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REVIEW ARTICLE



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Ultrasonographic Features and Diagnostic Challenges of Hepatic Tuberculosis: Insights from Taiwan and Southeast Asia

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This review focuses on the ultrasonographic features of hepatic and hepatobiliary TB, with reference to the epidemiologic data from Southeast Asia and Taiwan. Ultrasonography remains the most commonly used first-line imaging modality and typically demonstrates five morphologic patterns: nodular, abscess-like, infiltrative or diffuse, biliary, and miliary. However, none of these patterns are specific and substantial overlap exists with malignant and inflammatory hepatic conditions. Awareness of these sonographic patterns, in conjunction with clinical context and risk factors, is therefore essential for raising the suspicion of HTB. Given the limitations of imaging alone, definitive diagnosis requires histopathologic confirmation and microbiologic or molecular testing. For ultrasound practitioners, early recognition of atypical or malignancy-like hepatic lesions and timely recommendation for liver biopsy play a pivotal role in reducing diagnostic delay. Improved awareness of HTB among clinicians and radiologists, particularly in regions affected by population mobility from TB-endemic areas, may facilitate earlier diagnosis and more appropriate management.

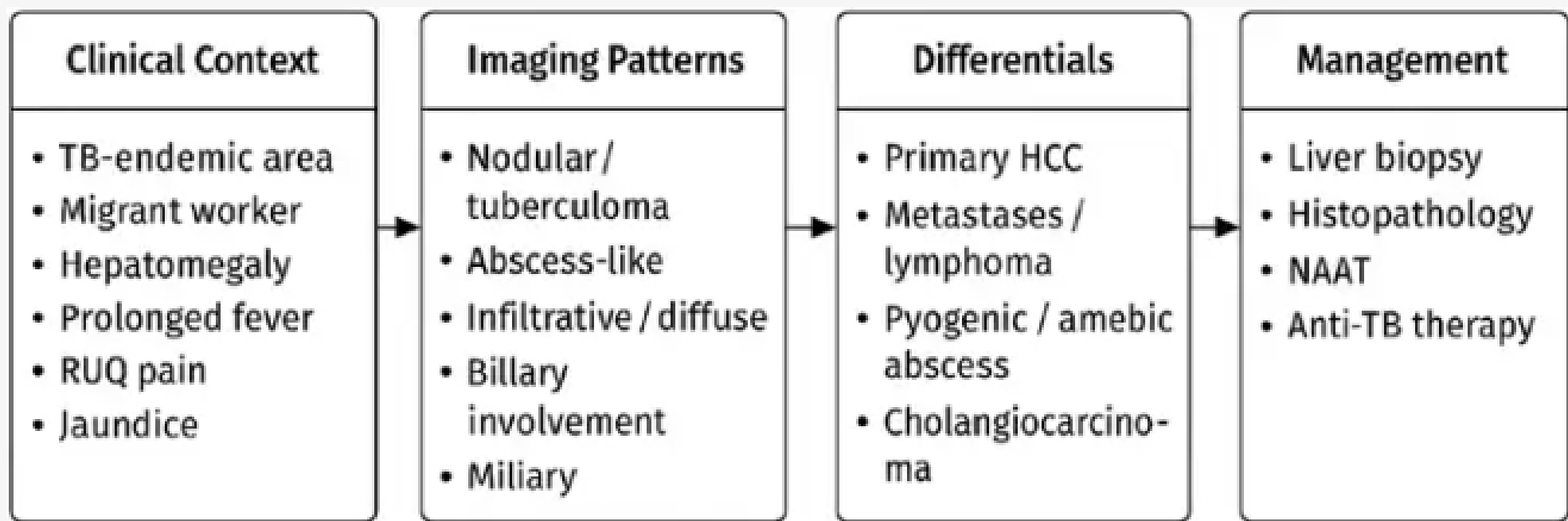


Figure 2 General diagnostic workflow for hepatobiliary tuberculosis, integrating clinical context, imaging patterns, differentials, and management principles

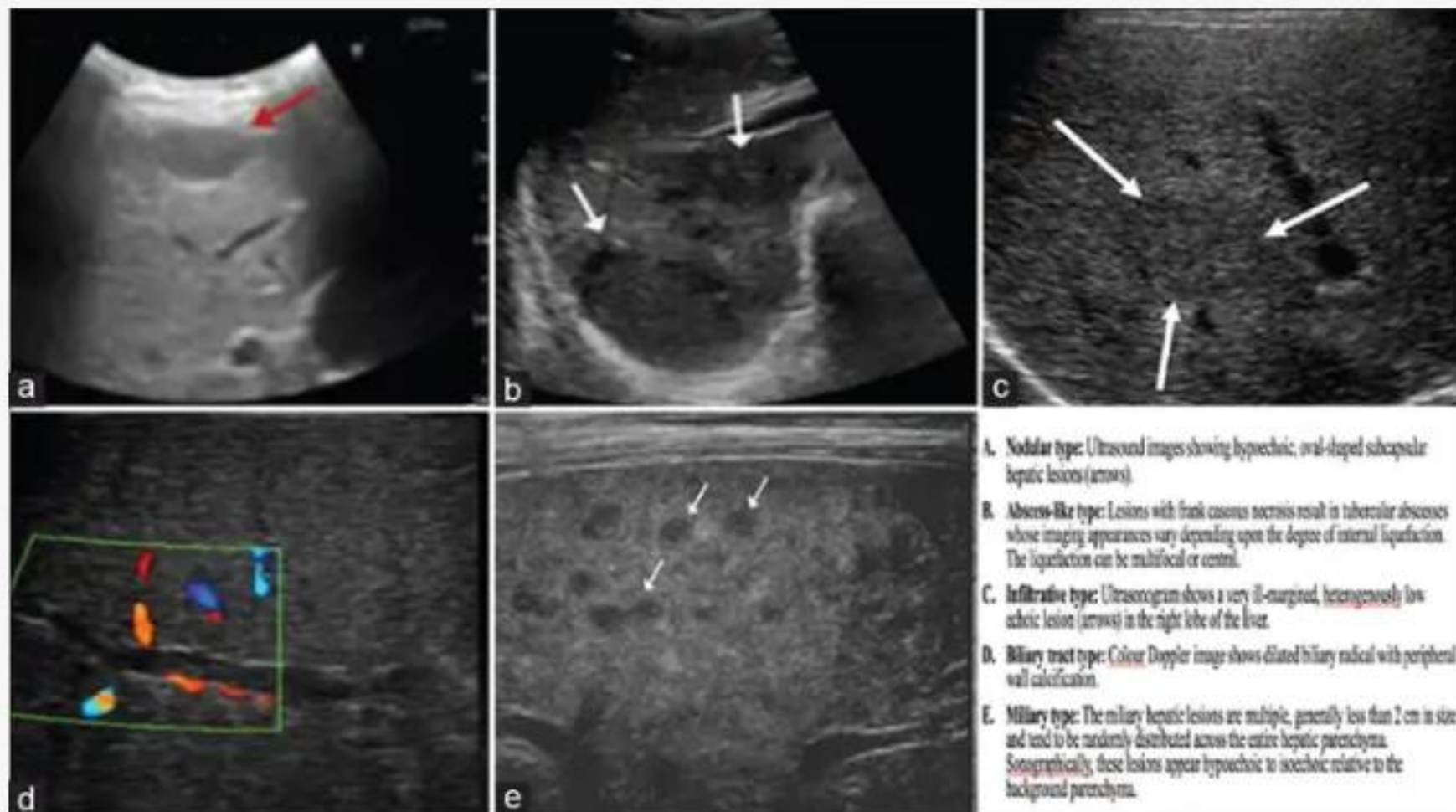


Figure 1 Representative ultrasonographic appearances of hepatic tuberculosis showing five morphologic patterns: (a) nodular (tuberculoma), (b) abscess-like lesion, (c) infiltrative/diffuse pattern, (d) biliary involvement, and (e) miliary pattern. Adapted from da Rocha *et al.*^[17] and Kakkar *et al.*^[20], with modifications

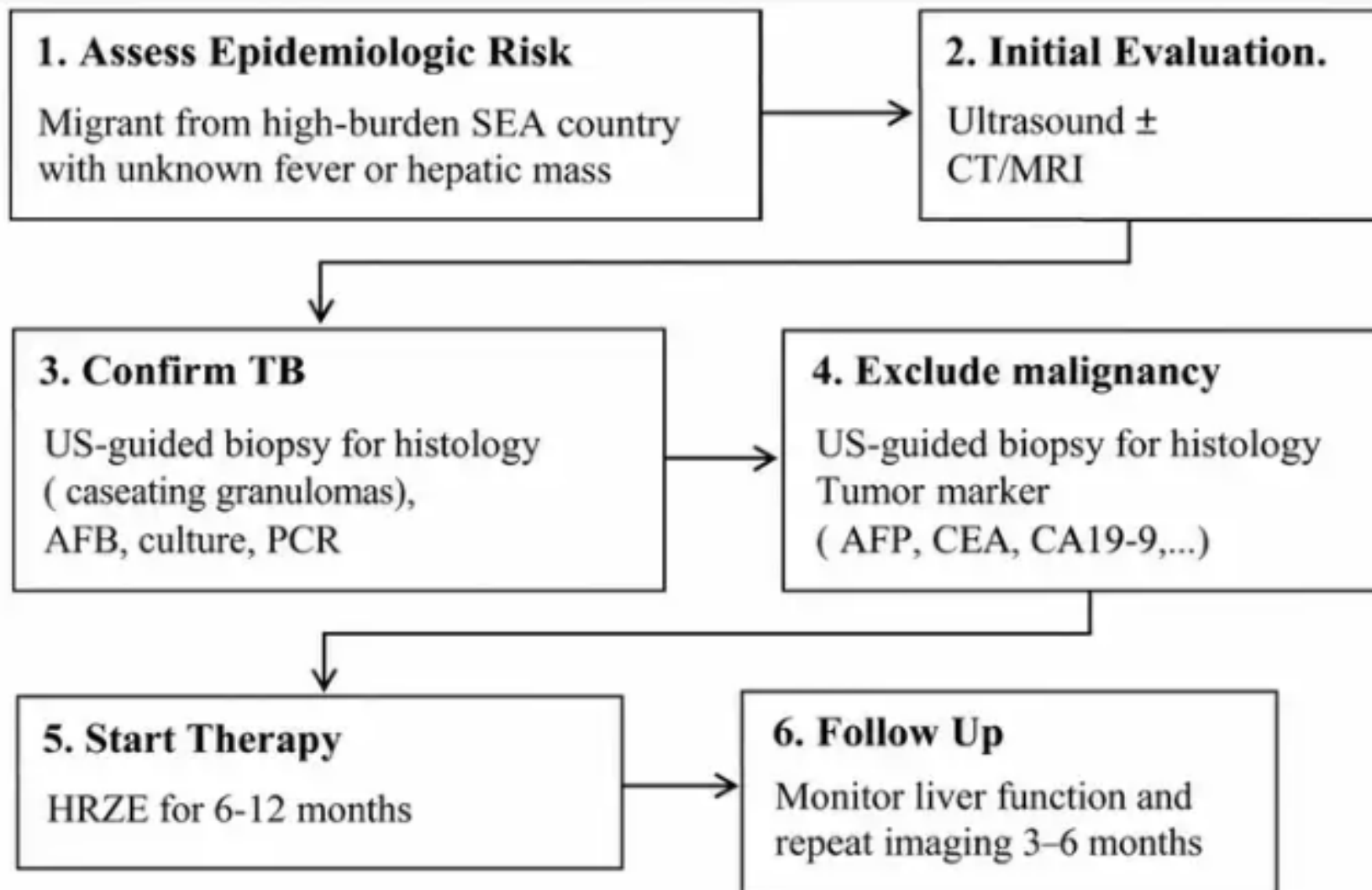


Figure 3 Simplified diagnostic framework tailored for migrant populations at risk of extrapulmonary tuberculosis. HRZE: isoniazid, rifampicin, pyrazinamide, and ethambutol

Aspect	Taiwan	High-burden SEA countries (e.g., Indonesia, Vietnam, Philippines)
Preentry screening	Mandatory CXR and symptom check before entry	Variable, often limited to CXR
Postarrival screening	CXR within 3 days; follow-up at 6, 18, and 30 months	Irregular or absent
Extrapulmonary TB screening	Not included in migrant health checks	Rarely included
Molecular diagnostic access	Widely available in tertiary hospitals	Limited to reference centers
Policy framework	Joint oversight by Ministry of Labor and TCDC	Fragmented public–private responsibility
Health education	Multilingual TB awareness materials provided	Language and literacy barriers remain significant
Regional coordination	Data sharing through Western Pacific TB initiatives	Developing surveillance networks

TB: Tuberculosis, CXR: Chest X-ray, TCDC: Taiwan Centers for Disease Control, SEA: Southeast Asia

Pattern	Key ultrasonographic signs	Main differentials
Nodular/ tuberculoma	Solid hypoechoic nodules, sometimes with central necrosis or calcification	Metastases, HCC, lymphoma
Abscess-like	Complex cystic lesions with internal echoes or septations	Pyogenic abscess, amoebic abscess, necrotic metastasis
Infiltrative/ diffuse	Ill-defined hypoechoic areas, heterogeneous parenchyma	Diffuse HCC, lymphoma, steatohepatitis
Biliary involvement	Ductal wall thickening, irregular strictures, intrahepatic duct dilatation	Cholangiocarcinoma, IgG4-related cholangitis
Miliary	Numerous tiny (<5 mm) hypoechoic nodules producing a “starry-sky” appearance	Miliary metastases, fungal microabscesses

HCC: Hepatocellular carcinoma, IgG4: Immunoglobulin G4

Thyroid Nodule Size is Not a Predictor of Malignancy: A Focus on Fine-needle Aspiration Cytology Findings

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Abstract

Background: This study aimed to evaluate the relationship between thyroid nodule size and various factors and malignancy risk, using fine-needle aspiration cytology (FNAC) as the diagnostic standard. **Methods:** A retrospective analysis was conducted on 760 patients with 850 thyroid nodules who underwent ultrasound (US) and US-guided FNAC from June 2023 to July 2024. Nodules were assessed using the ACR-Thyroid Imaging Reporting and Data Systems (TIRADS) classification and classified cytologically according to the 2017 Bethesda System. Statistical analyses included logistic regression to evaluate the association between variables and malignancy risk. **Results:** Malignant nodules were predominantly observed in TIRADS category 5 (72.7%), while benign nodules were more frequent in categories 3 and 4. Higher TIRADS scores were significantly associated with malignancy, each unit increase in score was associated with a 5.86 – fold increase in odds ($P = 0.0001$). Malignancies were more common in younger patients, with risk decreasing by 2% per additional year of age ($P = 0.028$). Nodule size was not an independent predictor of malignancy. **Conclusion:** TIRADS is an effective tool for predicting thyroid malignancy and stratifying risk, aiding clinical decision-making. Younger age is a significant risk factor, while nodule size alone should not be used as a predictor of malignancy.

Keywords: Fine-needle aspiration cytology, malignancy risk, thyroid imaging reporting and data systems, thyroid nodule size

Table 1: The demographic information of patients with thyroid nodules

Characteristics	Summary statistics
Number of patients	760
Number of nodules	850
Age (years), mean±SD (range)	47.82±14.09 (15–91)
Female, <i>n</i> (%)	560 (73.7)
Nodule position, <i>n</i> (%)	
Left	328 (43.2)
Isthmus	39 (5.1)
Right	393 (51.7)
Mean largest nodule diameter (mm), mean±SD (range)	16.25±12.03 (2–70)
FT4 (ng/dL), mean±SD (range)	1.31±0.40
TSH (mIU/ml), mean±SD (range)	1.74±3.88

TSH: Thyroid-stimulating hormone, FT4: Free thyroxine, SD: Standard deviation

Table 2: Distribution of cytological results according to thyroid imaging reporting and data systems risk levels

Cytology	Lesion number in cytology	TIRADS					<i>P</i>
		I	II	III	IV	V	
Benign	371 (43.6)	3 (0.8)	51 (13.8)	128 (34.7)	159 (43.1)	28 (7.6)	0.0001
Suspicious for malignancy	94 (12.4)	0	1 (1.0)	4 (3.8)	53 (51.0)	46 (44.2)	
Malignant	11 (1.4)	0	0	2 (18.2)	1 (9.1)	8 (72.7)	
Indeterminate	36 (4.2)	1 (2.8)	0	5 (13.9)	19 (52.8)	11 (30.6)	
Follicular neoplasm	90 (11.8)	0	2 (2.0)	13 (13.3)	65 (66.3)	18 (18.4)	
Inadequate	229 (26.9)	12 (5.2)	16 (7.0)	66 (28.8)	111 (48.5)	24 (10.5)	

TIRADS: Thyroid imaging reporting and data systems


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ORIGINAL ARTICLE



Assessment of Renal Cortical Stiffness in Diabetes Mellitus by Shear Wave Elastography Ultrasound

Heba Ahmed Mostafa^{*}, Arwa Arafa Hussein Ali, Osama Lamay Nakhla[Authors and Affiliations >](#)*Journal of Medical Ultrasound* 34(3):p 357-364, Jul-Sep 2026. | DOI: 10.4103/jmu.JMU-D-25-00052 ©

Abstract

Background: Diabetic kidney disease (DKD) is a major complication of diabetes and a leading cause of end-stage kidney disease. Renal fibrosis worsens the prognosis of DKD. While biopsy is the gold standard for assessing fibrosis, noninvasive alternatives like elastography – which measures tissue stiffness – are promising. This study aimed to evaluate renal cortical stiffness in patients with diabetes using shear wave elastography (SWE) and assess its diagnostic value compared to conventional ultrasound. **Methods:** A case–control study was conducted at Beni Suef University Hospital between October 2023 and April 2024, including 30 patients with diabetes and 30 age- and sex-matched healthy controls. Participants underwent clinical evaluation, laboratory tests (including hemoglobin A1C [HbA1c], serum creatinine, albumin/creatinine ratio), and renal ultrasound with SWE. SWE measurements were taken from both kidneys, and mean stiffness values were calculated. Statistical analysis included *t*-tests, receiver operating characteristic (ROC) curve analysis, and correlation assessments. **Results:** Conventional ultrasound parameters showed no significant differences between cases and controls. However, SWE values were significantly higher in patients with diabetes (mean SWE: 12.90 ± 1.23 kPa) compared to controls (9.71 ± 0.88 kPa, $P < 0.001$). ROC analysis revealed excellent diagnostic accuracy for mean SWE (area under the curve = 0.998), with 96.67% sensitivity and 100% specificity at a cut-off of 10.95 kPa. SWE values strongly correlated with diabetes duration, HbA1c, fasting glucose, creatinine, and albumin/creatinine ratio ($P < 0.001$). **Conclusion:** SWE is a highly sensitive, noninvasive tool for detecting early renal changes in patients with diabetes, with superior diagnostic performance to conventional ultrasound.

CONCLUSION

This study elucidated the utility of SWE as a noninvasive and highly sensitive assessment method for renal cortical stiffness in DKD. Our data established a strong correlation of SWE values with key markers of renal pathology, such as disease duration, glycemic markers, as well as biomarkers like serum creatinine and albuminuria, emphasizing that SWE outperformed traditional ultrasound parameters. The ability of SWE to accurately differentiate diabetic from nondiabetic kidneys, with astonishing sensitivity and specificity, emphasizes its diagnostic reliability and clinical utility. Although multiple studies corroborated our findings, variations in cutoff values highlight the influence of population demographics, sample sizes, and methodological differences on SWE performance, meriting larger cohorts to validate the reproducibility of SWE as a technique in the diagnosis as well as the risk stratification of DKD, aiming to establish a standardized procedure for routine clinical use.

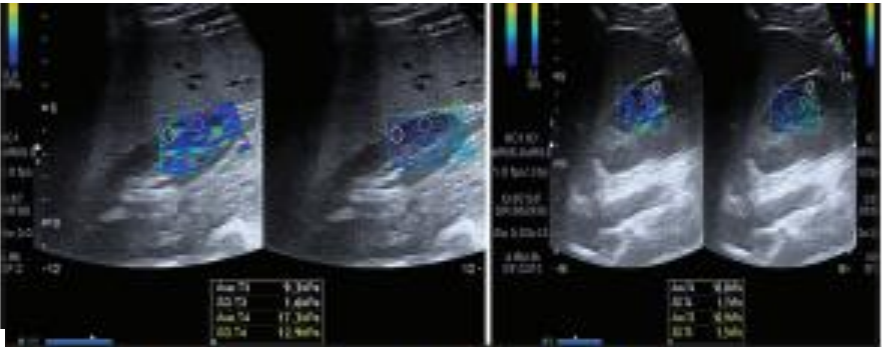


Figure 2: Shear wave elastography images of control 1

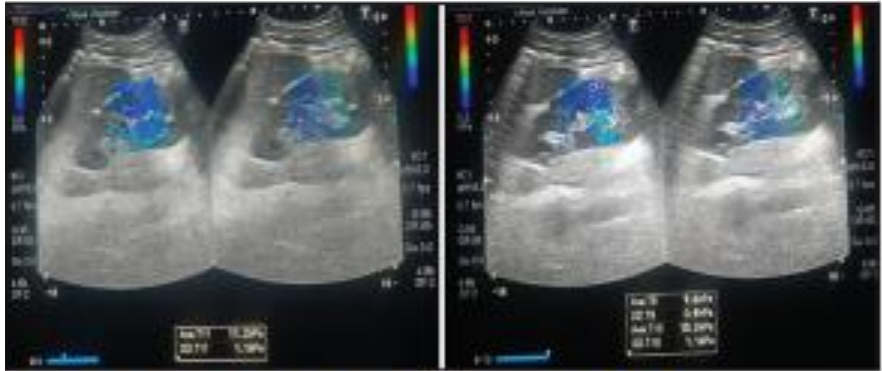


Figure 4: Shear wave elastography images of control 2

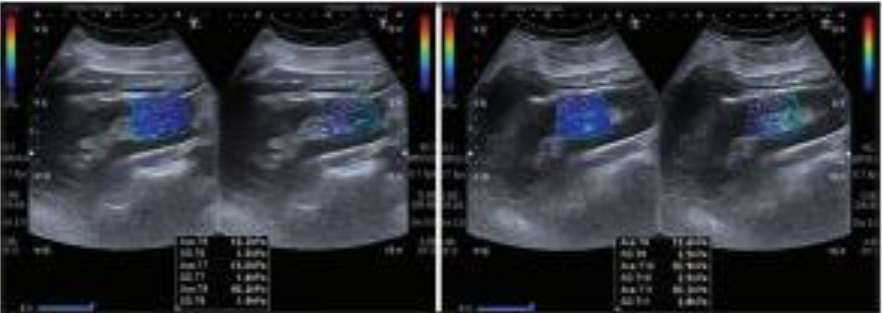


Figure 6: Shear wave elastography images of case 1

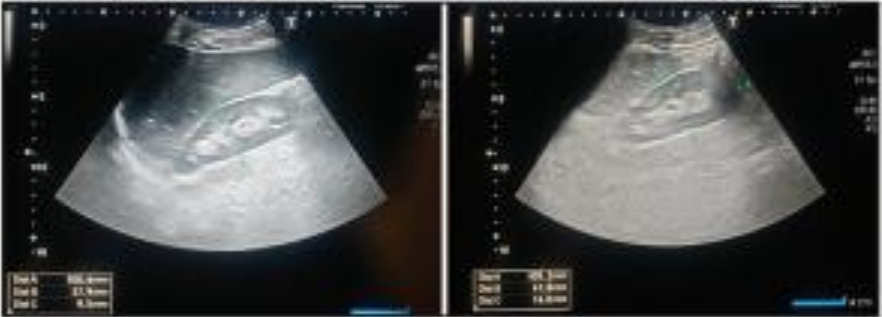


Figure 3: Ultrasound images of control 2



Figure 5: Ultrasound images of case 1

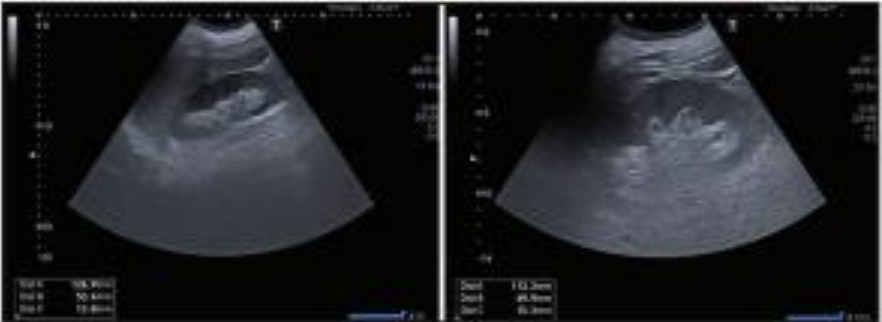


Figure 7: Ultrasound images of case 2

Trả lời bình luận về bài viết “Vai trò của siêu âm trong chẩn đoán viêm ruột thừa mãn tính: Một nghiên cứu quan sát trên 400 trường hợp”

Manohar Baburao Kachare^{1 *}, Zaid Peerpasha Inamdar¹, Sanjay B. Kulkarni², Shabbirahmed Y. Shaikh³

Tác giả và đơn vị công tác >

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Chúng tôi đồng ý rằng chụp cắt lớp vi tính (CT) nói chung có độ nhạy cao hơn so với siêu âm trong việc hình dung ruột thừa. Tuy nhiên, các đặc điểm CT của viêm ruột thừa mãn tính được mô tả bởi Rao *et al* . CT có các dấu hiệu như thâm nhiễm mỡ ở mô quanh manh tràng, giãn ruột thừa, sỏi phân vôi hóa và hạch mạc treo phì đại, tương tự như những dấu hiệu thấy trong viêm ruột thừa cấp tính, do đó không thể phân biệt chính xác giữa viêm ruột thừa cấp tính và mãn tính. Trong khi đó, siêu âm có độ phân giải không gian cao hơn so với chụp CT. Vì vậy, siêu âm giúp xác định các đặc điểm của viêm mãn tính, chẳng hạn như sự bất thường của lòng ruột thừa và mất cấu trúc lớp thành ruột thừa, đặc trưng cho viêm ruột thừa mãn tính. Hơn nữa, sự hiện diện của sỏi phân không vôi hóa, yếu tố gây ra viêm ruột thừa mãn tính, có thể được nhìn thấy trên siêu âm, nhưng có thể bị bỏ sót trên phim CT. Các ưu điểm khác của siêu âm bao gồm: tránh tiếp xúc với bức xạ ion hóa, chi phí thấp, dễ dàng và sẵn có. Dựa trên các yếu tố trên, kết quả nghiên cứu của chúng tôi ủng hộ việc sử dụng siêu âm thay vì chụp CT như là phương pháp chẩn đoán hình ảnh được lựa chọn trong các trường hợp nghi ngờ viêm ruột thừa mãn tính, được thực hiện bởi các bác sĩ có kinh nghiệm và được giải thích trong bối cảnh lâm sàng phù hợp.

Chúng tôi cũng thừa nhận những hạn chế của siêu âm, chẳng hạn như phụ thuộc vào người thực hiện và độ nhạy giảm ở những bệnh nhân có thể trạng không thuận lợi hoặc có quá nhiều khí trong ruột. Chụp CT vẫn là phương pháp chẩn đoán được lựa chọn hàng đầu ở những bệnh nhân này. Những yếu tố này nhấn mạnh tầm quan trọng của việc đào tạo và chuyên môn đầy đủ để tối ưu hóa kết quả chẩn đoán.

Đề xuất về phương pháp chẩn đoán hình ảnh từng bước, trong đó siêu âm được thực hiện trước khi chụp CT trong các trường hợp không rõ ràng, là hoàn toàn hợp lý và phù hợp với các chiến lược chẩn đoán hiện đại. Bằng chứng cho thấy việc kết hợp các phương pháp chẩn đoán hình ảnh khi cần thiết có thể cải thiện độ chính xác chẩn đoán .^{4]}

Đề xuất kết hợp các hệ thống báo cáo có cấu trúc, chẳng hạn như APPENDIC-RADS ^[5] và tích hợp các hệ thống chấm điểm lâm sàng như điểm Alvarado, ^[6] rất có giá trị và có thể nâng cao tính nhất quán trong chẩn đoán.



This single-center retrospective study

A total of
747 patients
were assessed

Both imaging modalities
can identify direct and
indirect signs of
acute appendicitis

Direct appendicitis signs

- Wall: thickening larger than 3 mm and/or loss of stratification of parietal layers and/or increased periappendicular echogenicity and/or increased vascularity on color Doppler
- Periappendicular abscess

Indirect appendicitis signs

- Free abdominal fluid
- Hyperechogenicity of the periceal fat
- Pneumoperitoneum, gas outside the intestinal loop
- Locoregional adenopathy

The imaging findings
were classified into
five categories:



- **APPENDIC-RADS 0**
Appendix not visualized



- **APPENDIC-RADS 1**
Normal appendix: absence of thickening, direct and indirect signs



- **APPENDIC-RADS 2**
Probably normal appendix: partially visualized with normal features



- **APPENDIC-RADS 3**
Appendicitis cannot be excluded: at least one direct or indirect sign is present (except periappendicular abscess)



- **APPENDIC-RADS 4**
Acute appendicitis: maximum transverse diameter under compression > 6 mm and loss of compressibility; direct and indirect signs may be present