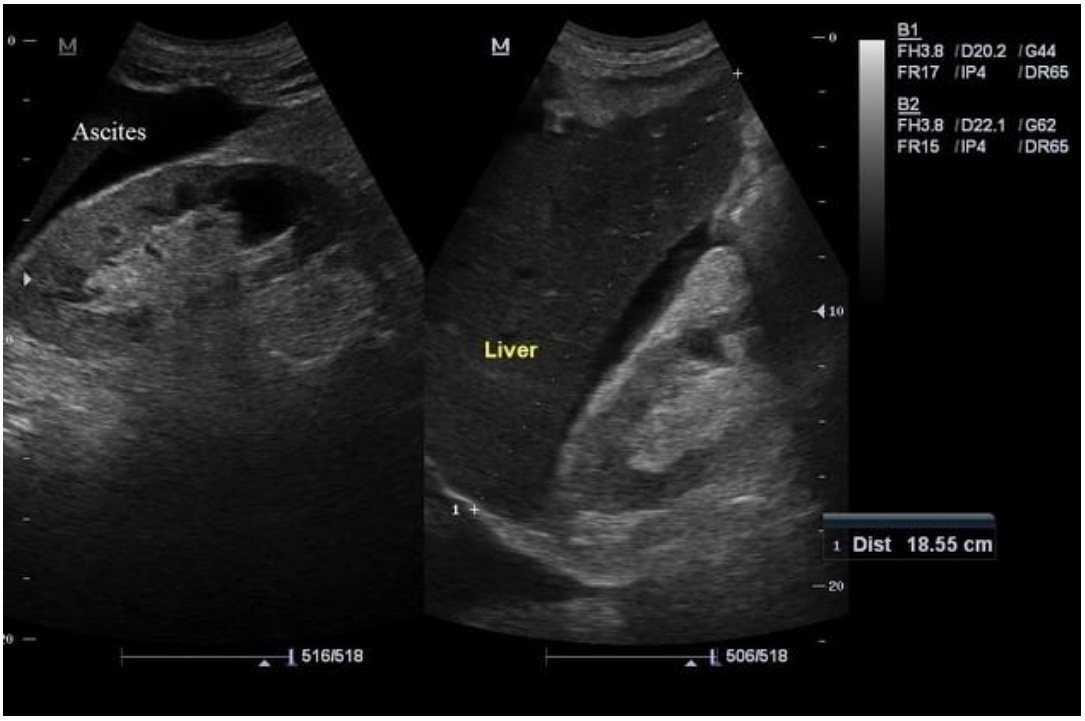
Case Presentation

A 45-year-old female presented to her family physician complaining of irregular menstrual cycles and abdominal bloating, symptoms she believed to be related to the onset of menopause. She denied weight loss, fever, or changes in bowel habits. Clinical examination was unremarkable, without palpable masses or organomegaly. Neurological and gastrointestinal exams were within normal limits.

Routine blood work showed mild normocytic anemia (hemoglobin 112 g/L), with all other hematological and biochemical parameters within reference ranges.

Given the persistent bloating and subtle abdominal fullness, a POCUS examination of the abdomen was performed using a curvilinear probe. The ultrasound revealed a small amount of free fluid in the pelvis (ascites). Liver, gallbladder, spleen, kidneys, and bladder were all sonographically normal, with no signs of masses, hepatomegaly, or portal hypertension.

Due to the presence of ascites without a clear intra-abdominal cause, a gynecological etiology was suspected. The patient was referred to a gynecologist for further evaluation. Transvaginal ultrasound showed endometrial thickening, and an endometrial biopsy was performed. Histopathological analysis revealed endometrial adenocarcinoma (uterine cancer).



The patient was referred to oncology for staging and treatment. Surgical management followed by adjuvant therapy was initiated promptly.

Discussion

This case underscores the pivotal role of POCUS in general and family medicine. The patient's symptoms were vague and easily attributed to perimenopause, a common transitional phase in women around the age of 45–55. Without ultrasonographic evaluation, the presence of ascites may have been overlooked until more advanced symptoms emerged. Ascites, even in small volumes, in a woman with nonspecific symptoms should prompt consideration of gynecologic malignancies, especially in the absence of gastrointestinal or hepatic findings [3].

The utility of POCUS lies not only in its diagnostic capabilities but also in its potential to direct further, more specialized investigations. In this case, the absence of pathology in visualized abdominal organs redirected clinical focus toward gynecological assessment, ultimately leading to early detection of a potentially life-threatening condition.

This case also demonstrates the importance of training primary care physicians in the use of POCUS as a routine extension of the physical exam. Early detection improves treatment options, outcomes, and overall prognosis.

Conclusion

POCUS is an invaluable tool in primary care that can uncover hidden pathologies in patients presenting with nonspecific complaints. In this case, it facilitated the timely diagnosis of uterine cancer, initially masked by presumed climacteric symptoms. Routine incorporation of POCUS into clinical practice may significantly enhance diagnostic accuracy and improve patient outcomes.

References

1. *Moore CL, Copel JA. Point-of-care ultrasonography. N Engl J Med. 2011;364(8):749–57.*
2. *Arienti V, Camaggi V, Monesi A, et al. Bedside ultrasonography for routine assessment of medical patients: an emerging need. Intern Emerg Med. 2014;9(8):897–902.*
3. *Timmerman D, Van Calster B, Vergote I, et al. Subjective assessment versus ultrasound models to diagnose ovarian cancer: A multicenter diagnostic accuracy study. B*

POCUS Academy of Serbia

Activities during the 1st half of 2025

Contributed by Ivica Zdravkovic, MD, Director of POCUS Academy of Serbia

Over the past six months, we have continued training colleagues according to the programs of the Academy. A new development is that, in addition to physicians, we have begun training medical technicians, many of whom are employed on cruise ships, where it is increasingly required that medical technicians master the skill of using ultrasound probes. We have had the pleasure and honor to train not only colleagues from primary healthcare but also cardiologists, neurosurgeons, and other specialists. This recognition is a special affirmation that the work of our Academy is increasingly valued among physicians in Serbia.

Besides the training conducted at the “Dr. Zdravković” clinic, which is also the headquarters of the POCUS Academy of Serbia, our colleague Dr. Gordana Bojović has held trainings at her practice in Čajetina over the past six months.

This spring, the POCUS Academy of Serbia was officially registered with the Serbian Business Registers Agency (APR) as a non-profit professional association of physicians, established to promote POCUS diagnostics and to provide education in clinical echsonography. Starting this autumn, we will launch new training programs and models.

During the past months, we have engaged with representatives of several companies and tested probes from Clarius, Mindray, and Chison. Our general impression is that handheld/pocket probes remain somewhat uncomfortable for detailed examinations, regardless of the software solutions and options integrated for tablet use. Considering that all examinations are performed bedside, with hands occupied by scanning and holding a tablet or smartphone, quantitative diagnostics and more complex dynamic evaluations, such as echocardiography, are not recommended with handheld probes.

These devices are primarily designed for rapid, rough qualitative assessment of organs, tissues, and body cavities. We recommend their use mainly in emergency departments, fieldwork, and ambulance settings, particularly for examinations such as eFAST, RUSH protocol, lung ultrasound (LUS), rough FATE exams, PEARLS protocol, and similar. For detailed measurements and complex ultrasound studies, we strongly recommend the comfort of larger machines with large monitors, the possibility of sitting during use, and the use of conventional buttons, trackballs, and keys instead of touchscreen tapping.

We organized the POCUS Diagnostics Days — the first “POCUS Diagnostics Days” event organized by the POCUS Academy of Serbia. It was a wonderful gathering of nearly 90 physicians from Serbia and Bosnia and Herzegovina, held in the pleasant atmosphere of “Titova Vila” on Zlatibor.

We extend our gratitude to everyone who helped organize and realize this event, especially our unofficial host, the excellent colleague Dr. Gordana Bojović, the kind Marija Jeremić from “Titova Vila,” the courteous representatives of the companies Medisal d.o.o. and Clarius (Luka, Aleksandar, Metodije, Ivana, and Jelena), as well as the outstanding speakers and educators at the event: Prof. Siniša Ristić, Prim. Dr. Željka Popović, Dr. Kristina Stević, Dr. Sava Vojnović, Dr. Vekoslav Zajić, Dr. Narić Svetlana, Dr. Dejan Živanović, Dr. Suzana Zdravković, Dr. Nikola Milojević, Dr. Milena Tošić Milosavljević, Prim. Dr. Danijel Atijas, and others.

See you next year!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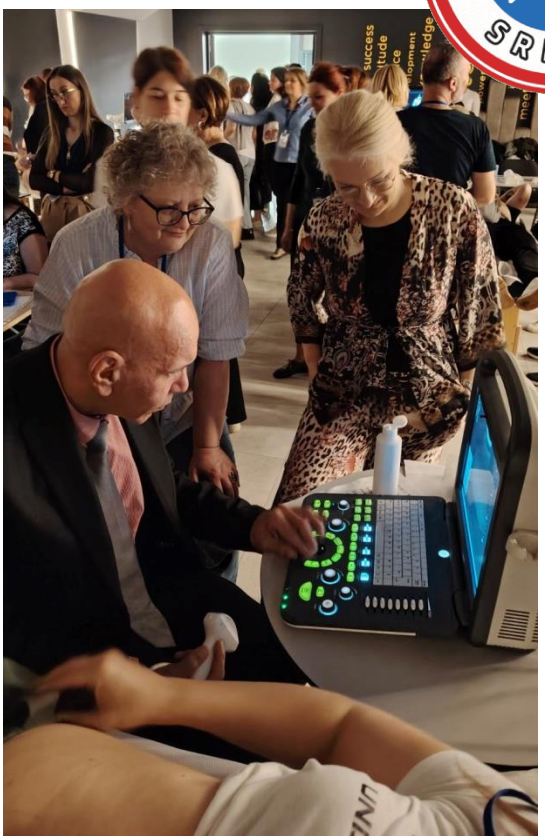
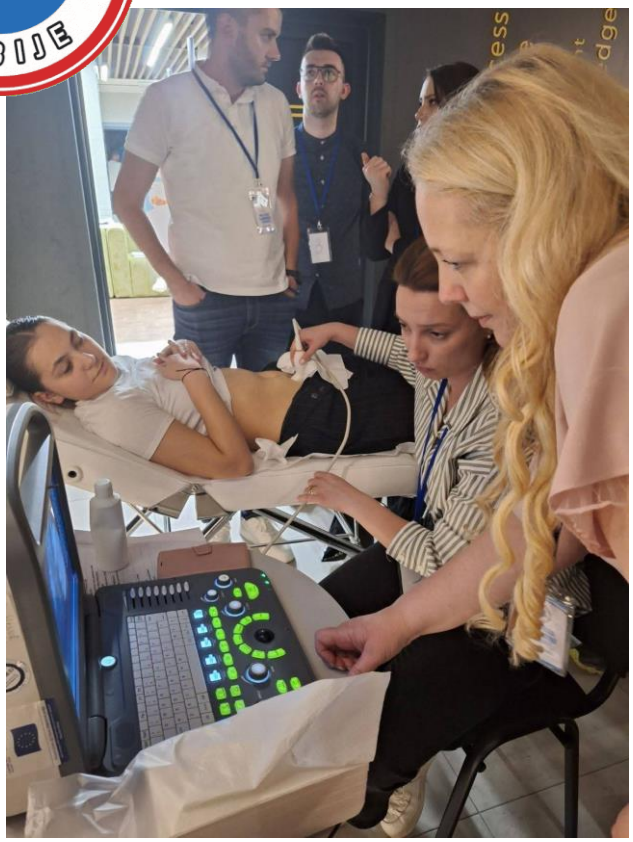




See full info from our event here:

https://www.pocus.edu.rs/serbiaNEWSpage05.htm

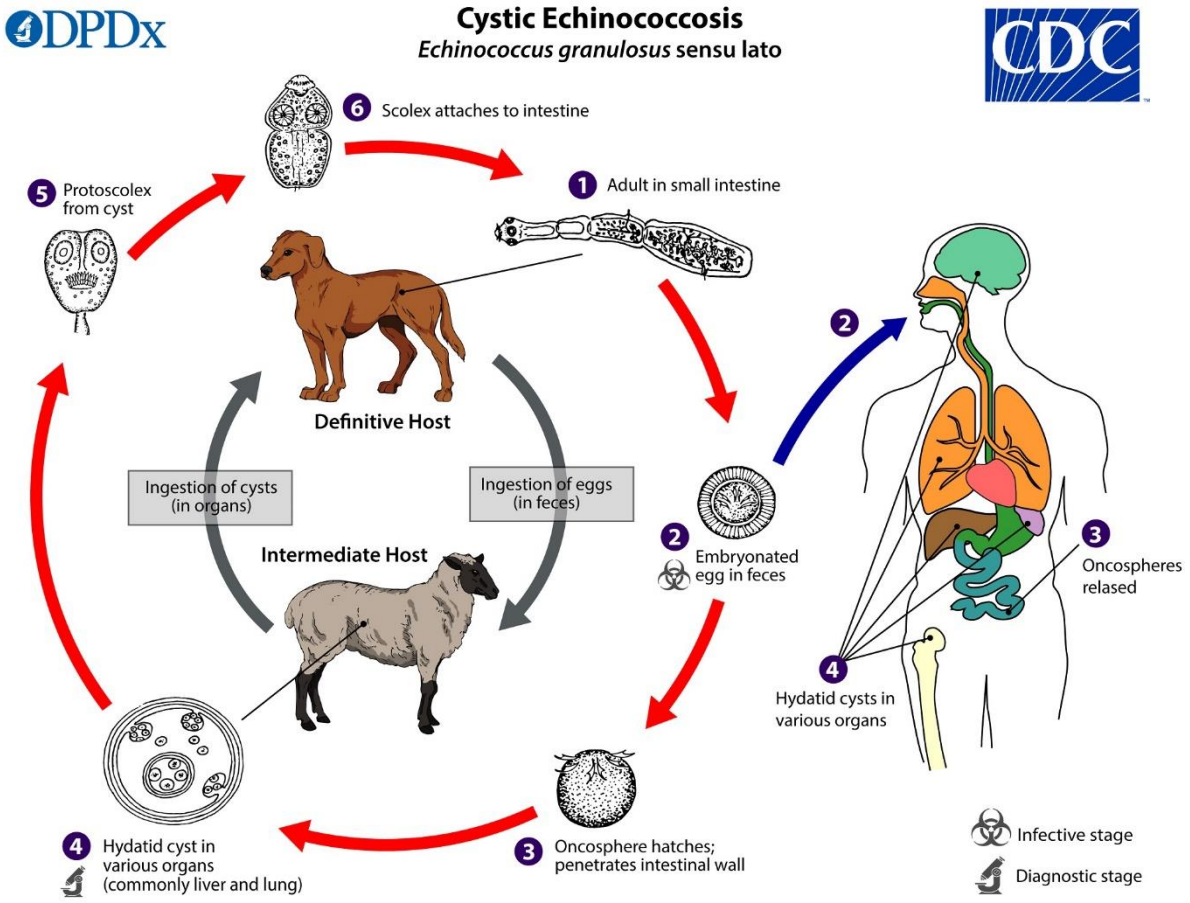
Echinococcosis

Dr Svetlana Milinković
University Clinical Center of the Republic of Srpska (UKC RS), Clinic for Infectious Diseases

Echinococcosis in Humans

Echinococcosis (also known as hydatidosis or hydatid disease) in humans is caused by the larval stages of cestodes (tapeworms) of the genus *Echinococcus*. *Echinococcus granulosus* (sensu lato) causes cystic echinococcosis and is the most common form. Dogs are the definitive hosts, capable of harboring adult tapeworms in their gastrointestinal tract, while herbivores (e.g., sheep, goats, pigs, cattle, camels, horses, deer) and humans serve as intermediate hosts, developing cystic lesions in the liver or other organs.

Another species, *E. multilocularis*, causes alveolar echinococcosis. The species *E. vogeli* and *E. oligarthrus* are associated with "neotropical echinococcosis"; *E. vogeli* causes the polycystic form, whereas *E. oligarthrus* causes an extremely rare unicystic form. Numerous genotypes of *E. granulosus* have been identified, differing in their geographic distribution, host range, and certain morphological characteristics.



Life Cycle of *Echinococcus granulosus*

- In humans, the most commonly affected organs are the **liver** (52–77%) and **lungs** (8.5–44%), with **other organs** (such as the brain, heart, kidneys, bones, pancreas, etc.) involved in **13–19%** of cases.
- The **initial phase of primary infection** is always **asymptomatic**.
- The **incubation period** can last up to **10 years**.
- The **clinical presentation** depends on the **size and location** of the cyst.

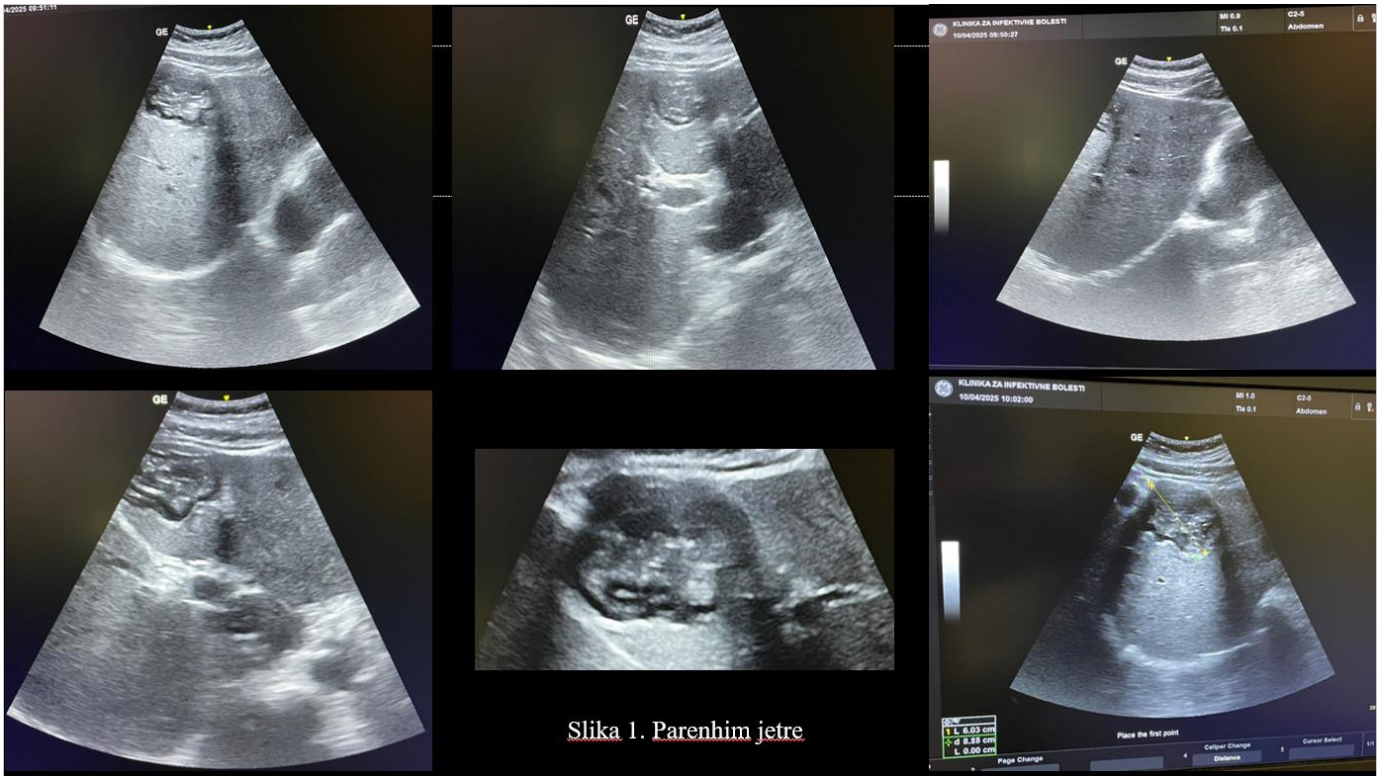
- The **most common signs and symptoms** include:

    - hepatomegaly
    - pain in the right upper quadrant of the abdomen
    - nausea and vomiting
    - symptoms of cholestasis
    - biliary cirrhosis
    - portal hypertension

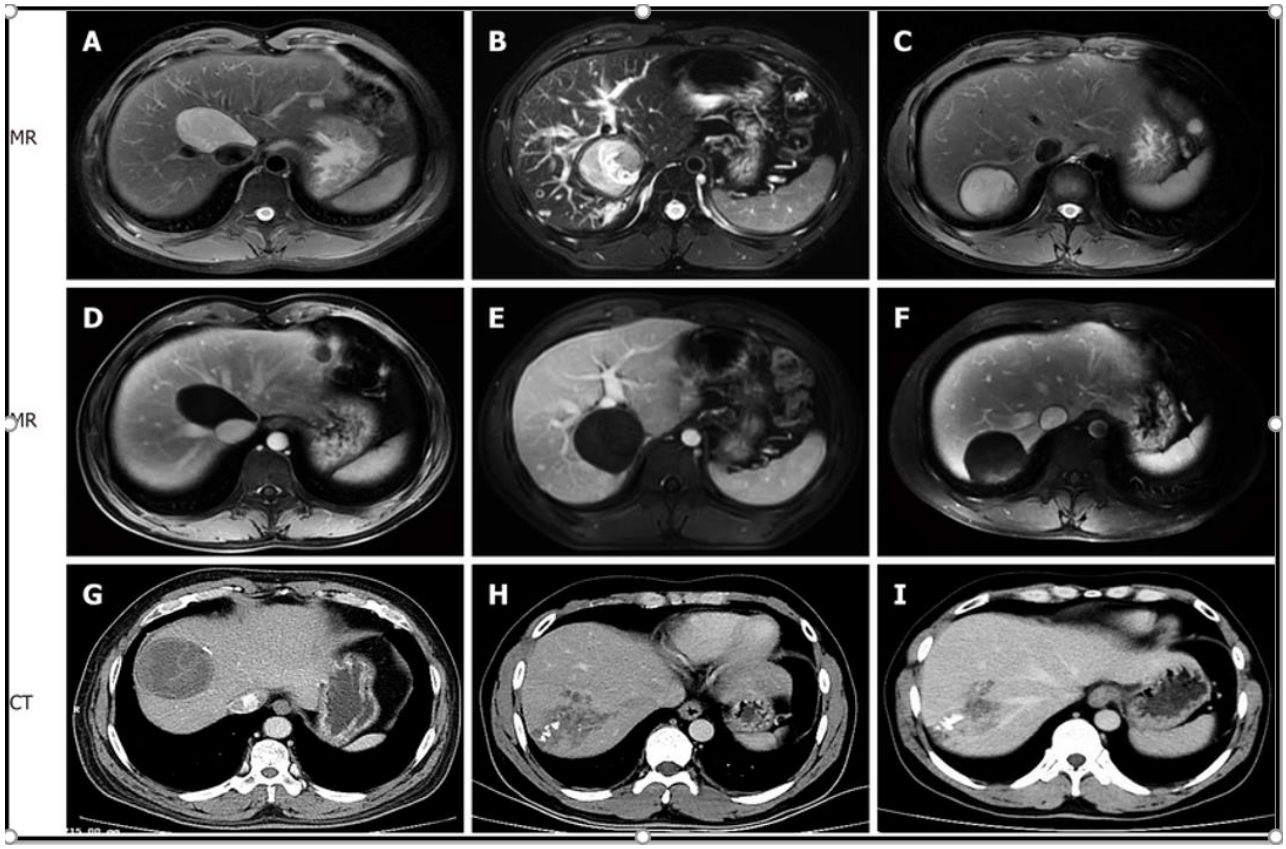
CASE REPORT

Patient M.T., 48 years old, was referred for consultation with an infectious disease specialist due to elevated transaminase levels.

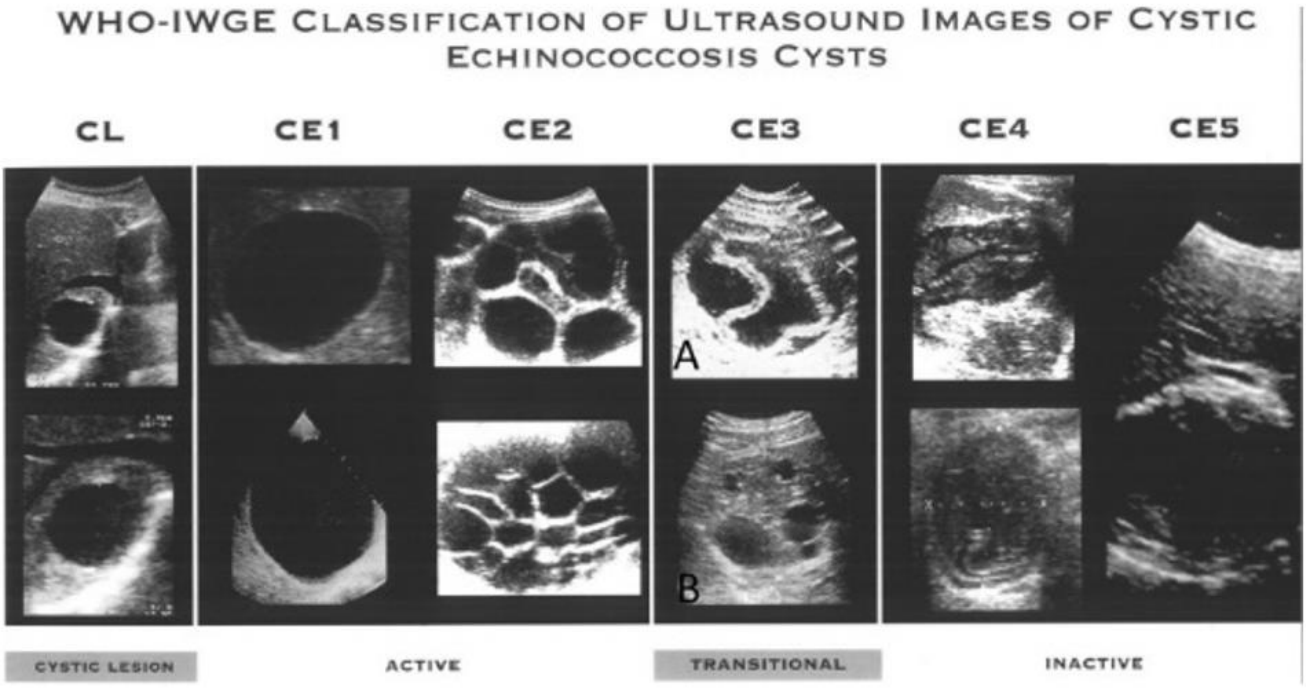
- **Anamnesis:** occasional abdominal pain accompanied by a feeling of bloating
- **Physical examination:** normal, except for a **palpable liver** 1 fingerbreadth below the right costal margin
- **Laboratory findings:** CBC (eosinophils 6.4%), AST 39, ALT 73, GGT 82, ALP 74
- **Imaging diagnostics:** abdominal ultrasound, CT/MRI of the abdomen, and chest X-ray
- **Serological tests**



Liver changes



MR and CT of the abdomen



Classification of cysts

Serological diagnosis can be useful, although a negative test does **not exclude** the diagnosis of echinococcosis. Antibodies are positive in approximately **90% of hepatic cyst cases**, whereas **pulmonary cysts** are serologically negative in about **50%** of cases.

Treatment of cystic hydatid disease caused by *Echinococcus granulosus* should be based on the **viability of the parasite**, which can be assessed through radiological imaging. Based on **ultrasound appearance**, cysts are classified as **active, transitional**, and **inactive**.

- **Active cysts** include:
  - **CL** (cystic lesion without a visible cyst wall),
  - **CE1** (visible cyst wall and internal echoes – "snowflake sign"),
  - **CE2** (visible cyst wall and internal septations).
- **Transitional cysts (CE3)** may present with detached laminated membranes or be partially collapsed.
- **Inactive cysts** include:
  - **CE4** (heterogeneous mass),
  - **CE5** (cyst with a thick calcified wall).

Therapy is determined based on the **size, location**, and **clinical presentation** of the cyst, as well as the **patient's overall health**. Small CL, CE1, and CE3 cystic lesions may respond to **albendazole therapy**. For **CE1 lesions** and **uncomplicated CE3 cysts**, **percutaneous aspiration, infusion of a scolicidal agent, and reaspiration (PAIR)** is recommended over surgery.

Surgery remains the treatment of choice for:

- **complicated cysts** (e.g., those communicating with the biliary tree),
- **at risk of rupture or fistula formation**,
- **large cysts (>10 cm)**,
- **multilocular CE2/CE3b cysts**,
- **most thoracic and intracranial cysts**, and
- **cases where PAIR is not feasible or relapse occurs**.

For hepatic *E. granulosus* cysts, the preferred surgical approach is **pericystectomy**, which removes the entire cyst along with the surrounding fibrotic tissue.

Spillage of cyst fluid during surgical or PAIR procedures carries the risk of **anaphylaxis** and **dissemination of infectious protoscoleces**.

Albendazole therapy, administered for **12 weeks to 6 months**, results in cure in approximately **30%** of cases and **clinical improvement in an additional 50%**. The combination of **albendazole (10–15 mg/kg/day, up to 800 mg/day)** with surgical treatment leads to **recurrence rates under 10%** when the protocol is strictly followed.Without **pre- and postoperative albendazole**, the **recurrence risk rises to 25–40%**.

Therapeutic response is best monitored through **serial imaging studies**, based on cyst size and consistency. Ultrasound/CT follow-ups are recommended **every 3–6 months for two years**.

SUMMARY OF THE PROTOCOL

1. Diagnosis (Ultrasound/CT, serology)
2. Cyst staging assessment (WHO CE2/CE3b classification)
3. Albendazole (10–15 mg/kg/day in two divided doses, preoperatively for 7 days or longer depending on cyst type and patient status, typically 2–6 weeks)
4. Surgery (radical or conservative)
5. Albendazole postoperatively for 1–3 months in cases of rupture or residual disease, up to 6 months if needed
6. Monitor CBC and liver enzymes every 2–4 weeks (pause albendazole if levels rise >3x)
7. Ultrasound/CT controls every 3–6 months

References:

1. White AC Jr, Weller PF. Cestodes. In: Kasper DL, Fauci AS, Hauser SL, Longo DL, Jameson JL, Loscalzo J, editors. *Harrison's Principles of Internal Medicine*. 19th ed. New York: McGraw-Hill Education; 2015. pp. 1432–1434.

2. PROBE Protocol, Point-of-Care Ultrasound Rapid Overall Body Exam. Ivica Z., 2023; pp. 43–49.

3. Centers for Disease Control and Prevention (CDC). *Echinococcosis – Healthcare Providers*. Atlanta (GA): CDC; updated 2024. Available at: https://www.cdc.gov/echinococcosis/hcp/clinical-care

4. MSD Manual, Professional Version. *Echinococcosis*. Reviewed Dec 2023. Available at: https://www.msdmanuals.com/professional/infectious-diseases/cestodes-tapeworms/echinococcosis

The Thinking Ultrasound – A New "Colleague" in a White Coat

Modern Diagnostics Supported by Software That Understands Clinical Practice

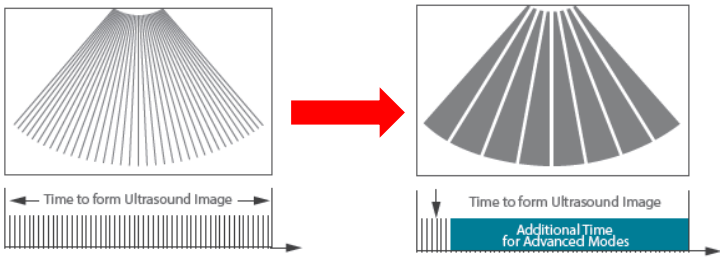
In today's world, where everything must be fast, accurate, and intuitive, ultrasound can no longer afford to be slow, complicated, or technically demanding. We are no longer speaking merely about image quality and resolution. Today, we are talking about intelligent tools that perform measurements automatically and recognize what we are examining.

POCUS is no longer reserved solely for intensive care or emergency medicine. It has become an integral part of everyday clinical routine.

"The goal is no longer to 'find the right angle' — but to know what is happening with the patient within 60 seconds, with data ready for immediate reporting. More time for the patient. Less for device settings. That is the essence of smart ultrasound diagnostics today."

But for this to truly work, the device must adapt to the user – not the other way around.

Thanks to technological advancements, the operating principle of modern ultrasound machines no longer relies on line-by-line scanning, as is the case with conventional models. Instead, imaging is performed by zones, enabling up to ten times faster image formation and allowing for the development of a wide range of intelligent tools and software that significantly accelerate and simplify workflow on the device..



The evolution of ultrasound devices has led to a shift away from 200-kilogram machines, moving toward solutions that are highly optimized, intuitive, simple, and easy to use. The Chinese premium company **Mindray** has successfully integrated both the complete user interface and ultrasound imaging into a single touchscreen monitor — and has gone even further by embedding the entire ultrasound system into a single probe that replaces all three standard types: linear, convex, and cardiac.

Additionally, ultrasound imaging can now be viewed through **virtual reality glasses**, with system parameters adjustable through **eye movement alone**, further enhancing usability and efficiency.

Ultrasound system fully integrated into a single probe.
3-in-1 functionality: combines linear, convex, and cardiac probe capabilities
Cutting-edge ZST+ zone scanning technology. Continuous scanning time of up to 90 minutes. Full battery charge in just 35 minutes

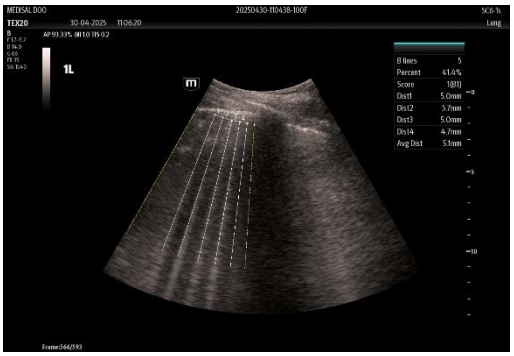


Waterproof and shock-resistant design
Supports all scanning modes: B-mode, Color Doppler, PW, and M-mode
Compatible with Android/iOS tablets and smartphones
Unlimited software licenses included
Can be connected to virtual reality glasses, with ultrasound image optimization via eye movement

State-of-the-art premium ultrasound system, specifically designed for anesthesia, operating rooms, intensive care units, and Point-of-Care ultrasound

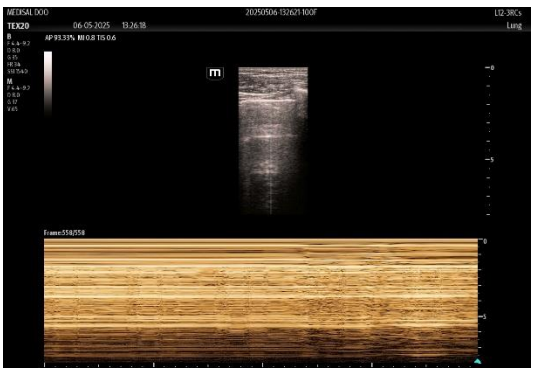
- Advanced ZST+ zone scanning technology
- 23.8" rotating touchscreen monitor
- Four active transducer ports, with the option to connect wireless probes
- Lightweight, mobile, and compact, ideal for use in demanding environments such as ORs and ICUs
- Superior image resolution and quality
- Extensive range of intelligent automated tools that accelerate and simplify procedures in challenging clinical settings
- Single Crystal transducer technology for enhanced penetration and higher image detail

LUNG EXAMINATION:



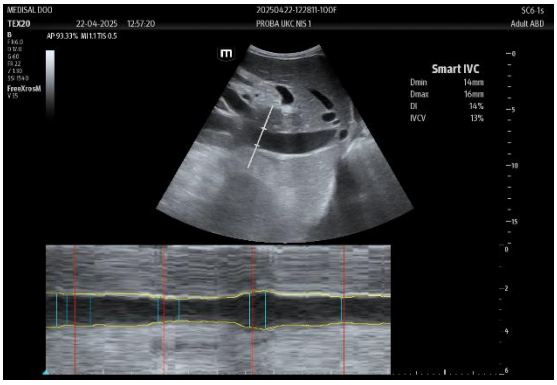
Smart B-line – lung scanning software that automatically counts the number of B-lines and calculates the surface area they occupy, based on a region of interest (ROI) that is automatically adjusted according to the acoustic shadows cast by the ribs. It then assigns a **Lung Ultrasound Score (LUS)** based on predefined lung zones being scanned.

Pleural effusion

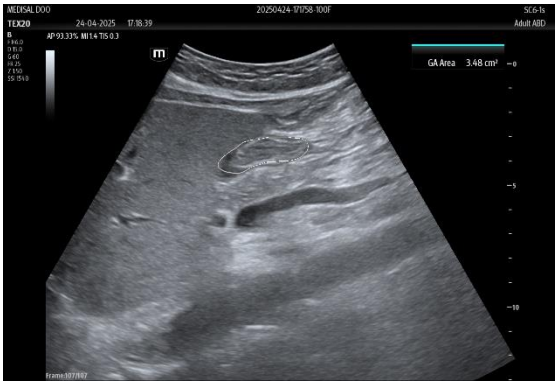


Normal M-mode findings, the „seashore sign“

EXAMINATION OF ABDOMEN



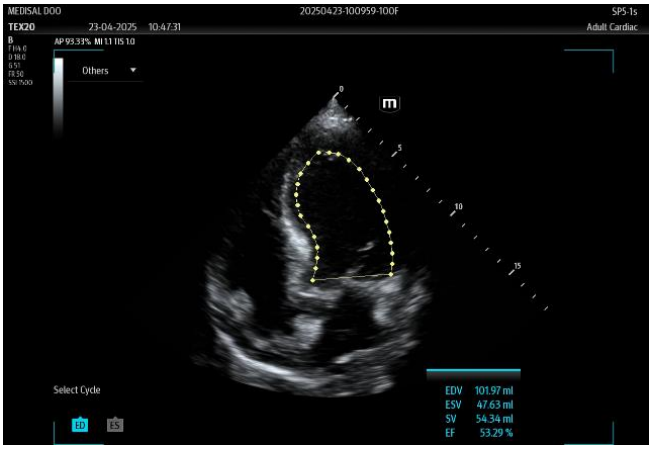
Smart IVC – automatically calculates the minimum and maximum diameter of the inferior vena cava (IVC) and determines the **collapsibility index (CI)** for spontaneously breathing patients, or the **distensibility index (DI)** and **coefficient of variation** for mechanically ventilated patients, all in real time.



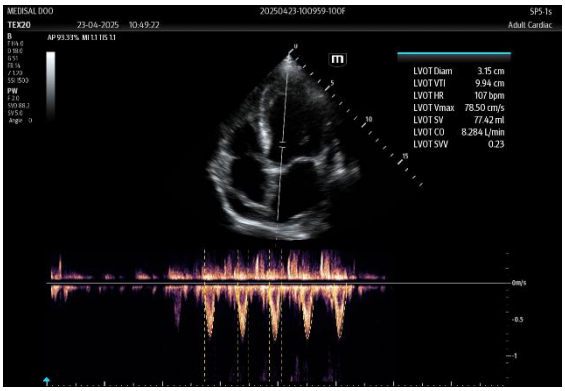
Auto GA – automatic calculation of the cross-sectional area of the gastric antrum.

Thanks to intelligent software, it is possible to display—for individual organs or structures—the correct probe positioning through probe scanning, along with the corresponding anatomical illustration and the **reference ultrasound image** that should be obtained.

HEART EXAMINATION:



Auto EF Plus – software that automatically determines the ejection fraction in real time with a single click, based on consecutive cardiac cycles.



Smart VTI – with just one click, it automatically adjusts the position of the PW Doppler and calculates the cardiac output and stroke volume based on the velocity-time integral measured through the left ventricular outflow tract.

Smart DFR – automatically adjusts the position of the PW Doppler to measure flow velocity at the mitral or tricuspid valve and automatically sets the positions of the E and A waves.

iScanHelper – significantly simplifies ultrasound use during regional nerve blocks by displaying, for each individual nerve, the proper probe positioning, anatomical illustration, and reference ultrasound image.

Smart Nerve – automatically detects nerve location and highlights nerves in green for easier visualization during regional blocks.

Modern ultrasound is no longer just a tool. It becomes our silent partner—measuring, recognizing, analyzing, and suggesting—without requiring explicit instructions each time. Ultrasound will never replace the physician, but it enables them to be more efficient, confident, and autonomous.

So, the next time you turn on the device, remember—you might not be working alone anymore. Technology is not your adversary, but your ally. And a true ally does not complicate the job—it makes it easier.

CONTENTS:

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