

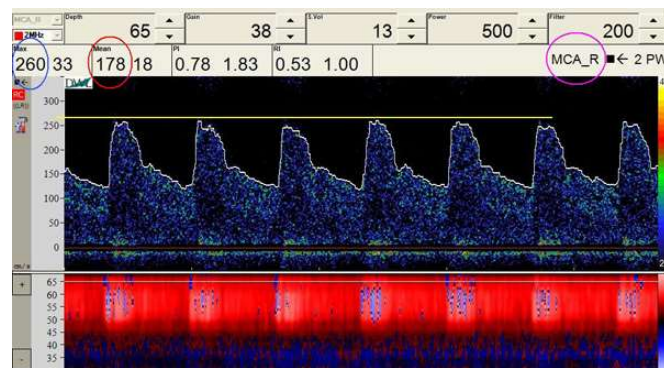
a) Image A = Transcranial Doppler study of the right MCA. Image B = Right internal carotid artery
b) Moderate cerebral artery vasospasm in the right MCA with a Lindegard ratio of 5 (260/52 cm.s-1)

c) 1. Ensure the patient is receiving nimodipine

2. Radiologically guided intra-arterial verapamil

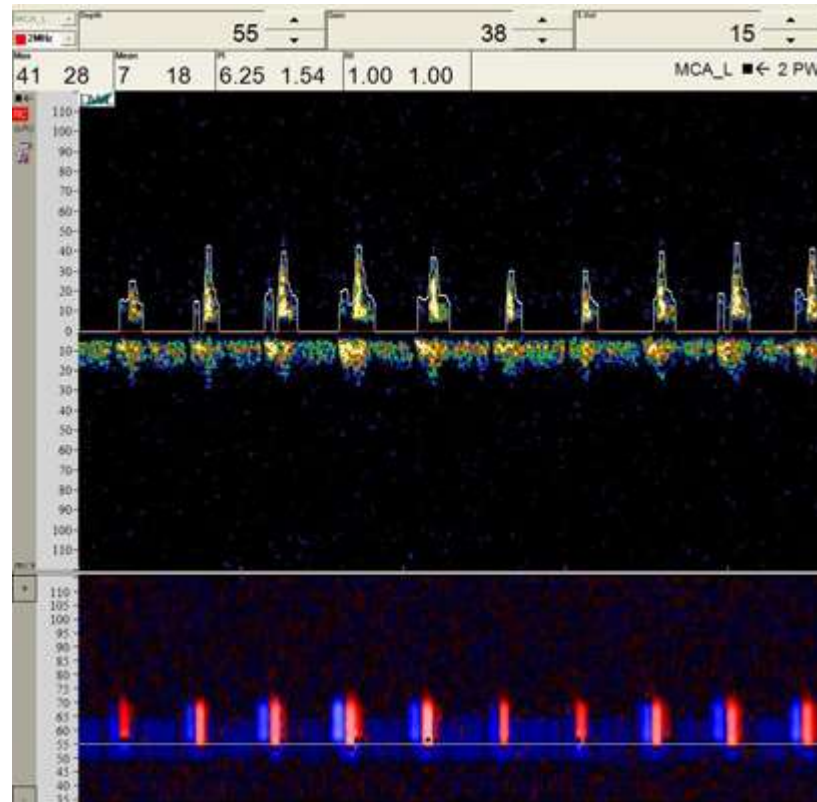
1. Percutaneous angioplasty

The mean MCA velocity (Red ellipse on Image A) is 178 cm/sec, which suggests mild to moderate vasospasm. The maximum MCA velocity (Blue ellipse and horizontal yellow line on Image A) divided by the peak ICA systolic velocity (Yellow ellipse and horizontal pink line on Image B) yields the Lindegard ratio, which at 5 indicates moderate cerebral vasospasm. (See DVD Chapter 6 – Data interpretation; Table 6.17).



ICA Doppler - Marked

22 year old female, who was admitted following a prolonged episode of acute severe asthma. The responding ambulance noted a weak carotid pulse, with no respiration. CPR was performed and she was intubated at the scene and given IM and IV adrenaline. She remained sinus tachycardia during transport. She was rapidly transported to the ICU for further care. Her neuromuscular blockade was ceased on day 2 and her sedation was ceased later that day. 2 days later she still has not had a motor response to a noxious stimulus and her pupils remain unreactive. A CT brain shows no abnormalities and an EEG is reported as demonstrating no evidence of seizure activity. A transcranial Doppler study is performed.



TCD report: M-mode demonstrates discontinuous brief blue/red signals at the same depth for both the right and left MCA at 55 and 70mm. The Doppler spectrum demonstrates high resistance flow.

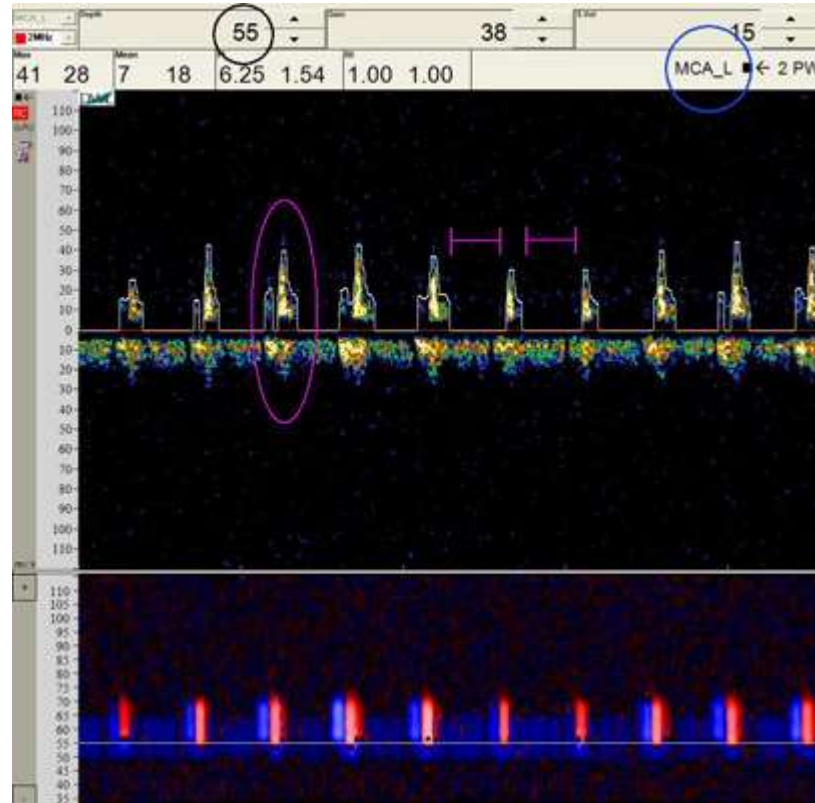
How can the result of the TCD be used in her further management?

The TCD result suggests that there is very limited MCA flow with a significant degree of proximal occlusion. Both the left and right MCA are affected at two separate distances, suggesting that this is a global process; in this context, global cerebral oedema, most likely due to hypoxic-ischaemic encephalopathy.

As there is flow demonstrated, albeit very limited, brain death cannot be diagnosed by this imaging modality. However, TCD is not an accepted definitive investigation for making this diagnosis and is instead often used to determine the optimal time to perform a 4-vessel angiogram with a reasonable chance of avoiding a residual flow, or a false positive or false negative result.

Otherwise, for now treatment would continue until such time as brain death is clinically or radiologically established, or a decision to withdraw curative treatment on the grounds of futility (some prefer the term "lack of therapeutic benefit") is made.

In addition to the answer given above, the image from the left MCA (Blue ellipse) TCD at 55mm (Black ellipse) demonstrate a phenomenon known as "Thump flow", where a column of fluid travels along a tube and meets a tight restriction proximal to the point of Doppler measurement. The "Thump" is the wave reflected back off the barrier and shows up as a small sharp upstroke associated with a small sharp flow reversal wave (Pink ellipse). There is little or no flow in between the waves (Pink bars).



Rt MCA thump at 55 – Marked