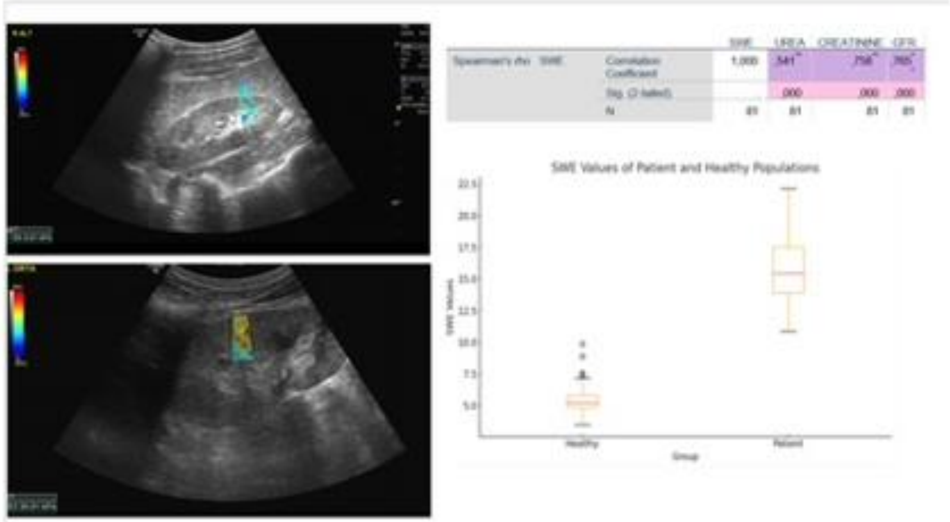
ULTRASOUND NEWS

June, 2025

Comparison of Shear Wave Elastography Measurements in Chronic Kidney Disease Patients and Healthy Volunteers

Sezer Kula, Nuray Haliloglu

Pages: 778-784 |
First Published: 20 February 2025

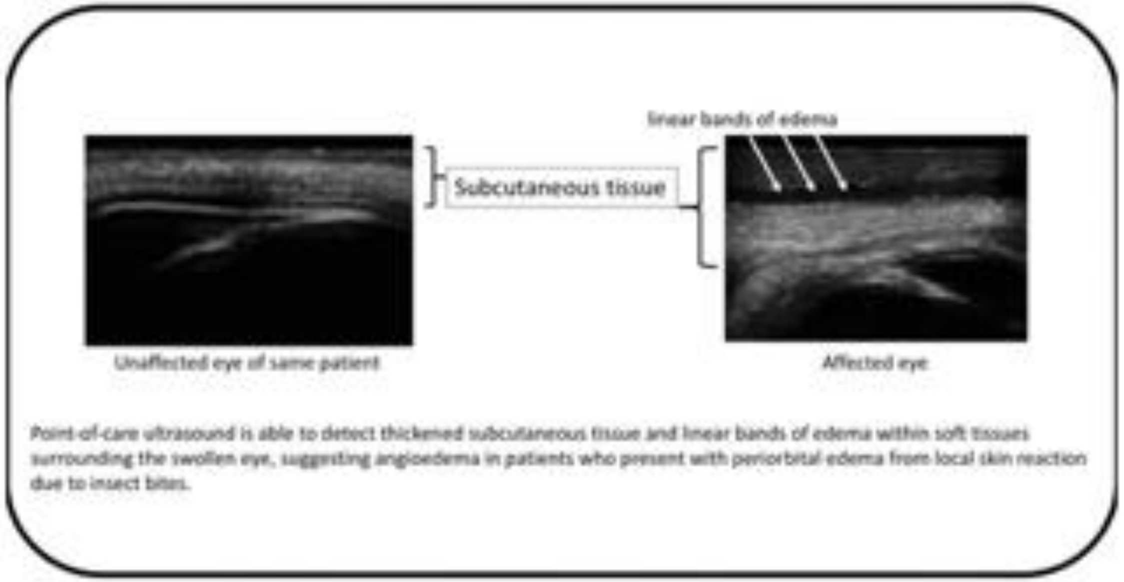


Our study found that renal parenchymal stiffness, as measured by 2D shear wave elastography (SWE), is significantly increased in patients with chronic kidney disease (CKD) and shows a strong positive correlation with serum urea and creatinine levels, and a negative correlation with glomerular filtration rate (GFR).

Differentiate Between Angioedema From Cellulitis in Pediatric Patients With Periorbital Swelling on Point-of-Care Ultrasound

Ee Tein Tay, James W. Tsung, Yue Jay Lin, Jennifer E. Sanders

Pages: 748-752 |
First Published: 16 February 2025

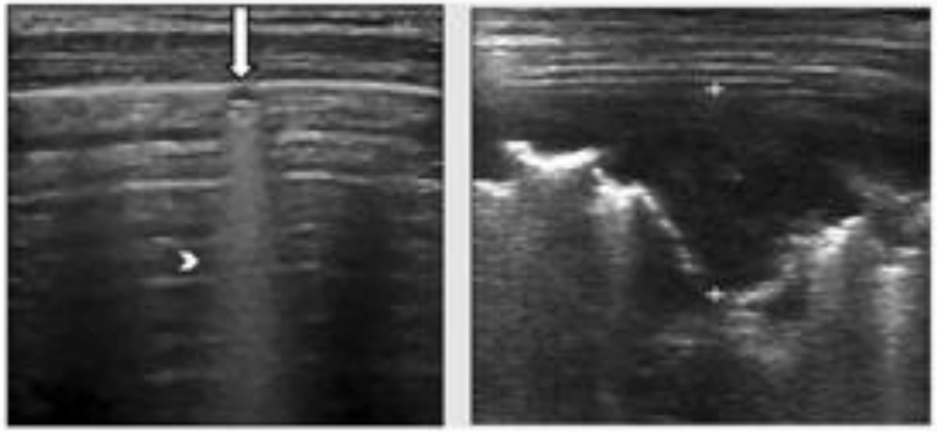


Linear bands of edema on point-of-care ultrasound in patients with periorbital swelling from insect bites and local angioedema.

Lung Ultrasound—A Supplementary Tool for the Diagnosis of Pulmonary Tuberculosis in Children

Vinita Rathi, Raveena Rawat, Sumit Kumar, Amol Srivastava, Anupama Tandon

Pages: 700-711 |
First Published: 31 January 2025

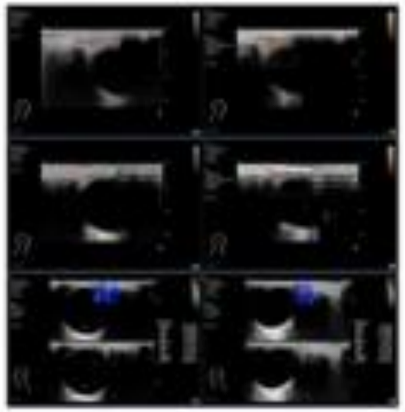


Lung ultrasound (LUS) appearances have not been studied in childhood pulmonary TB till date. We observed either consolidation and subpleural nodule in 96.7% children on LUS. Thus in endemic areas, LUS by virtue of being non-invasive and not using ionizing radiation, can be a useful supplementary tool in the diagnosis of PTB in children.

The Value of Lacrimal Gland Ultrasonography and Shear Wave Elastography in the Evaluation of Primary Sjögren's Syndrome: A Cross-Sectional Study

Wenxing Zhong, Hua Zhang, Haitao Ran

Pages: 685-694 |
First Published: 29 January 2025



Lacrimal gland ultrasonography (LGUS) and shear wave elastography (SWE) accurately diagnose primary Sjögren's syndrome (PSS) by evaluating lacrimal gland structure, perfusion, and tissue hardness; further research is needed for standardization. LGUS and SWE assess PSS activity and prognosis, correlating with european league against rheumatism sjögren's syndrome disease activity index (ESSDAI), hypergammaglobulinemia, and hypocomplementemia, guiding clinical management.

Med Ultrason 2025:0, 1-7 Online first
DOI: 10.11152/mu-4521

Is there a sonographer effect? Sonographer as a source of variability for Shear Wave Elastography

Elleen Kim[1], Ghada Issa[2], Alyssa Berube[3], Wendy J Smith[4], Alison B. Chambers[5], Erika D. Petrin[5], Michael D. Beland[2], Grayson L. Baird[2]

[1]Warren Alpert Medical School, Brown University, [2]Warren Alpert Medical School, Brown University, Department of Diagnostic Imaging at Warren Alpert Medical School, Brown University, [3]School of Medical Imaging, Brown University Health Hospital System, [4]Rhode Island Hospital, Department of Diagnostic Imaging, [5]Brown University Health Hospital System, Providence, USA

Abstract

Aims: This study aims to estimate the degree of sonographers as a source of systematic variance for Shear Wave Elastography (SWE) values. **Materials and methods:** Two studies estimated variance in SWE measurements: *1)* within-subjects and between-sonographer differences, and *2)* between-sonographer differences alone. Both used a block design with six trained sonographers scanning six healthy liver volunteers using the same machine. Following training, each sonographer obtained ten SWE measurements from the right liver lobe for each volunteer per manufacturer guidelines. **Results:** When patients were scanned on different days, intraclass correlation coefficient (ICC)=0.23 was achieved, and when scanned on the same day, ICC=0.83, indicating that 17% of the variability was due to differences between sonographers. This 17% inter-sonographer variability translated into statistical and potentially clinically significant differences between sonographers—one sonographer had a SWE value of (4.99) and another (5.43), $p<0.01$, almost passing a clinical threshold. **Conclusion:** SWE values are influenced by a sonographer effect, highlighting the need to standardize protocols to minimize systematic variability between sonographers. Multiple scans are justified for patients with SWE values near clinical thresholds. Since healthy volunteers exceeded the manufacturer-defined threshold, inherent variability between sonographers could challenge the reliability of clinical thresholds in practice.

Concerning our study results, when controlling for all factors (machines, probes, and liver volunteers in time), 17% of inter-observer variability was due to **sonographers**. The results indicate that this 17% was enough to constitute a .44 difference on average between two given sonographers.

The differences in scanning procedures reported by healthy liver volunteers may explain why SWE values varied among sonographers, but the reason these scanning procedures varied among sonographers in the first place is not clear. When sonographers were debriefed after the study, all reported receiving training from the manufacturer. However, there are nuances to the **protocol** that are likely not included in the training or the consensus guidelines. For example, some sonographers retain the **first 10 SWE values** they capture while others care fully review and select their SWE values, retaining some and resampling others. Some sonographers tend to keep the lowest measurements, or the measurements with the least variability. Another area of potential variability is **where the ROI is placed within the color box.** It is possible that these differences in sampling produced a selection bias that led to differences in SWE values for some liver volunteers but not others (i.e., poor sampling may be less sensitive to the day-to-day differences within liver volunteers; or contrariwise, better sampling may be more robust to day-to-day differences occurring in liver volunteers). That is, it is possible that by following strict protocols, along with multiple resamples throughout a day,

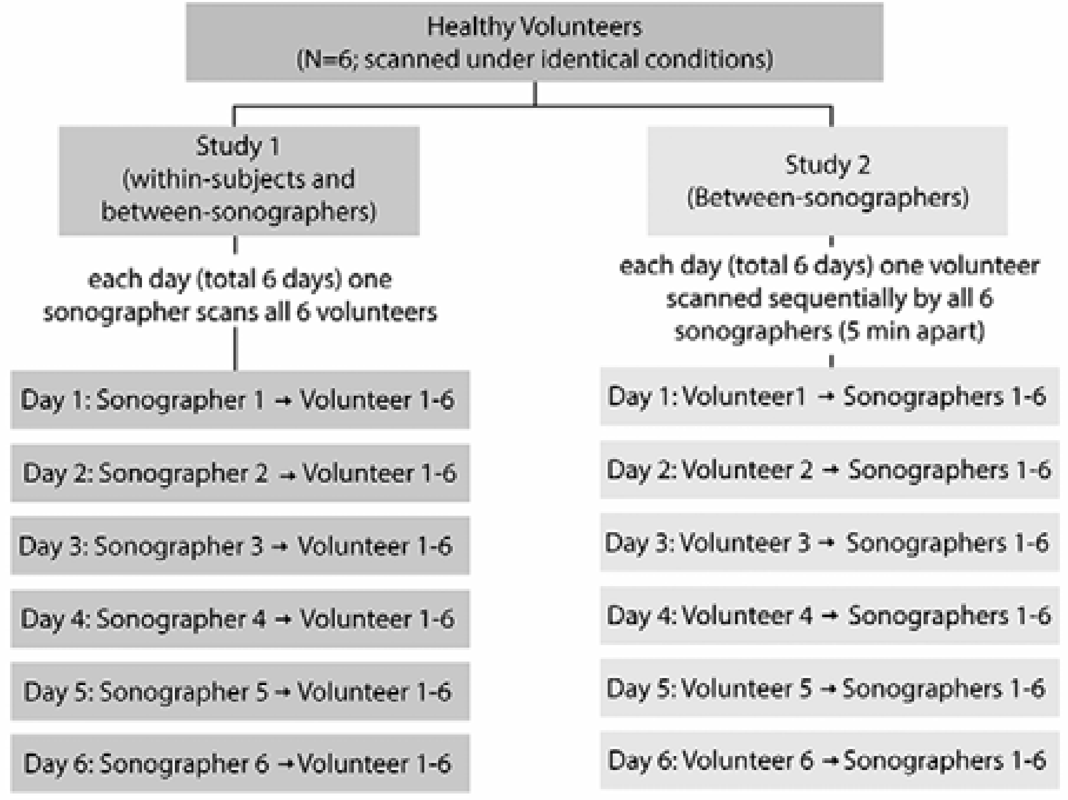


Fig 1. Study design. Two complementary experiments were conducted over six days to assess intra- and inter-sonographer variance in shear wave elastography measurements. In Study 1 (left panel), each day, one sonographer scanned all six volunteers. In Study 2 (right panel), each day, one volunteer was scanned sequentially by all six sonographers.

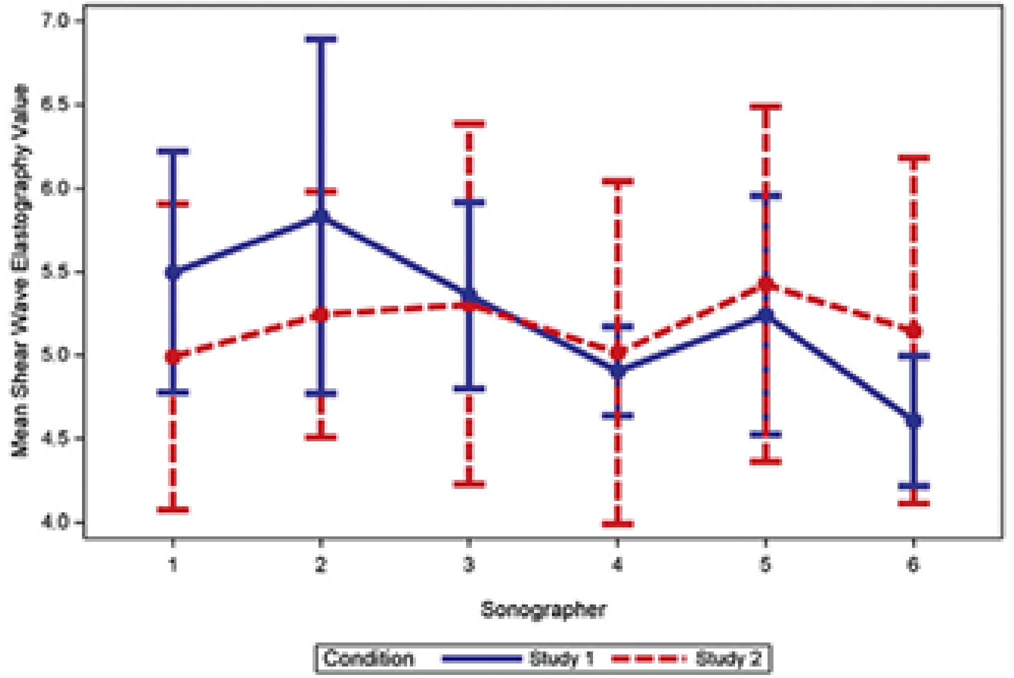


Fig 2. Variability between sonographers between Study 1 and Study 2. Study 1 (Blue) and Study 2 (Red) SWE results with 95% confidence intervals, by sonographer (X axis, 1-6) and SWE values (Y axis). Note that for sonographers 3, 4, and 5, smaller differences exist between the studies while large differences exist for sonographers 1, 2 and 6. Because all liver volunteers are the same, the means and confidence intervals should be approximately the same, by sonographer and by study.

Conclusion

In conclusion, **liver shear wave elastography (SWE) values are a function,** to some degree**, of the sonographers obtaining these values.** Caution should be used in interpreting SWE values, particularly when relying on strict thresholds for clinical decision making.

Ahead of print

Med Ultrason 2024:0, 1-11 Online first
DOI: 10.11152/mu-4439

How to perform Point of Care Ultrasound at resuscitation and when it is useful

Daniel Wastl[1], Michael Blaivas[2], Rudolf Horn[3], Guido Michels[4], Armin Seibel[5], Simone Schwarz[6], Beatrice Hoffmann[7], Oliver Hoffmann[7], Dieter von Ow[8], Christoph F Dietrich[8]

Abstract
Point of Care Ultrasound (POCUS) can be useful as a tool before, during and after the performance of cardiopulmonary resuscitation (CPR). Before or after resuscitation it can help with monitoring unstable hemodynamics, has the potential to identify reversible causes if patient deteriorates. During resuscitation POCUS can help detect potentially treatable causes of the cardiac arrest. Performance of POCUS while resuscitation requires experienced sonologists and a good team structure to embed the examination in advanced cardiovascular life support (ACLS) algorithms. This article gives an overview and tips about how to detect potential reversible causes of patient deterioration in all three phases of CPR. We describe some special situations in which resuscitation could take place. Further we give a comment about sonographic education of physicians and nonacademic medical staff.
Keywords: cardiopulmonary resuscitation; POCUS; hemodynamics, guideline; advanced cardiovascular life support

Table I. Some diagnoses and conditions related to symptoms of hypotension, hypoxia, altered mental status.

	Diagnoses and conditions
1	Acute coronary syndrome
2	Pulmonary embolism
3	Aortic syndrome with cardiac tamponade or rupture of abdominal aorta
4	Hypovolemia
5	Tension pneumothorax
6	Infections (with or without sepsis) (pneumonia, cholecystitis, uro-genital infections etc.)
7	Free abdominal or thoracic fluid after trauma or medical interventions

Fig 1. Sonographer and team leader directly right of patient of resuscitation. Sonographer is waiting for operation.

Table III. Use of ultrasound imaging during advanced life support (adapted from the ERC-Guidelines 2021)

General recommendations
Only trained operators should use intra-arrest point-of-care ultrasound (POCUS).
POCUS must not cause additional or prolonged interruptions in chest compression.
POCUS may be useful for diagnosing treatable causes of cardiac arrest such as cardiac tamponade and pneumothorax.
Right ventricular dilation in isolation during cardiac arrest should not be used to diagnose massive pulmonary embolism.
Do not use POCUS for assessing the contractility of the myocardium as a sole indicator for terminating CPR.

Table IV. Summary ERC and AHA recommendations to peri-arrest POCUS.

	AHA-recommendation	**ERC-recommendation**
Chest compression	Real-time audio-visual feedback	
Recharging automatic external defibrillator		Ongoing chest compression
Witnessed cardiac arrest		Three defibrillations in a row
Shockable cardiac arrest rhythms	1 mg adrenaline iv/io after 2nd shock	1 mg adrenaline iv/io after 3rd Shock
Intubation		The usage of a video laryngoscope, pausing chest compression max. 5 seconds
Reversible causes of cardiac arrest listed different		Using sonography if applicable and advanced life support can be continued

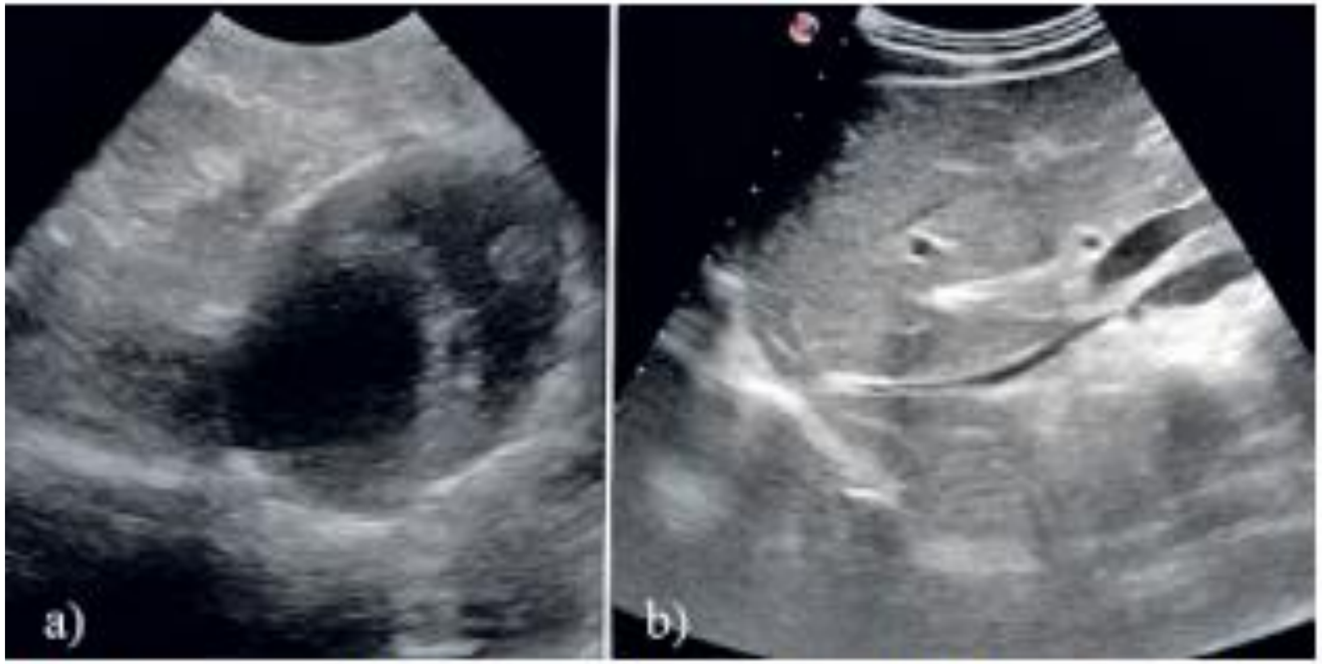


Fig 2. a) Abdominal aorta with dissection; b) Lack of volume. Collapsing V. cava.

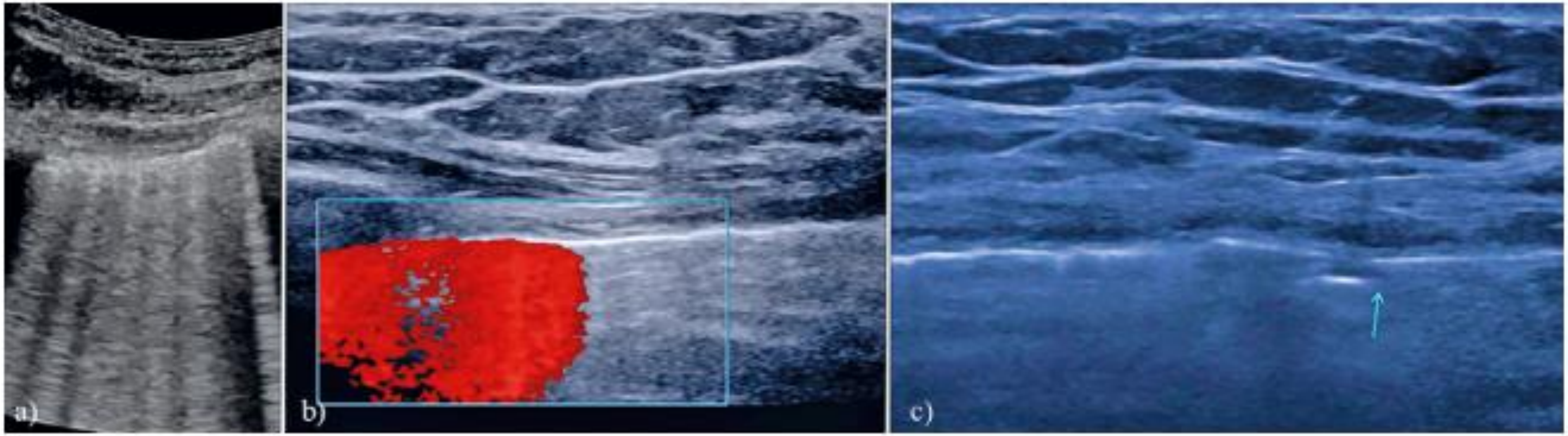


Fig 5. a) Reversible findings during resuscitation. Pulmonary edema in a nearly drowning patient. B-lines are shown [7,74]; b) Pneumothorax. Doppler ultrasound illustrates as well the gliding and non-gliding parts of the lung; c) Pneumothorax. Ultrasound does not reliably allow to differentiate between pneumothorax and tension pneumothorax [53,75,76]. The arrow shows the laceration of the lung surface, the most distinctive sign to identify the s-called lung point.

Med Ultrason 2024:0, 1-10 Online first
DOI: 10.11152/mu-4440

An [illustrative] update on pediatric emergency ultrasound: part 3 – cerebral, musculoskeletal and other applications

Simone Schwarz[1*], Yi Dong[2*], Peter J Snelling[3], Beatrice Hoffmann[4], Nasenien Nourkami-Tutdibi[5], Yun-Lin Huang[1], Sheng Chen[1], Andrius Cekuolis[6], Rasa Augustiniene[6], Dagmar Schreiber-Dietrich[7], Lara Grevelding[8], Christoph F Dietrich[9]

Abstract
Point-of-care ultrasound (POCUS) plays an essential role in pediatric emergency medicine by improving diagnostics and procedural safety. The role of POCUS in the care of pediatric patients in the emergency department has expanded considerably in recent years. Cranial and musculoskeletal imaging has significant potential, yet POCUS has also become a vital tool for common procedures, such as central and difficult peripheral intravenous access. The purpose of this article is to provide an overview of pediatric POCUS applications for cranial, small parts (head, eyes, nose, throat, and soft tissue), musculoskeletal, and common procedural applications, forming the third part of the series.
Keywords: emergency; point-of-care ultrasound (POCUS); pediatric; cranial; small parts

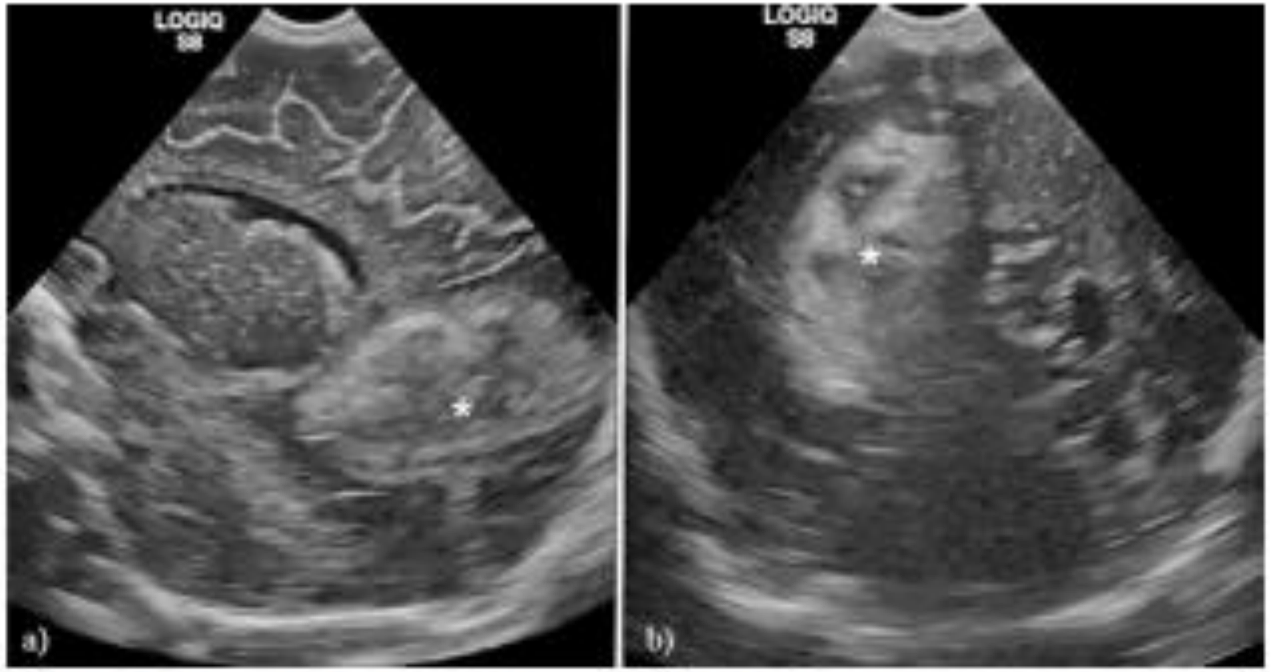


Fig 2. Parenchymal parietooccipital hemorrhage (*) in a newborn. Sonographic images of a parasagittal section through the anterior fontanel (a) and coronal section through the posterior fontanel (b).

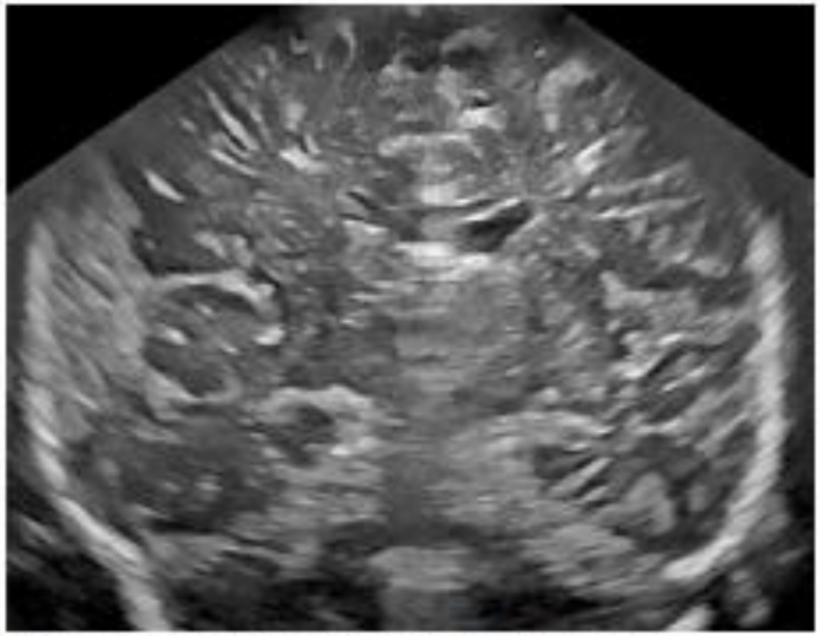


Fig 4. Small right parietotemporal epidural hematoma.

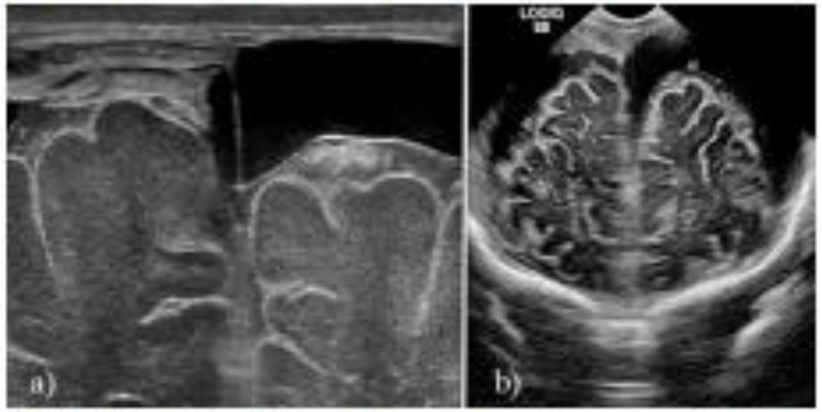


Fig 5. Infant with shaken baby syndrome. Imaging of subdural and subarachnoid hematoma and hygroma frontally using (a) a high-resolution linear probe and (b) a mini-curved array transducer.

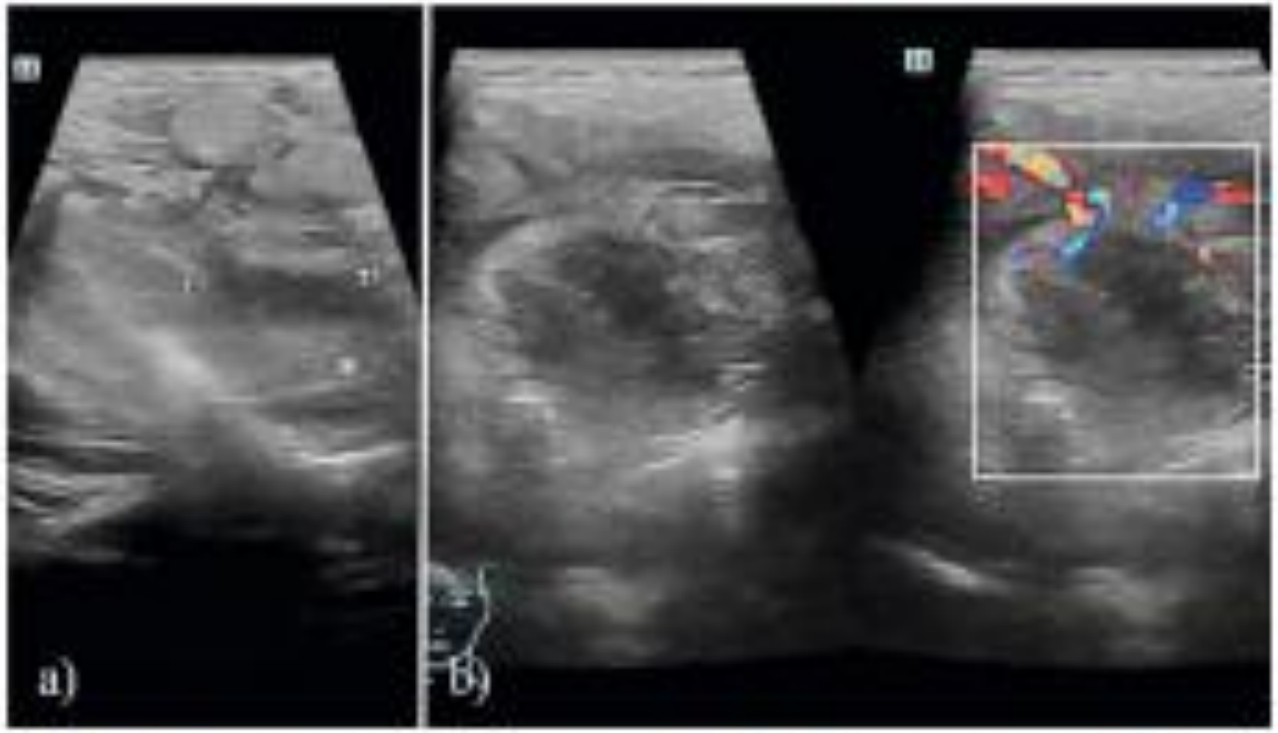


Fig 6. Ultrasound image: Deep neck abscesses in children. a Fluid collection deep in the neck para tonsiliary (a). Right para tonsiliar abscess in a 17-year-old girl (b).

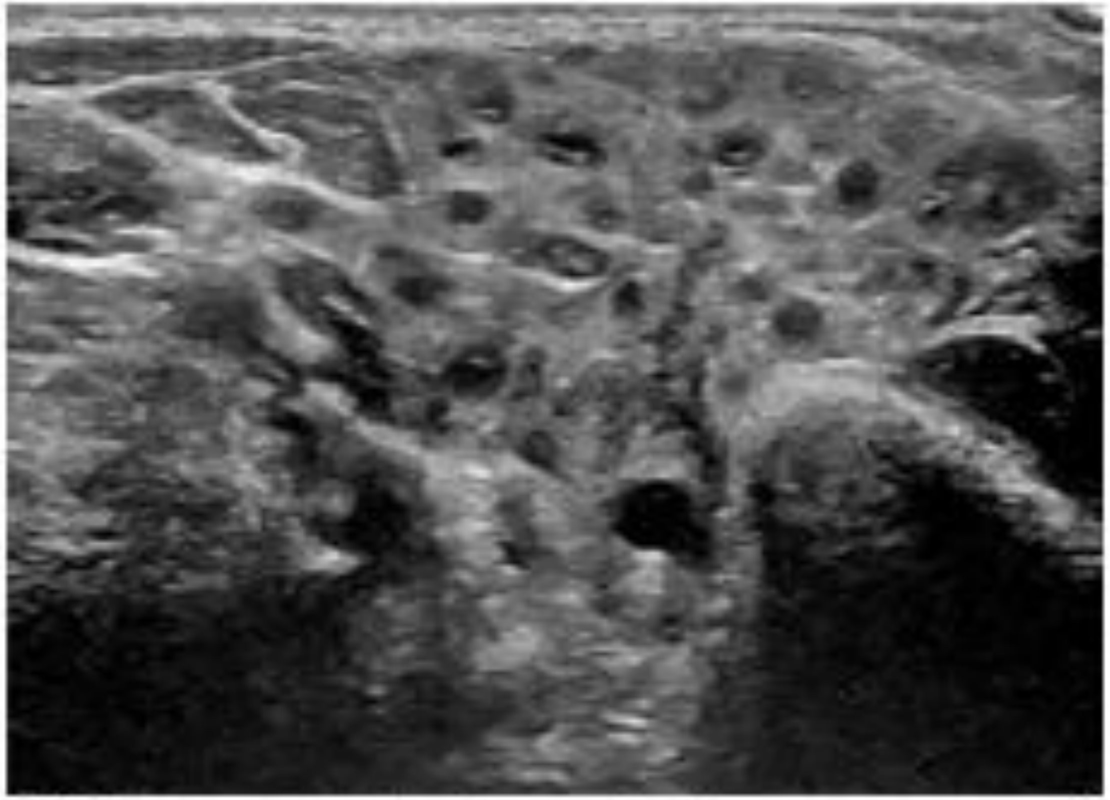


Fig 7. Acute parotitis in a 6-year-old girl.

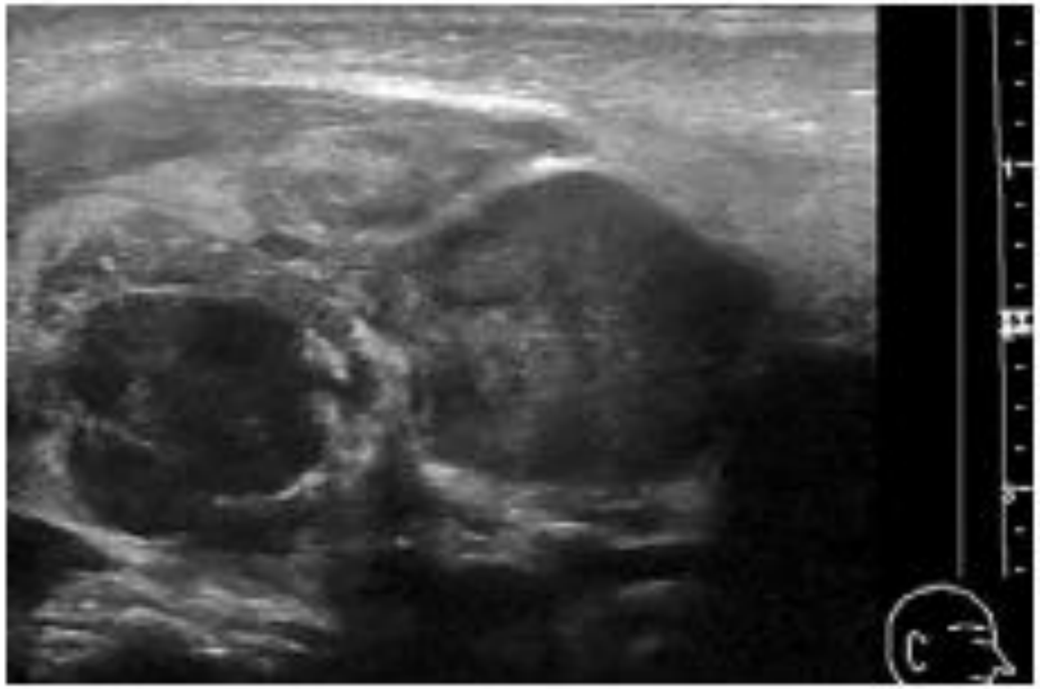


Fig 8. Lymph node abscess in a 1-year-old boy.

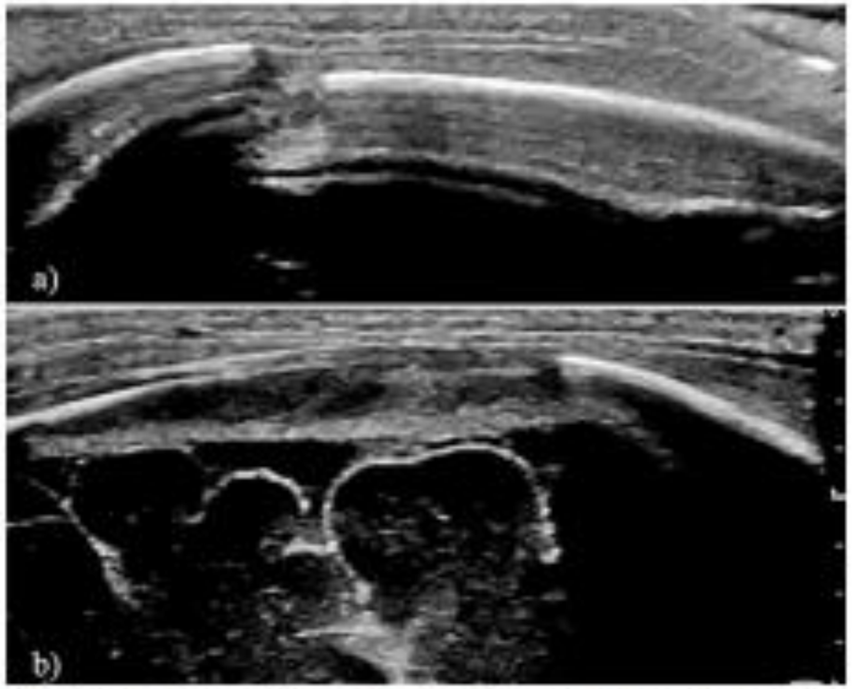


Fig 9. Ultrasound images of traumatic skull fracture (a) with small epidural hematoma in a 4-week-old infant (b).

Review

Med Ultrason 2025, Vol. 27, no. 1, 63-72
DOI: 10.11152/mu-4414

An [illustrative] update on pediatric emergency medicine ultrasound: part 2 – abdominal and urogenital applications

Yi Dong[1], Beatrice Hoffmann[2], Simone Schwarz[3], Nasenien Nourkami-Tutdibi[4], Yun-Lin Huang[1], Sheng Chen[1], Andrius Cekuolis[5], Rasa Augustiniene[5], Peter J Snelling[6], Dagmar Schreiber-Dietrich[7], Lara Grevelding[8], Christoph F Dietrich[9]

Abstract
Emergency ultrasound, or point-of-care ultrasound (POCUS), has been established into daily patient care over the last decades. The use of abdominal and pelvic ultrasound in clinical practice has the potential to improve the efficiency and safety of pediatric emergency care. This article will provide a review of current applications of pediatric emergency abdominal and urogenital ultrasound, forming the second part of the series. Keywords: pediatric emergency; acute abdomen; point of care; ultrasound

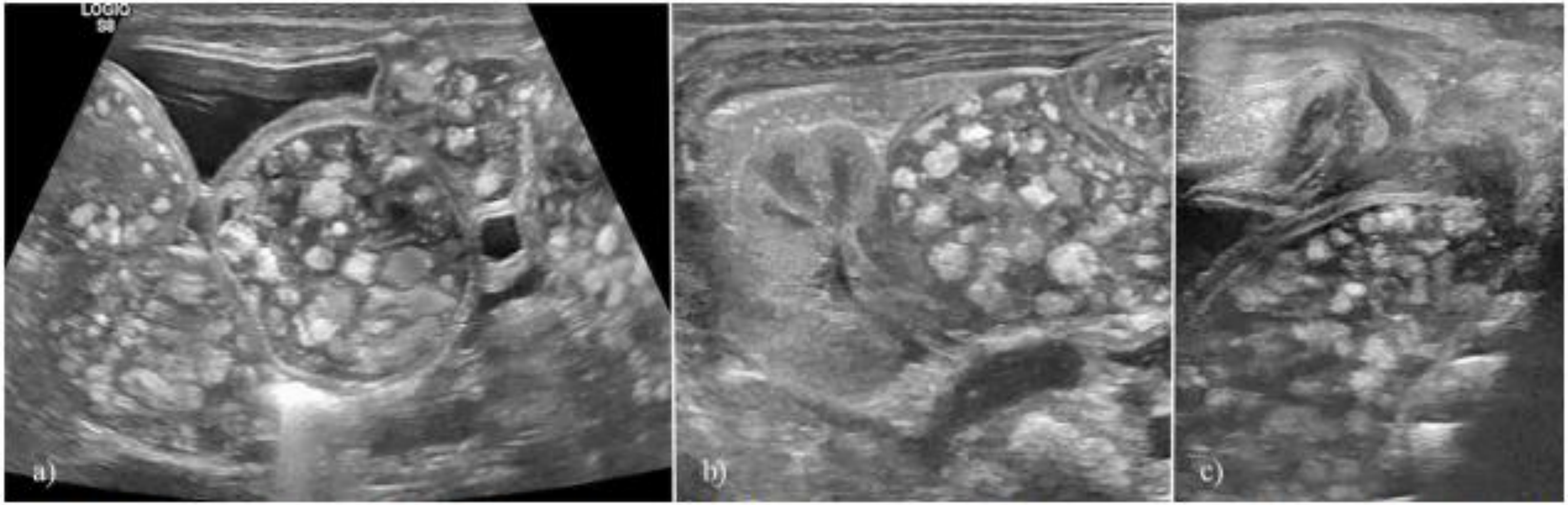


Fig 2. Anal atresia in a newborn infant. Images of severely dilated colonic loops with compression of the urinary bladder and left ureter (a), kidney (b), from the abdominal and rectal blind sac (c) visualized from a perineal window.

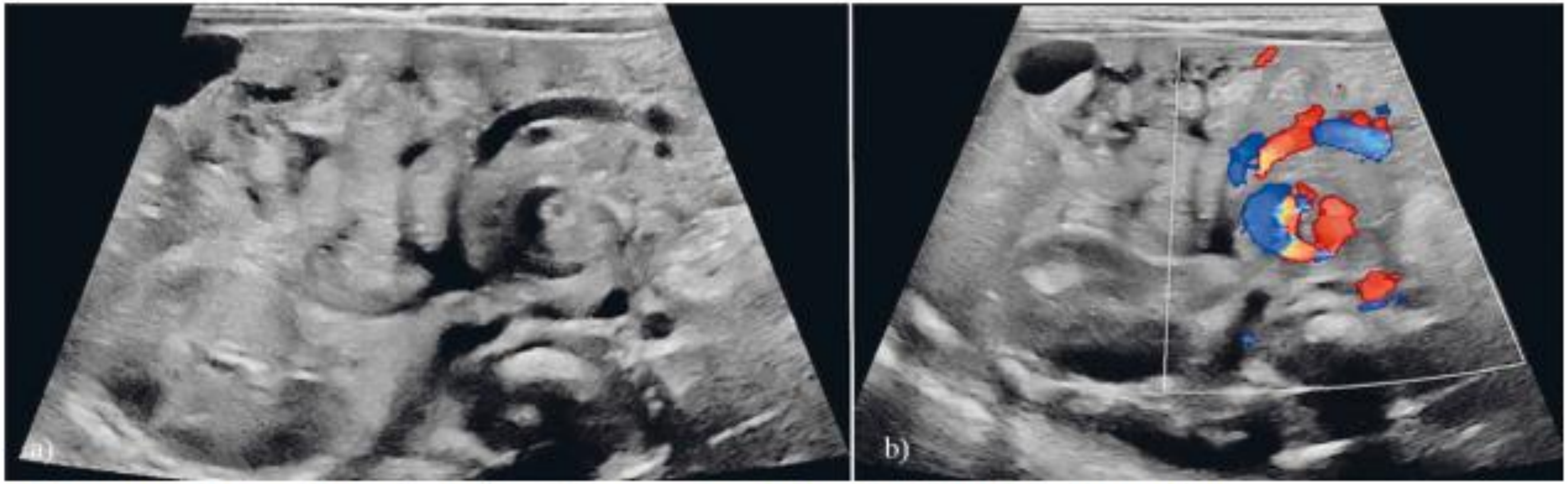


Fig 3. B-mode ultrasound (a) and color flow (b) images of a volvulus with whirlpool sign in a newborn.

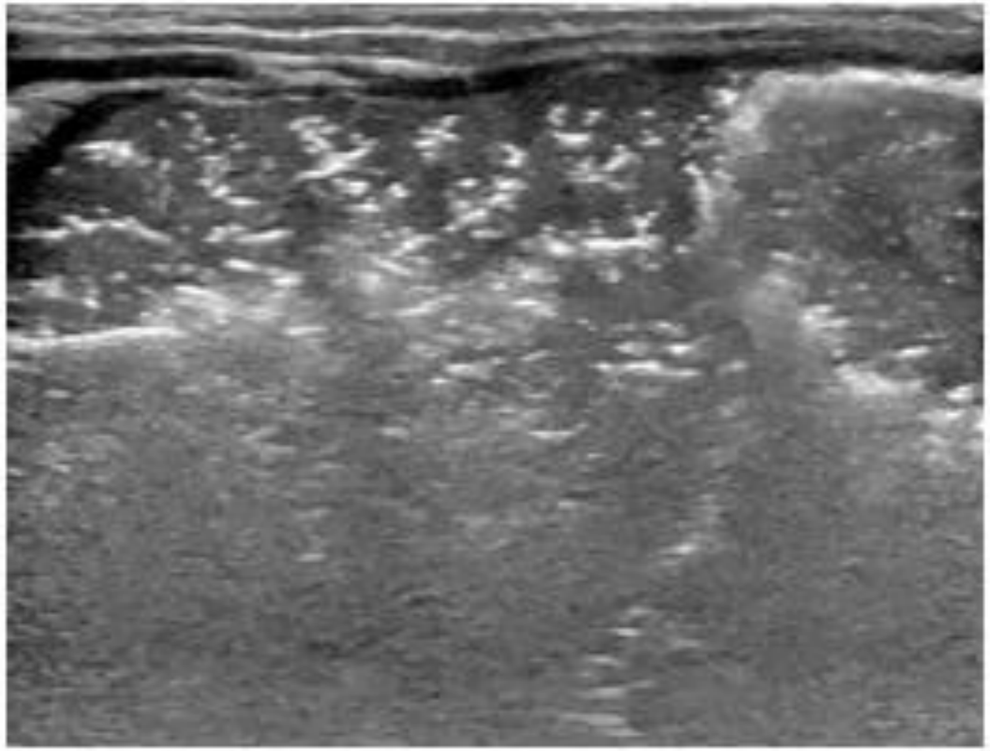


Fig 7. Pneumatosis hepatis and intestinalis in a premature infant with necrotizing enterocolitis. Gas appears as hyperechogenic punctate or tubular structures ith dirty shadowing in the small vessels of the portal system and intestinal wall.

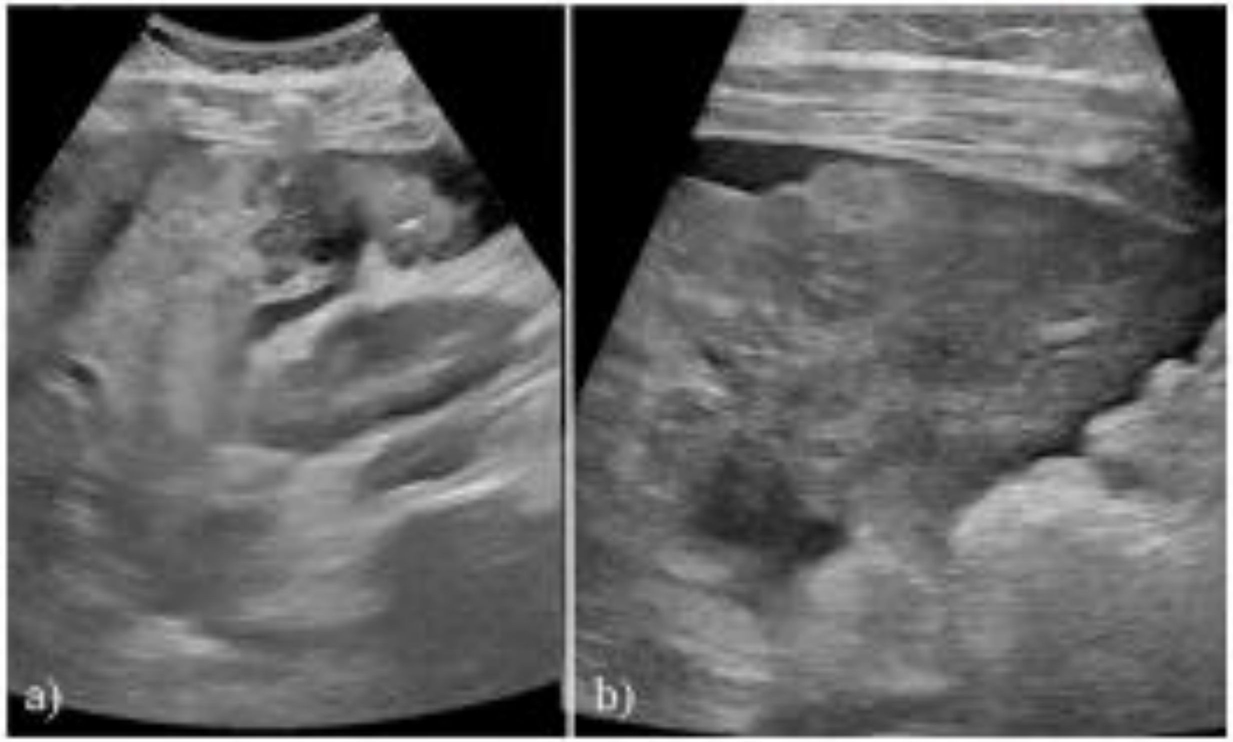


Fig 10. Liver rupture in a 7-year-old girl after being kicked by a horse. B-mode ultrasound with a curved array probe (a) and a high-frequency linear probe (b) in a lateral longitudinal plane.

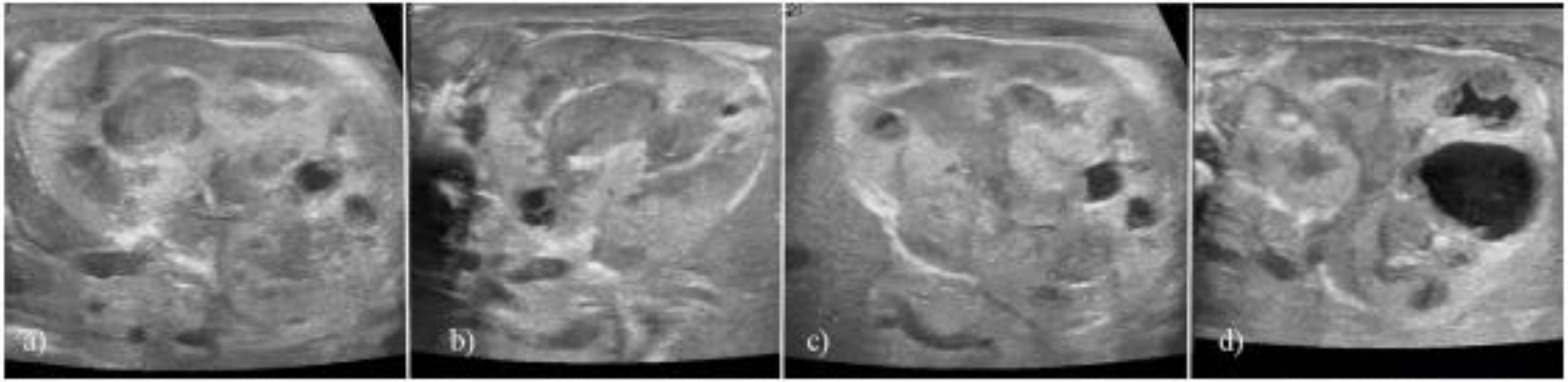


Fig 13. Xanthogranulomatous nephritis caused by Candida species. (a) Inhomogeneous renal parenchyma with abolished medullary rib differentiation and (b) irregularly circumscribed cysts. The renal pelvic caliceal system is shown partially cystically dilated (c), and partially filled with solid material (d).

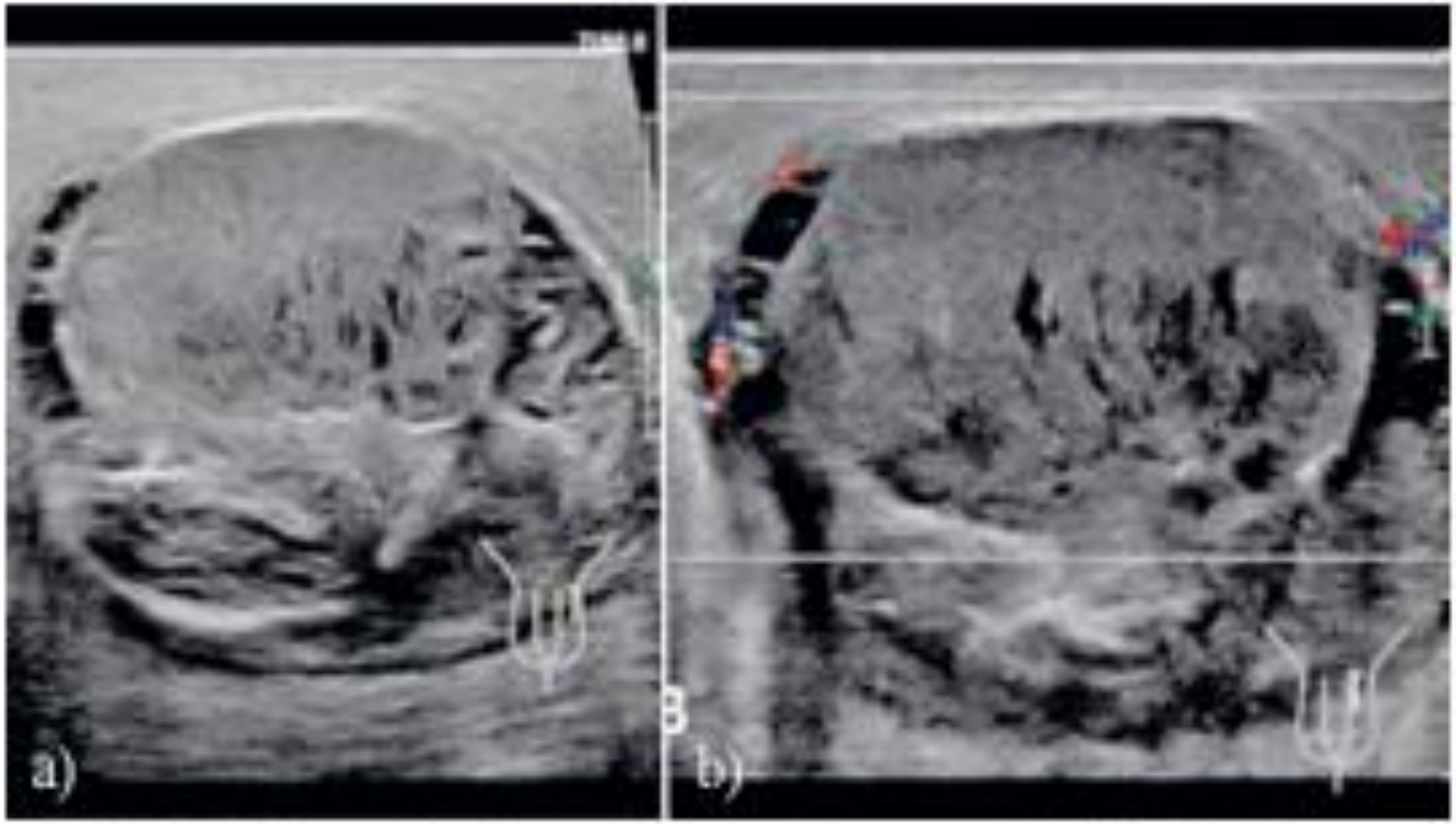


Fig 15. Right testicular torsion in a 13-year-old child. (a) B-mode ultrasound image and (b) color Doppler image with lack of flow.