

European Federation of Societies for Ultrasound in Medicine and Biology



Euroson 2026 Lublin, Poland

Winner of the 2025 Young Investigator Competition



Janna Ruisch

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Towards personalized risk assessment of carotid artery stenosis using ultrasound-based velocity vector imaging

Abstract

Background

Stroke remains a leading cause of death and disability, with up to 20% arising from carotid plaque rupture [1]. Current risk stratification poorly predicts stroke risk, and patients remain vulnerable to restenosis and recurrent events even after carotid endarterectomy (CEA). As blood flow plays a central role in atherosclerosis, carotid flow patterns may offer patient-specific risk indicators. We developed ultrasound-based velocity vector imaging (US-VVI) for detailed blood flow mapping [2] and applied it across a spectrum of carotid bifurcation conditions to study how flow patterns relate to atherosclerotic progression and stroke risk.

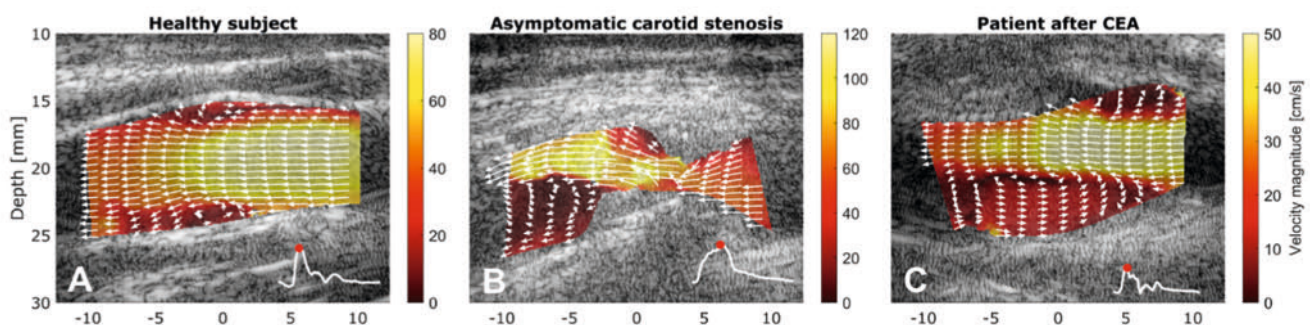
Methods

I conducted multiple clinical studies examining carotid flow patterns using visual assessment and flow-related metrics, including vector complexity, vortex presence, and wall shear stress (WSS). First, US-VVI was validated against 4D-flow MRI, and

flow patterns were characterized in twenty healthy carotid arteries. Second, US-VVI was performed in 85 asymptomatic stenotic carotid arteries to identify atheroprone or rupture-prone flow characteristics, during two-year follow-up. Finally, flow patterns were characterized in the carotid bifurcation of 70 patients before and after CEA, combined with histological evaluation of plaque-vulnerability.

Results

US-VVI demonstrated good agreement with 4D-flow MRI [3], uniquely detected small short-term recirculating regions not captured by 4D-flow MRI, and confirmed complex hemodynamics in non-diseased arteries (► Fig. 1A) [4]. In 38.2% of asymptomatic carotid stenosis cases, atheroprone flow features were found, with location driven by jet direction, and marked by higher vector complexity, more and longer vortices, and elevated oscillatory WSS (► Fig. 1B). Post-operative analysis showed vortical wall-adjacent flow in 43.3% of patients and unstructured, multi-directional flow in 35%. Both conditions were associated with atheroprone flow characteristics, with vortical flow likely influenced by post-operative lumen width and jet-inflow direction (► Fig. 1C).



► Fig. 1 Ultrasound-based velocity vector imaging (US-VVI) in (A) a healthy subject, (B) a patient with asymptomatic carotid stenosis, (C) a patient after recent carotid endarterectomy (CEA), showing the velocity vector fields during peak systole.

Conclusions

US-VVI was successfully applied to relatively large cohorts spanning multiple carotid conditions. Flow patterns relevant to atherosclerosis were identified, highlighting its potential for personalized risk assessment in carotid artery stenosis.

References

- [1] van Velzen TJ et al. BMC Neurol 2021; 21 (1): 20
- [2] Saris AECM et al. Ultrasound Med Biol 2019; 45 (7): 1691–1707
- [3] Ruisch J et al. Ultrasound Med Biol 2025; 51 (6): 969–976
- [4] Ruisch J et al. IEEE TUFFC 2025; 72 (3): 309–320

Winner of 2026 Young investigator Award



Daniel Julius Lauritzen

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Margin Assessment Using 3D Ultrasound Compared with MRI in Oral Cancer Surgery

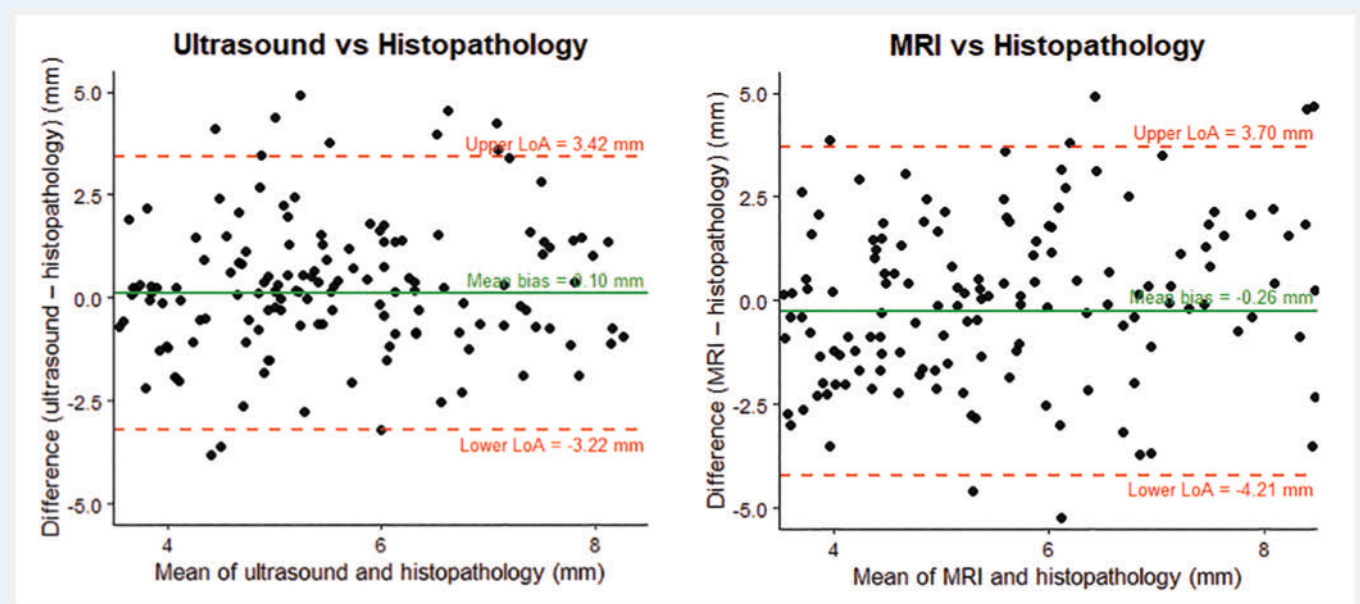
Abstract

Introduction

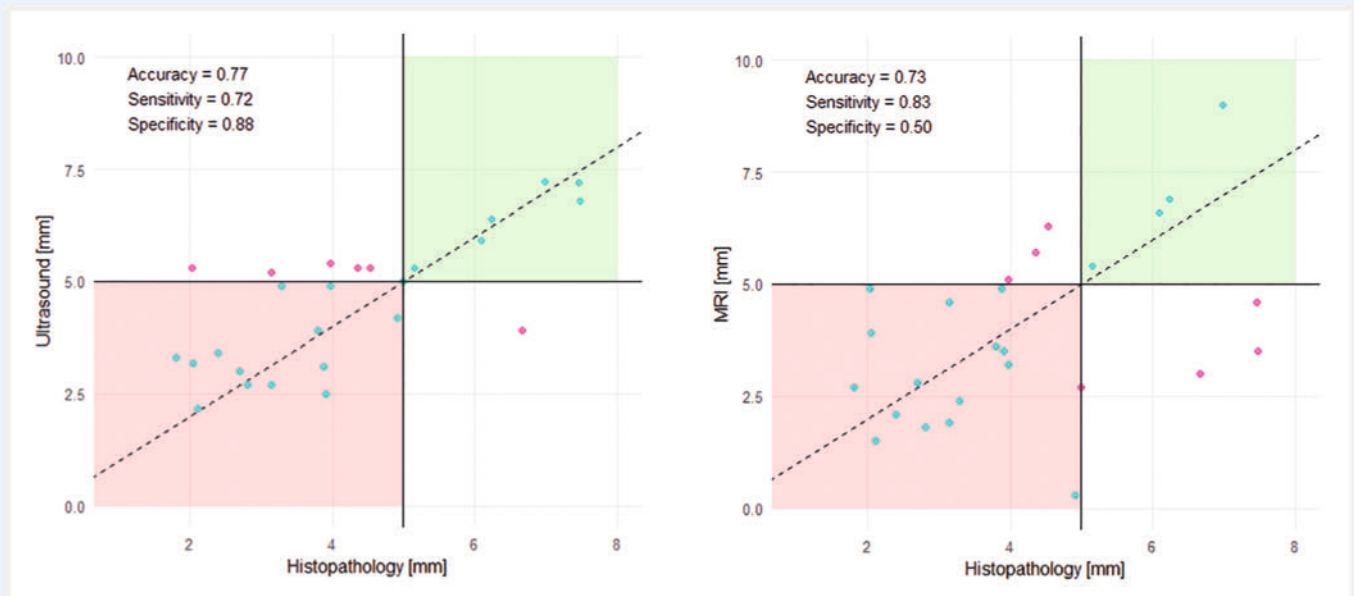
Inadequate surgical margins in tongue squamous cell carcinoma are associated with poorer oncologic outcomes. Frozen section analysis is commonly used intraoperatively but is limited by sampling error and inability to measure margin distance. Three-dimensional (3D) imaging of resected specimens may enable more accurate intraoperative assessment of margins.

Methods

In this prospective diagnostic accuracy study, patients undergoing primary resection for T1–T3 tongue squamous cell carcinoma were included. Immediately after resection, specimens underwent ex vivo scanning with 3D ultrasound followed by MRI prior to formalin fixation. Imaging measurements of the deep margin were compared with final histopathology. The primary outcome was the difference between imaging-based and histopathology-based deep margin measurements.



► **Fig. 2** Bland-Altman plots comparing ultrasound (left) and MRI (right) with histopathology for all deep margin measurements. The green line indicates the bias, and the red dashed lines show the 95% LoA.



► **Fig. 3 Diagnostic performance.** Scatter plots showing the relationship between the minimum deep margin distances measured on histopathology and corresponding measurements obtained by ultrasound (left) and MRI (right). The vertical and horizontal lines mark the 5 mm threshold. Top left quadrant, FN; Top right quadrant (green), TN; Bottom left quadrant (red), TP; Bottom right quadrant, FP. Each plot displays accuracy, sensitivity, and specificity.

Results

Twenty-six patients contributed 175 matched ultrasound–MRI–histopathology slice pairs. Ultrasound measurements were significantly closer to histopathology than MRI (mean absolute difference 0.9 ± 0.8 mm vs 1.5 ± 1.3 mm; $p = 0.02$) and demonstrated narrower limits of agreement (► Fig. 2). Overall accuracy for predicting final margin status was 77% for ultrasound and 73% for MRI (► Fig. 3). Compared with frozen section–based intraoperative assessment, 3D imaging may improve margin assessment by 50%–57%.

Conclusions

Ex vivo 3D imaging enables accurate intraoperative assessment of deep margins in tongue cancer surgery. Three-dimensional ultrasound demonstrated higher agreement with histopathology than MRI and may represent a practical modality for intraoperative decision-making. Further studies should evaluate whether imaging-guided margin assessment improves oncologic outcomes.

Winner of the Best Published Paper Prize

Dr. med. Johannes Weimer, Germany

Paramedics Performed Sonographic Identification of the Conic Ligament–A Prospective Controlled Trial

Published: *Diagnostics (Basel)*. 2025 May 21; 15(10): 1296. doi: 10.3390/diagnostics1510 1296

Winner of the bid to host EUROSON 2030

The poster for EUROSON 2030 ISTANBUL features a night view of the Istanbul skyline, including the Bosphorus Bridge and the Hagia Sophia. The text on the poster includes: "EUROSON 2030 ISTANBUL", "Let's meet where the continents meet.", ".MAY 2030", "Istanbul Lutfi Kırdar International Convention and Exhibition Center", "EFSUMB", and "TIBBİ ULTRASONOGRAFİ DERNEĞİ (The Society of Medical Ultrasonography) since 1983".

EFSUMB Euroson Schools

EFSUMB presents a number of Schools in 2026 and Endorsed Courses which can be viewed on the EFSUMB website <https://efsumb.org/endorsed-course>

	EUROSON SCHOOL: Abdominal Ultrasound Course Basic & Advanced <i>Location: University Hospital RWTH Aachen, Aachen, Germany</i> 26 - 29 August 2026	
	EUROSON SCHOOL: Point of Care Ultrasound ★ 7th Edition ★ <i>Location: Medical University of Vienna, Austria</i> 11 - 12 September, 2026	
	EUROSON SCHOOL - Liver Ultrasound: from basic to advanced applications Europe as a bridge between Asia and Africa <i>Campus Bio-Medico University of Rome</i> 11 - 12 September 2026	
	EUROSON SCHOOL: Contrast-Enhanced Ultrasound <i>National Palace of Culture in Sofia, Bulgaria</i> 25 September 2026	
	EUROSON SCHOOL: Postgraduate Course "Tropical Medicine and Point-of-Care Ultrasound: An Integrated Approach" September 2026 – March 2027 <i>Online Course</i>	
	EUROSON SCHOOL: Current Concepts in Diagnostic and Interventional Ultrasound <i>Location: Point Hotel Barbaros - Istanbul</i> 3-4 October, 2026	
	EUROSON SCHOOL: Musculoskeletal Sonography Course in Rheumatology - Basic Level <i>Location: Graz, Austria</i> 14 - 16 October 2026	
	EUROSON SCHOOL: Global CEUS Masterclass, Hepatic and Extrahepatic Indications, Europe meets China and North America <i>Location: Munich, Germany</i> 25 - 28 October 2026	
	EUROSON SCHOOL: Intermediate Musculoskeletal Ultrasound Course <i>Location: Belek Beach Resort Hotel, Antalya</i> 28 - 30 October, 2026	
	EUROSON SCHOOL: Advanced Musculoskeletal Ultrasound Course <i>Location: Belek Beach Resort Hotel, Antalya</i> 29 - 31 October, 2026	

WEBINARS

EFSUMB Webinar:
Recent progress in Interventional Ultrasound (INVUS) - Guidelines Update
Tuesday, 1st September 2026 ~ 11.00 CEST
3 x Speakers + questions & discussion

[VIEW HERE](#)





WFUMB Webinar: Steatotic Liver Disease

Organized by WFUMB, chaired by: Dr. Mar Pérez-Peña

23 SEPTEMBER 2026
17:00 European time (CEST)



Annalisa Berzigotti
Clinical aspects



Giovanna Ferraioli
Diagnosis - Quantitative ultrasound



Alina Popescu
Diagnosis - B-mode ultrasound



Vincent Wong
Treatment

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Case of the Month

EFSUMB invites submission of interesting cases for the website section “Case of the Month”. All CoM submissions are eligible for selection for free registration at the next Euroson congress. The EFSUMB Publications Committee will review all *Best Case*

of the Month submissions at the end of March 2026. Two cases that receive the most ‘likes’ over a period from the last congress to March 2026 and judged on a range of factors, including scientific value, will receive free registration for the next

EUROSON congress and the third case will receive a cash prize of 100 EUR.

Visit the Case of the Month archive <https://efsumb.org/case-of-the-month-archive/>

EFSUMB Journal Club – Number 8

Title

From imaging to management: Enhancing the Breast Imaging Reporting and Data System with contrast-enhanced ultrasound for stratification of breast lesions

Asian Journal of Surgery, 2026, [EPUB]
DOI: 10.1016/j.asjsur.2026.01.153

Authors

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Objectives

Selective vacuum-assisted biopsy (VAB) improves diagnostic accuracy for intermediate breast lesions (including B3, imaging-pathologic discordant, and high-risk lesions) while enabling complete resection. The authors evaluate the integration of contrast-enhanced ultrasound (CEUS) in the Breast Imaging Reporting and Data System (BI-RADS) to optimize selection of patients for VAB.

Methods

Retrospective study analysis of 647 patients (from 2016 to 2023) who underwent con-

ventional ultrasound, CEUS, core needle biopsy, and surgical excision.

A triple-classification BI-RADS model was developed based on the original BI-RADS. Multivariate logistic regression analysis was conducted to develop a logistic regression model.

CEUS was incorporated into BI-RADS to establish two models: the CEUS-adjusted BI-RADS model and the CEUS-BI-RADS scoring model.

Overall accuracy, sensitivity, specificity, underdiagnosis rate of malignancies, overdiagnosis rate of benign lesions, and sim-

ulated secondary excision rate for intermediate lesions were compared across models.

Results

Multivariate analysis showed that irregular shape, earlier enhancement, and iso-/hyper-enhancement predicted intermediate lesions, whereas perfusion defects, irregular shape, earlier enhancement, and post-enhancement size enlargement predicted malignancy.

The CEUS-adjusted BI-RADS model achieved an overall accuracy of 73.8%, demonstrating sensitivities of 64.5% (benign), 52.2% (intermediate), and 93.0% (malignant), with corresponding specificities of 83.9%, 43.2%, and 84.2%.

Compared to the original BI-RADS, it improved sensitivity for malignancies (87.8%→93.0%), reduced the overdiagnosis rate of benign lesions (25.1%→13.3%) and the simulated secondary resection of intermediate lesions (19.4%→6.5%), while maintaining the same underdiagnosis for malignant lesions (1.2%→1.2%).

Conclusion

The integration of CEUS with BI-RADS demonstrates potential for improving classification of breast lesions before biopsy. Especially shows promise in distinguishing benign lesions, B3 lesions, imaging-pathologic discordant lesions, high-risk lesions, and malignant lesions prior to biopsy, providing a conceptual framework for optimizing clinical management efficiency.

Key points

CEUS-Adjusted BI-RADS Model (i.e. lesions initially classified as BIRADS 4C/5 with be-

nign CEUS scores were and BI-RADS 3/4A/4B lesions with suspicious CEUS were upgraded by two categories) demonstrated lower overdiagnosis rate with similar sensitivity for malignancy.

In lesions larger than 2.5 cm, the CEUS-adjusted BI-RADS model demonstrated higher diagnostic performance.

Simple combined BI-RADS-CEUS Scoring Model decreased the overdiagnosis rate but increased the false negatives.

Link (DOI)

<https://doi.org/10.1016/j.asjsur.2026.01.153>

Ultrasound speciality

Ultrasound, BIRADS, Breast US, CEUS

Short-Review by

Prof. Dr. Jose Luis del Cura
Department of Radiology
Donostia University Hospital
Spain

Strengths

The role of CEUS in breast imaging has not been clearly established. Moreover, the authors propose a specific application in a subgroup of lesions that pose a management problem: lesions of uncertain malignant potential on core needle biopsy. Surgical excision is recommended, but most of them are benign lesions. The potential role of CEUS in these lesions is an interesting field for investigation. The study is comprehensive and reviews all possible aspects of the problem.

Weaknesses

Retrospective. Only in one centre. They study BIRADS 3–5 lesions but the authors do not explain how these categories were diagnosed. The patients were selected among those who met CNB eligibility criteria following initial screening; so, the results cannot be generalized to all breast screening populations. There is no specific statement about the analysis of CEUS to be blinded to the result of mammography and, obviously, they were not blinded to the US exam. It should be noted that misclassifying an intermediate lesion as malignant does not change initial clinical management. Clinical application of the results is not clear.

Personal thinking

A new article about CEUS in breast. The study has the merit of adding more information about CEUS signs and diagnostic value in breast cancer. However, the clinical usefulness of CEUS for diagnosing breast lesions is actually questionable after these results: my impression is that the authors probably modified the initial scope of their investigation, to focus on B3 CNB lesions, after initial disappointing outcomes with the full dataset of patients. Regarding this specific group of patients, in a potentially lethal condition like breast cancer it is currently difficult to tell the patient to avoid a VAB even in the few cases of a previous diagnosis of lesions of uncertain malignant potential on CNB, if the alternative is going through a CEUS exam with a 1,2% of underdiagnosis. VAB has 0% and is just a percutaneous procedure.

Next Young EFSUMB Summer School

YOUNG EFSUMB
Summer School 2027
 16 - 18 September 2027





16-18 September
SAVE the date
2027

The Young EFSUMB Summer School will take place in Timisoara, Romania on 16-18 September 2027, bringing together medical students and young residents from across Europe to advance ultrasound education and hands-on training. Organised by EFSUMB, the programme reflects EFSUMB's commitment to supporting the next generation of ultrasound practitioners and educators, particularly in countries where student ultrasound training opportunities remain limited.



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