EULVIC, October 18-19th, Innsbruck

Correct adjustment US equipment - for performance of vascular US examination

Christina Duftner

Univ.-Klinik f. Innere Medizin II
Vorstand: o. Univ.-Prof. Dr. G. Weiss

Adjustment

Evidence

EULAR recommendations for the use of imaging in large vessel vasculitis in clinical practice

Christian Dejaco,[1,2] Sofia Ramiro,[3] Christina Duftner,[4] Florent L Besson,[5,6] Thorsten A Bley,[7] Daniel Blockmans,[8] Elisabeth Brouwer,[9] Marco A Cimmino,[10] Eric Clark,[11] Bhaskar Dasgupta,[12,13] Andreas P Diamantopoulos,[14] Haner Direskeneli,[15] Annamaria Iagnocco,[16] Thorsten Klink,[7] Lorna Neill,[17] Cristina Ponte,[18,19] Carlo Salvarani,[20,21] Riemer H J A Slart,[22,23] Madeline Whitlock,[12] Wolfgang A Schmidt[24]

RMD Open
Rheumatic & Musculoskeletal Diseases

ORIGINAL ARTICLE

Imaging in diagnosis, outcome prediction and monitoring of large vessel vasculitis: a systematic literature review [illegible] forming the EULA[illegible]

no single study

Christina Duftner,[1] Christian Dejaco,[2,3] Alexandre Sepriano,[4,5] Louise Falzon,[6] Wolfgang Andreas Schmidt,[7] Sofia Ramiro[4]

Technical settings/requirements

Reco 12 [LoE 5, LoA 9.8 (100% ≥8)]

- examination should be done by a trained specialist
- appropriate equipment, operational procedures and settings
- improvement of reliability by specific training

Box 1 Suggestions for technical and operational parameters on imaging modalities in large vessel vasculitis

Ultrasound

- High-quality, modern equipment is essential. Linear probes are recommended for supra-aortic arteries, sector or convex probes for ascending aorta and aortic arch and convex probes for abdominal aorta. Settings may slightly vary according to different equipment.
- The B-mode frequency should be ≥15 MHz for temporal arteries and 7–15 MHz for extracranial supra-aortic arteries. Image depth should be 10–20 mm for temporal arteries and 30–40 mm for extracranial supra-aortic arteries.
- The focus should be at the level of the artery. The B-mode gain should be adjusted to avoid anechoic appearance of the artery wall. The
- High quality equipment
- Doppler frequencies of 7–12 MHz and 4–8 MHz should be applied for the temporal and for the extracranial supra-aortic arteries, respectively. PRF should be 2–3.5 kHz and 3–4 kHz, respectively. The angle between sound waves and artery should be ≤60°.

Dejaco C, ARD 2018

Settings and artefacts relevant for Doppler ultrasound in large vessel vasculitis

L. Terslev[1*], A. P. Diamantopoulos[2], U. Møller Døhn[1], W. A. Schmidt[3] and S. Torp-Pedersen[4]

ART 2017

B-mode

General aspects - probes

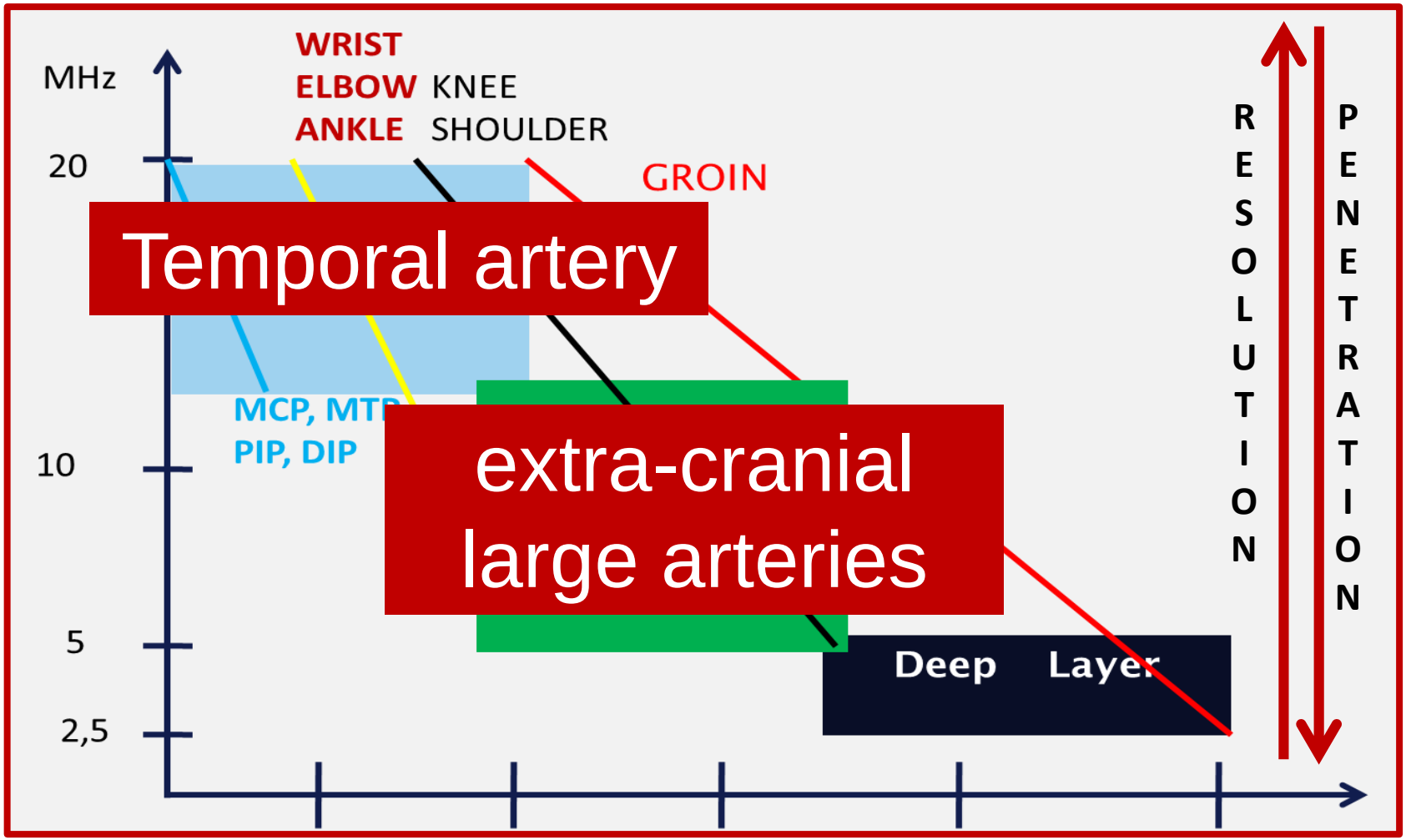
supra-aortic arteries

linear

Aorta

sector/convex

General aspects - probes



Mandl P et al., Essential applications of MSUS in rheumatology

Temporal & large arteries

- Focus zone – level of artery

Colour Doppler

General aspects – Col. Doppler

- Flow type – fast, direction & velocity
- Choice of Doppler – Colour Doppler
- Doppler Frequency – varies f. location

  (TA ↑, large arteries ↓)
- Gain – according noise level, min.blooming
- PRF – different PRFs according vessel

  PRF↑-correct flow direct. & veloc.

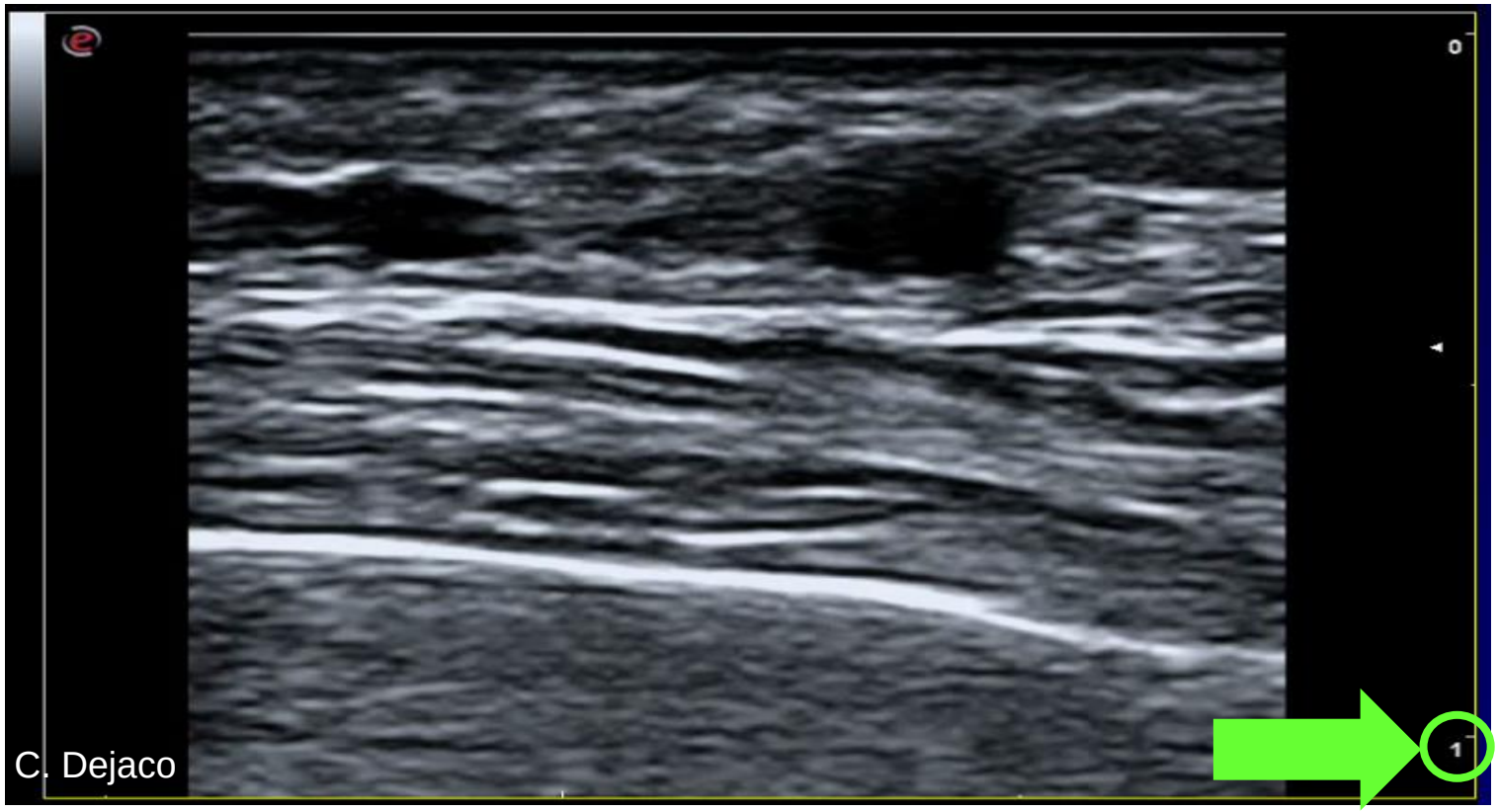
  wall filter↑–avoid motion artefacts
- Focus – at level of ROI, sensitivity↑

Temporal arteries

- B-mode frequency ≥15 MHz
- image depth 10-20mm

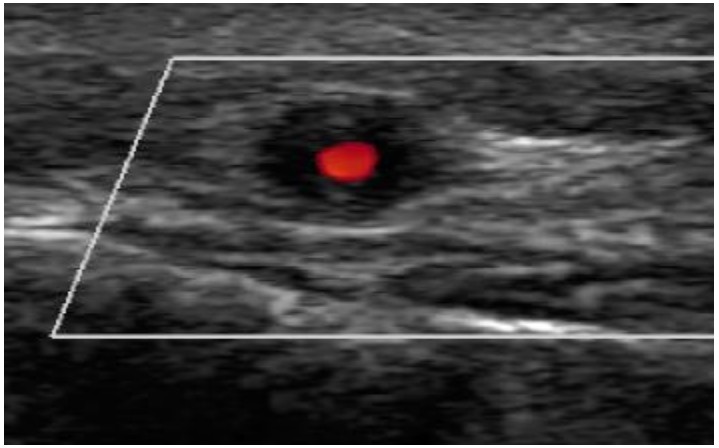
Temporal arteries

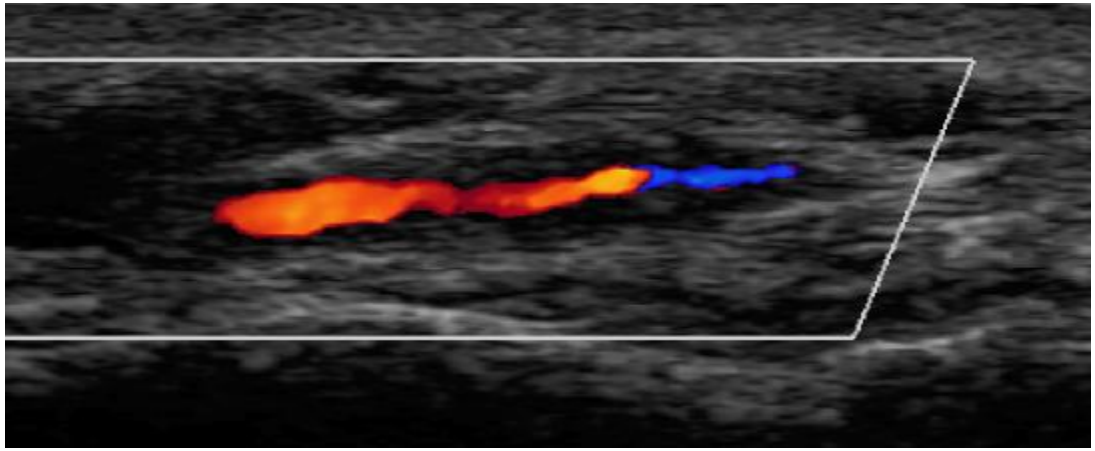
- B-mode frequency ≥15 MHz
- image depth 10-20mm



Temporal artery

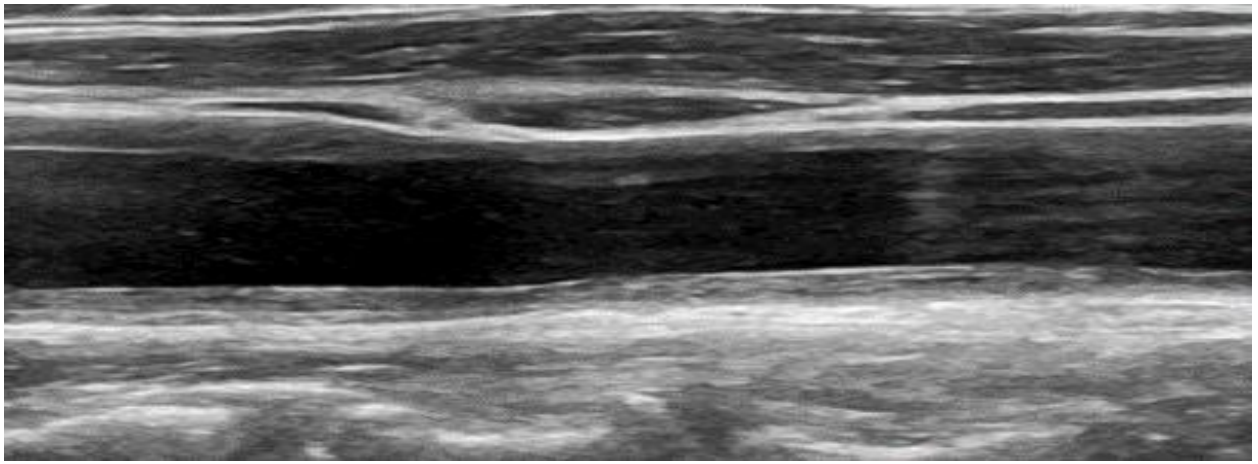
- B-mode frequency ≥15 MHz
- image depth 10-20mm
- Colour Doppler preferred over Power D.
- Doppler frequencies 7-12 MHz
- Pulse repetition frequency (PRF): 2-3.5kHz





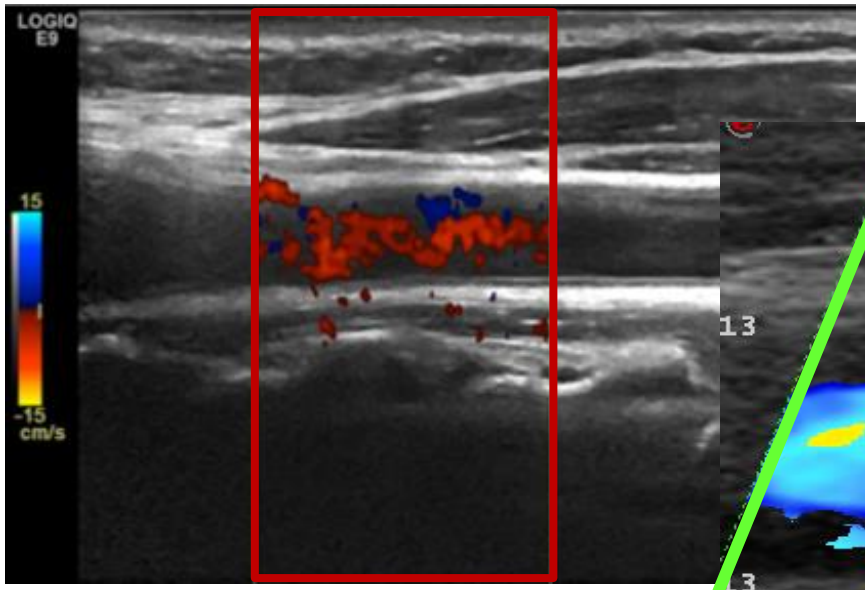
Extracranial large arteries

- B-mode frequency 7-15 MHz
- image depth 30-40mm
- Colour Doppler preferred over Power D.
- Doppler frequencies 4-8 MHz
- Pulse repetition frequency (PRF): 3-4kHz

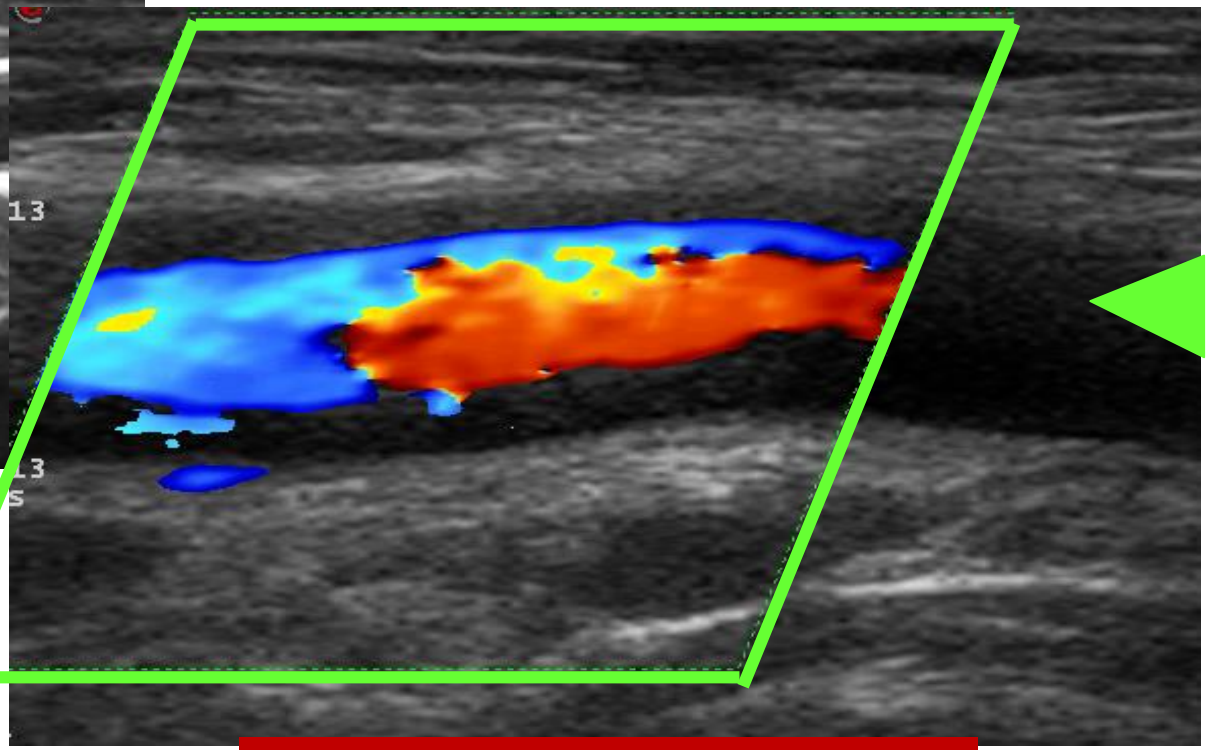


Temporal & large arteries

- angle Doppler Box ≤60°



Terslev L, ART 2017

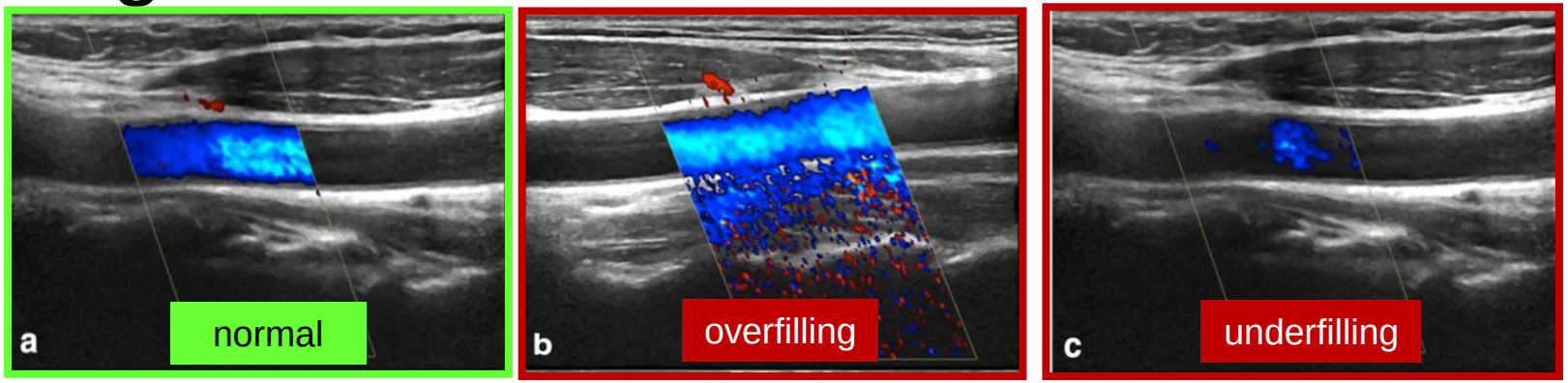


frequency shift↑

Additional aspects

Temporal & large arteries

- B-mode gain – avoid anechoic appearance vessel wall
- Colour Doppler gain – avoid over-/under-filling of vessel lumen



Terslev L, ART 2017

- tissue harmonic imaging – improved delineation of IMC

Thank you for your attention!