

ULTRASOUND NEWS

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POCUS to Evaluate for Achilles Tendon Involvement in Ankle Lacerations

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Abstract

Achilles tendon injury is uncommon in children but is often caused by direct trauma to the posterior ankle. The diagnosis of Achilles tendon involvement after injury may be inadequate when based solely on physical examination findings. There is limited literature describing the identification of Achilles tendon injury in the pediatric population with point of care ultrasound (POCUS). This case series describes two patients with ankle lacerations in whom Achilles tendon involvement was evaluated using POCUS.

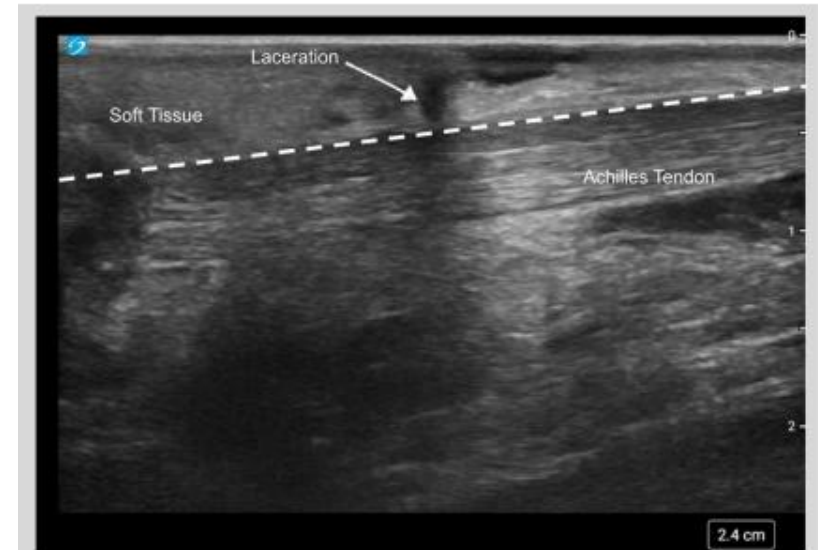


Figure 1. Point of care ultrasound (POCUS) image showing a sagittal view of the Achilles tendon (below the dotted line) with a laceration (arrow) above, but not including, the tendon.



Figure 3. The sagittal view is obtained by placing the ultrasound probe maker toward the patient's head and scanning from the calcaneal tuberosity to the distal calf.

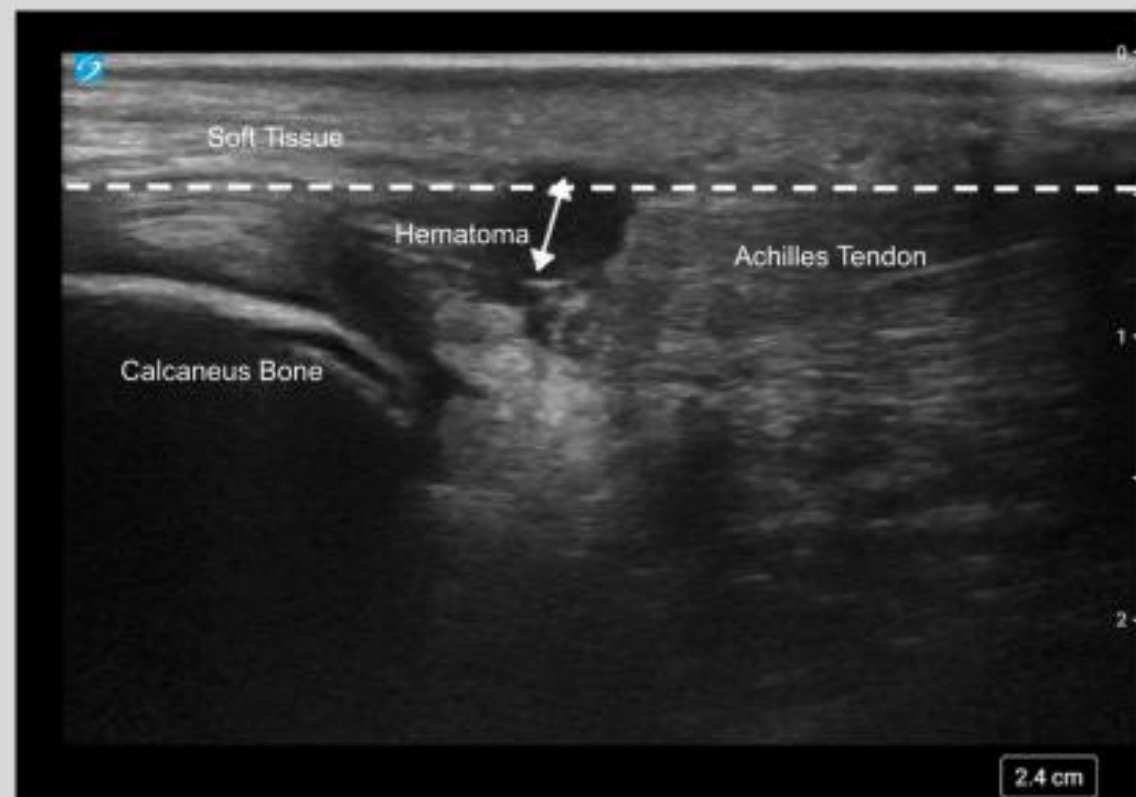


Figure 2. Point of care ultrasound (POCUS) image showing a sagittal view of a lacerated Achilles tendon (tendon below the dotted line) with a hematoma (double arrows above the laceration).

Pulmonization of Liver: The Unexpected Appearance of Lung POCUS Signs in the Abdomen

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Abstract

Point of care ultrasound (POCUS) is an increasingly common tool used in patient evaluation. Rapid interpretation of POCUS findings rely on the operator's familiarity with POCUS patterns. However, over-reliance on heuristics can result in misdiagnosis. We describe a case involving a patient who exhibited characteristic lung POCUS in the abdominal region. This case emphasized the importance of anatomic correlation and the limitations of pattern recognition in isolation.



Figure 3. A) Unlabeled point of care ultrasound (POCUS) image of Supplementary Material S1 at 0:02. B) The structures of interest are shown. The kidney, identifiable by its shape and hyperechoic renal sinus, is now visible at a depth of 6 cm (dotted, orange line). The kidney is seen cephalad to the curved hyperechoic line initially interpreted as the diaphragm (green line), demonstrating that the line is not the diaphragm. As such, the structures seen are in the abdomen rather than the thorax.



Figure 1. A) Unlabeled point of care ultrasound (POCUS) image of Supplementary Material S1 at 0:00. B) The structures of interest are highlighted. The curved green line highlights what was falsely presumed to be the diaphragm. The blue arrows show hyperechoic foci against a soft tissue density, initially interpreted as "air bronchograms." The yellow line highlights the irregular hyperechoic line with distal reverberation artifact, initially interpreted as "shred sign."

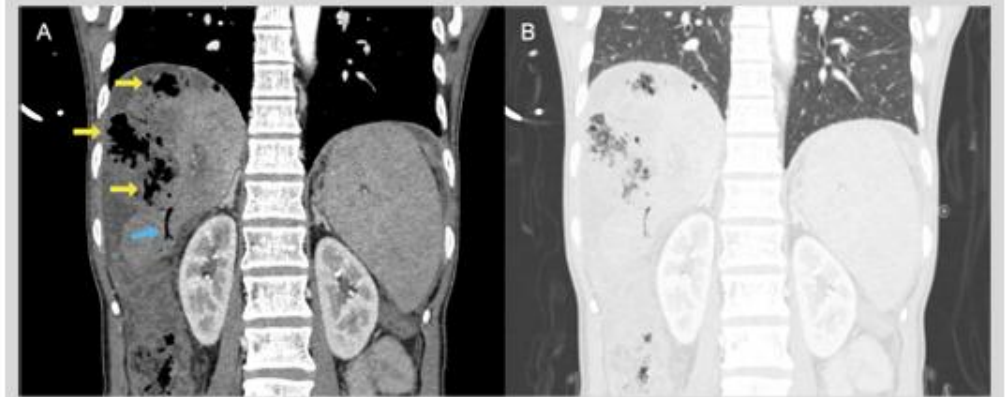


Figure 2. A) A coronal cut of the computed tomography (CT) abdomen. Air is seen within the liver parenchyma in two patterns: large collections of air within the liver masses (yellow arrows), and smaller tracks of air extending to the periphery of the liver (blue arrows). B) Coronal cut of the CT abdomen in the lung preset. The lung bases appear clear.

Dental Abscess on POCUS: A Retrospective Case Series Analysis

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Abstract

Background: Point of care ultrasound (POCUS) has proven utility in confirming the diagnosis of skin and soft tissue abscesses. We studied the characteristics of 50 dental abscesses on pediatric POCUS examinations and their outcomes. **Methods:** This was a convenience sample of cases collected in the pediatric emergency department from December 2020 to December 2024. All included patients were examined by an oromaxillofacial specialist and hospitalized. All cases had POCUS imaging performed at initial assessment by the first author. **Results:** The median age of the patients was 7 years (IQR = 5 years), and 31 (62%) were male. Forty (80%) received antibiotic prior to arrival. Thirty-five (70%) presented within 3 days from onset of pain, and 36 (72%) were referred to the pediatric emergency department by a dentist for oromaxillofacial evaluation. Four children (8%) experienced spontaneous drainage while inpatient, and eleven children underwent surgical drainage (22%). There was a significant correlation between maximal abscess height from bone and the need for surgical drainage ($p = 0.011$). A cutoff of 4.5 mm yielded a sensitivity of 72.7% and specificity of 69%, indicating that abscesses measuring greater than 4.5 mm are more likely to need surgical drainage. **Conclusions:** This was the first known study to describe POCUS findings in children determined to have dental abscess by an oromaxillofacial specialist and hospitalized for treatment. POCUS may have utility in identifying dental abscess, and may be useful in following the progress of abscesses under treatment. The majority of dental abscesses will resolve with antibiotic therapy, but abscesses above 4.5 mm may require drainage early in the course of treatment.



Figure 1. A representation of the sagittal probe placement to identify dental abscess in the maxillary area. The probe should fan through the area of swelling.



Figure 2. Point of care ultrasound (POCUS) image of dental abscess. Star indicates buccal soft tissue. Single arrow indicates maxillary cortex. Double-headed arrow demarcates the maximum height of an anechoic dental abscess.



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Ultrasound imaging of small peripheral nerves – a primer for radiologists

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Abstract

High-resolution imaging has transformed the evaluation of small superficial peripheral nerves, enabling earlier detection of neuropathies, traumatic injuries, and entrapments. Among available modalities, ultrasound is particularly well suited for this purpose owing to its high spatial resolution, dynamic assessment capabilities, and ability to guide interventions. Normal nerves can be recognized on ultrasound by their fascicular architecture and characteristic honeycomb appearance, which helps distinguish them from adjacent tendons, vessels, and connective tissue. High-frequency transducers allow improved delineation of fascicular detail, while small-footprint probes enable imaging of nerves in anatomically constrained regions, establishing ultrasound as a reliable and cost-effective tool for evaluating peripheral nerve injuries. Because of spatial resolution limitations, magnetic resonance imaging has restricted ability to evaluate submillimeter-sized nerves; high-resolution ultrasound is therefore particularly effective in localizing pathological nerves – both in terms of the exact site of involvement and the length of the affected segment. This review article highlights in detail the sonographic techniques, pitfalls, and key anatomic landmarks for visualizing small peripheral nerves in the upper and lower extremities, with particular emphasis on nerves that are frequently under evaluated in routine clinical practice yet often contribute to allodynia. Normal anatomical appearance on ultrasound is provided for better understanding along with examples of pathologies affecting these nerves

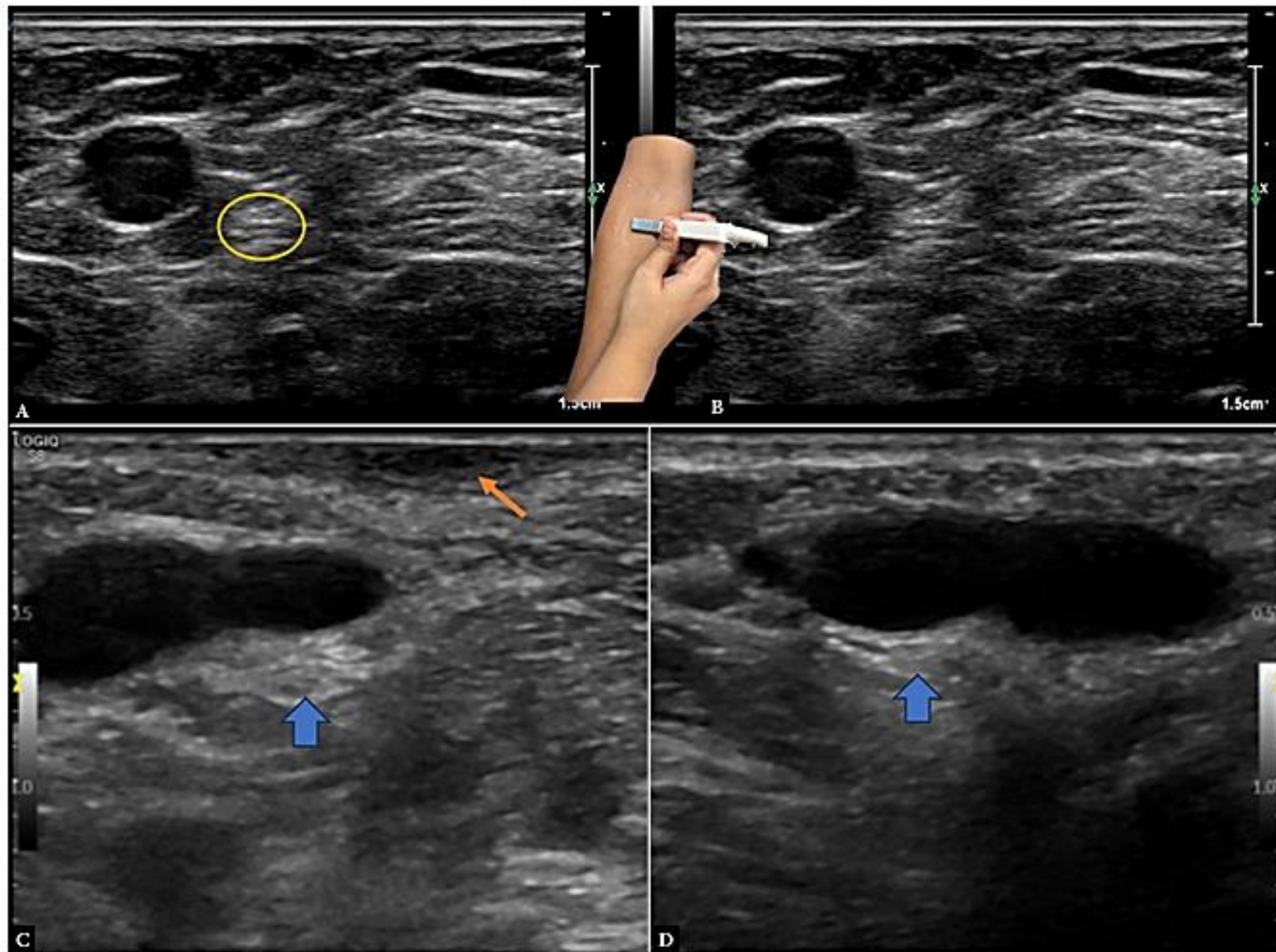


Fig. 4. The lateral antebrachial cutaneous nerve (yellow circle) is identified in the antecubital fossa, adjacent to the cephalic vein (A and B). Note probe position in the inset. Image C demonstrates thickening of the LABC (blue arrow) in a patient following biceps tendon repair, compared to the contralateral normal nerve in image D. The orange arrow demonstrates focal scarring of the overlying skin in image C, indicating prior surgical intervention.

Hypertension

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Daily Low-intensity Pulsed Ultrasound Ameliorates Renal Fibrosis and Inflammation in Experimental Hypertensive and Diabetic Nephropathy

Yoshiki Aibara, Ayumu Nakashima, KI-ichiro Kawano, Farina Mohamad Yusoff, Fumitaka Mizuki, Shinji Kishimoto, Masato Kajikawa, Tatsuya Maruhashi, and Yukihiro Higashi | AUTHOR INFO & AFFILIATIONS

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Hypertension

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- Gut Microbiota and Hypertension
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- Blood Pressure and Stroke
- Shockwave Therapy and Kidney Disease

Review of ABPM

Abstract

The estimated morbidity rate of chronic kidney disease is 8% to 16% worldwide, and many patients with chronic kidney disease eventually develop renal failure. Thus, the development of new therapeutic strategies for preventing renal failure is crucial. In this study, we assessed the effects of daily low-intensity pulsed ultrasound (LIPUS) therapy on experimental hypertensive nephropathy and diabetic nephropathy. Unilateral nephrectomy and subcutaneous infusion of angiotensin II via osmotic mini-pumps were used to induce hypertensive nephropathy in mice. Immunohistochemistry revealed that daily LIPUS treatment ameliorated renal fibrosis and infiltration of inflammatory cells induced by angiotensin II. A similar therapeutic effect was also observed in mice with angiotensin II-induced hypertensive nephropathy in which splenectomy was performed. In addition, LIPUS treatment significantly decreased systolic blood pressure after 21 days. Subsequently, *db/db* mice with unilateral nephrectomy developed proteinuria; daily LIPUS treatment significantly reduced proteinuria after 42 days. In addition, immunohistochemistry revealed that renal fibrosis was significantly ameliorated by LIPUS treatment. Finally, LIPUS stimulation suppressed TGF- β 1 (transforming growth factor- β 1)-induced phosphorylation of Smad2 and Smad3 in HK-2 (human proximal tubular cell line) cells. LIPUS treatment may be a useful therapy for preventing the progression of renal fibrosis in patients with chronic kidney disease.

DETAILS

RELATIONS



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ARTICLE

Daily Low-intensity Pulsed Ultrasound Ameliorates Renal Fibrosis and Inflammation in Experimental Hypertensive and Diabetic Nephropathy



Novelty and Significance

What Is New?

- Daily LIPUS (low-intensity pulsed ultrasound) ameliorates inflammation and tubulointerstitial fibrosis in experimental hypertensive nephropathy and diabetic nephropathy.

What Is Relevant?

- Exposure to LIPUS directly inhibits the TGF- β 1 (transforming growth factor- β 1)/Smad signaling pathway. In addition, the treatment with LIPUS is unlikely to exert a therapeutic effect via the splenic cholinergic anti-inflammatory pathway.

Summary Daily LIPUS therapy ameliorates inflammation and fibrosis in experimental hypertensive nephropathy and diabetic nephropathy. This modality may be a useful therapy for preventing the progression of renal fibrosis in patients with chronic kidney disease.

Key Therapeutic Effects of LIPUS on Renal Diabetes

- Renal Protection:** Daily LIPUS at an intensity of (315 mW/cm^2) can significantly ameliorate tubular injury and renal fibrosis.
- Anti-inflammatory Mechanism:** LIPUS downregulates IL-1R (Interleukin-1 Receptor) and its downstream genes in kidney tissues, reducing renal fibrosis and inflammation.
- Improved Glycemic Control:** Studies suggest LIPUS can increase insulin levels by nearly 80-95% and reduce glucose levels by approximately 45% in diabetic models.
- Pancreatic Support:** It helps manage type 2 diabetes by stimulating pancreatic function without destroying tissue.
- Potential for Renal Perfusion:** While Contrast-Enhanced Ultrasound (CEUS) is mainly used for diagnostic evaluation of microvascular renal perfusion, therapeutic pulsed ultrasound aims to improve blood flow in kidney tissues. [[1](#), [2](#), [3](#), [4](#), [5](#), [6](#)]

Typical Therapeutic Parameters

- **Intensity:** Low-intensity ($<315 \text{ mW/cm}^2$), often $(25\text{--}315 \text{ mW/cm}^2)$.
- **Frequency:** Usually (1 MHz) or (800 kHz) .
- **Pulse Ratio:** Often $(1:2)$ or $(1:4)$ (pulsed).
- **Treatment Duration:** (10) to (15) minutes daily. [[1](#), [2](#), [3](#), [4](#)]

Potential Benefits for Diabetic Complications

- **Reduction in Arterial Stiffness:** Low-frequency and low-intensity ultrasound applied to the forearm has been shown to reduce blood pressure and pulse rate in patients with type 2 diabetes.
- **Reduced Renal Fibrosis:** It reverses ischemia-reperfusion-induced tubular injury, a common cause of progressive renal dysfunction in diabetes. [[1](#), [2](#), [3](#)]

AIUM Practice Parameter for the Performance of Ultrasound Evaluation of the Prostate (and Surrounding Structures), 2025 Revision

The American Institute of Ultrasound in Medicine (AIUM) is a multidisciplinary association dedicated to advancing the safe and effective use of ultrasound in medicine through professional and public education, research, development of clinical practice parameters, and accreditation of practices performing ultrasound examinations.

The AIUM Practice Parameter for the Performance of Ultrasound Evaluation of the Prostate (and Surrounding Structures), 2025 Revision was revised by the American Institute of Ultrasound in Medicine (AIUM) in collaboration with other organizations whose members use ultrasound for performing this examination(s) (see “Acknowledgments”). Recommendations for personnel requirements, the request for the examination, documentation, quality assurance, and safety may vary among the organizations and may be addressed by each separately.

This Practice Parameter is intended to provide the medical ultrasound community with recommendations for the performance and recording of high-quality ultrasound examinations. The parameter reflects what the AIUM considers the appropriate criteria for this type of ultrasound examination but is not intended to establish a legal standard of care. Examinations performed in this specialty area are expected to follow the Parameter with the recognition that deviations may occur depending on the clinical situation.

the presence of prostate cancer and should not be used to obviate the need for prostate biopsy.^{4,6} Although micro ultrasound elastography and contrast-enhanced ultrasound may provide superior detection of prostate cancer, these techniques are not sufficiently established to be considered routine at this time.

Indications

Indications for prostate ultrasound include, but are not limited to, the following:

1. Guidance for biopsy for elevated PSA,⁷ after an abnormal digital rectal examination, following radiotherapy or other treatment to monitor patients with known prostate malignancy,^{8,9} or for a suspicious prostate lesion detected on magnetic resonance imaging (MRI). This includes the use of transrectal ultrasound (TRUS) biopsy as part of the TRUS/MRI fusion technique.⁴
2. Assessment of prostate volume before medical, surgical, interventional radiology, or radiation therapy^{8,9} and calculations of PSA density.¹⁰
3. Real-time guidance for the placement of brachytherapy seeds.¹¹
4. Real-time guidance for the placement of interstitial catheters for brachytherapy.
5. Real-time guidance for the placement of prostatic spacer material.
6. Real-time guidance for the placement of fiducials for image-guided radiation therapy.
7. Assessment of lower urinary tract symptoms.¹²
8. Assessment of congenital anomalies.¹³
9. Infertility including azoospermia and a low ejaculatory volume.
10. Hematospermia.
11. Evaluation for suspected recurrence in the prostatectomy bed in patients who have undergone prostatectomy.
12. Ejaculatory dysfunction or painful ejaculation.

Qualifications and Responsibilities of Personnel

Physicians interpreting or performing this type of ultrasound examination should meet the specified AIUM

Training Guidelines¹⁴ in accordance with AIUM accreditation policies.¹⁵

Sonographers performing the ultrasound examination should be appropriately credentialed¹⁶ in the specialty area in accordance with AIUM accreditation policies.¹⁵

Physicians not personally performing the examination must provide supervision, as defined by the Centers for Medicare and Medicaid Services Code of Federal Regulations 42 CFR §410.32,¹⁷ which is available from the US Government Publishing Office.

Request for the Examination

The written or electronic request for an ultrasound examination must originate from a physician or other appropriately licensed health care provider or under the provider's direction. The clinical information provided should allow for the performance and interpretation of the appropriate ultrasound examination and should be consistent with relevant legal and local health care facility requirements.

Specification of the Examination

Prostate

The transrectal approach to prostate ultrasound is the method of choice because the resulting image quality is superior to transabdominal and transperineal examinations. In patients for whom the transrectal approach is not possible, a transperineal ultrasound examination may be used to direct a biopsy procedure.¹⁸ A transabdominal approach can estimate prostate size in some settings.

The prostate should be imaged in its entirety in at least two orthogonal planes, sagittal and axial or longitudinal and coronal, from the apex to the base of the gland. An estimated volume is determined from measurements in three orthogonal planes (volume = length × height × width × 0.52).^{19,20} The volume of the prostate may be correlated with the PSA level. Alternatively, prostate planimetry, allows greater accuracy of prostate volume by accommodating individual variations in prostate shape.²¹

The prostate gland should be evaluated for focal mass, echogenicity, symmetry, and continuity of

AIUM Practice Parameter for the Performance of Scrotal Ultrasound Examinations, 2025 Revision

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The AIUM Practice Parameter for the Performance of Scrotal Ultrasound Examinations, 2025 Revision, was revised by the American Institute of Ultrasound in Medicine (AIUM) in collaboration with other organizations whose members use ultrasound for performing this examination(s) (see “Acknowledgments”). Recommendations for personnel requirements, the request for the examination, documentation, quality assurance, and safety may vary among the organizations and may be addressed by each separately.

This Practice Parameter is intended to provide the medical ultrasound community with recommendations for the performance and recording of high-quality ultrasound examinations. The parameter reflects what the AIUM considers the appropriate criteria for this type of ultrasound examination but is not intended to establish a legal standard of care. Examinations performed in this specialty area are expected to follow the Parameter with the recognition that deviations may occur depending on the clinical situation.

8. Evaluation of inguinal testes.²²
9. Detection of an occult primary tumor in patients with metastatic germ cell tumor²³ or unexplained retroperitoneal adenopathy or paraneoplastic syndrome.
10. Follow-up of patients with previous primary testicular neoplasms, testicular adrenal rest tumors, or testicular leukemia/lymphoma.^{24,25}
11. Evaluation of an abnormality noted on other imaging studies (including, but not limited to, computed tomography, magnetic resonance imaging, and positron emission tomography).
12. Evaluation of a disorder of sexual development.²⁶

Qualifications and Responsibilities of Personnel

Physicians interpreting or performing this type of ultrasound examination should meet the specified AIUM Training Guidelines²⁷ in accordance with AIUM accreditation policies.²⁸

Sonographers performing the ultrasound examination should be appropriately credentialed²⁹ in the specialty area in accordance with AIUM accreditation policies.²⁸

Physicians not personally performing the examination must provide supervision, as defined by the Centers for Medicare and Medicaid Services Code of Federal Regulations 42 CFR §410.32,³⁰ which is available from the US Government Publishing Office.

Request for the Examination

The written or electronic request for an ultrasound examination must originate from a physician or other appropriately licensed health care provider or under the provider's direction. The clinical information provided should allow for the performance and interpretation of the appropriate ultrasound examination and should be consistent with relevant legal and local health care facility requirements.

Specification of the Examination

The written or electronic request for scrotal ultrasound should provide sufficient information to

demonstrate the medical necessity of the examination and allow for the proper performance and interpretation of the examination.

Documentation that satisfies medical necessity includes 1) signs and symptoms and/or 2) relevant history (including known diagnoses). The provision of additional information regarding the specific reason for the examination or a provisional diagnosis would be helpful and may at times be needed to allow for the proper performance and interpretation of the examination.

The presence of two testes should be documented either on a single transverse, coronal, or coronal oblique image. A cine loop survey scan, taken in both longitudinal and transverse projections, may be obtained and stored with the rest of the study when technically feasible. The testes should be evaluated in at least two planes, longitudinal and transverse. Transverse images should be obtained in the superior, mid, and inferior portions of the testes. Longitudinal views should be obtained centrally as well as medially and laterally. Each testis should be evaluated in its entirety. Testicular volumes can be provided using the Lambert formula (length × width × height × 0.71).³¹ In cases of acute swelling or pain, the presence or absence of pain, by patient report, before beginning the scan should be noted. Some authors suggest that the asymptomatic side should be evaluated first and the symptomatic side afterward with the same/similar grayscale and Doppler settings.¹¹ The size, echogenicity, and blood flow of each testis and the epididymis should be compared with the contralateral side. Comparison of the right and left testes on both grayscale and color/power Doppler is best done with separate side by side views in a dual screen format. If a palpable abnormality is the indication for the sonogram, this area should be directly imaged.¹² In the event that a testis is not identified within the scrotum, the ipsilateral inguinal canal, inguinal rings, and pelvis should be scanned in an attempt to locate the testis.

Relevant intra-scrotal structures should be evaluated. The head, body, and tail of the epididymis should be evaluated when technically feasible. The spermatic cord and the supatesticular area should be evaluated if there is suspicion for testicular torsion.^{32,33} The scrotal wall, including the overlying skin, should be evaluated.