New Test to Diagnose Vasovagal Syncope

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Background

- Current diagnosis of vasovagal syncope is by exclusion after all the other tests are negative. Other tests include CT scan of the head, carotid arterial Doppler and tilt table test which are time consuming, non-specific, costly and not cost effective.

Method

- Patients with history of vasovagal syncope who arrived to the emergency room were enrolled.
- The patients of the control group received the usual tests as indicated and the patients in the study group received the new Size and Expansion of the Femoral Vein (SEFV) of which the results were shown to the investigators.

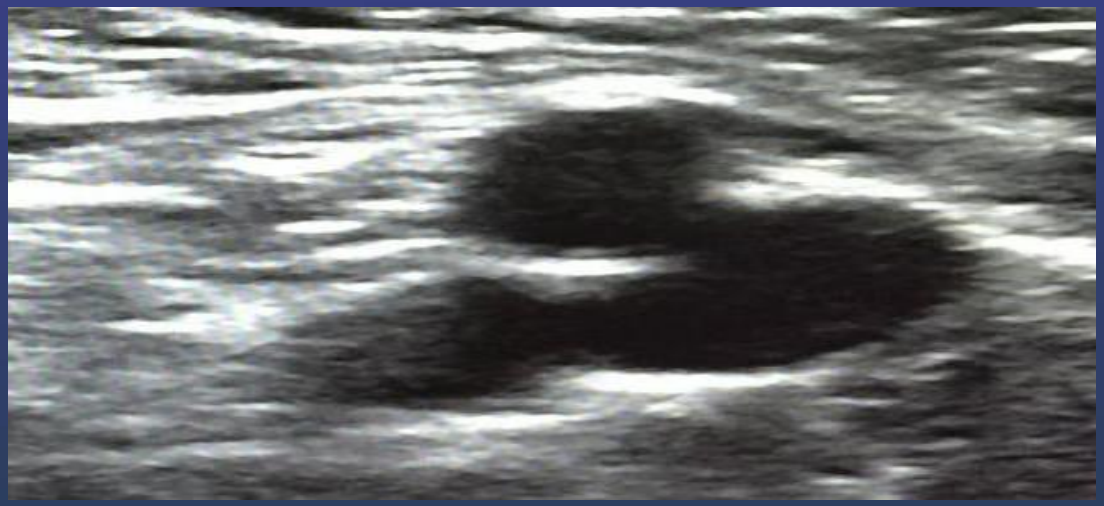
Principles on the Size and Expansion of the Femoral Vein (SEFV) test

- ***The first principle***: The volume of blood going through the femoral artery and returning through the common femoral vein should be the same.
- If so, in normal condition, the size of the femoral artery and the femoral vein should be the same.

Principles on the Size and Expansion of the Femoral Vein (SEFV) test

- ***The second principle:*** In the vascular system, most of the circulating blood is in the veins. The amount of blood in the arteries is small and the size of the arteries does not change much due to vascular tone in order to keep a fairly constant blood pressure. If there is a need to increase cardiac output, the most common mechanism is by increasing the heart rate.

New Non-Invasive SEFV Test

- 

- **Figure 1 - In this figure, the vein is seen at the bifurcation as the femoral artery divides into the superficial and deep femoral arteries.**

New Non-Invasive SEFV Test

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- Figure 2. Here at the distal end of the common femoral artery, the coronal plane of the artery is seen as a single round structure which pulsates. Next to it is the femoral vein. The size of the femoral vein is at the same of the common femoral artery

New Non-Invasive SEFV Test

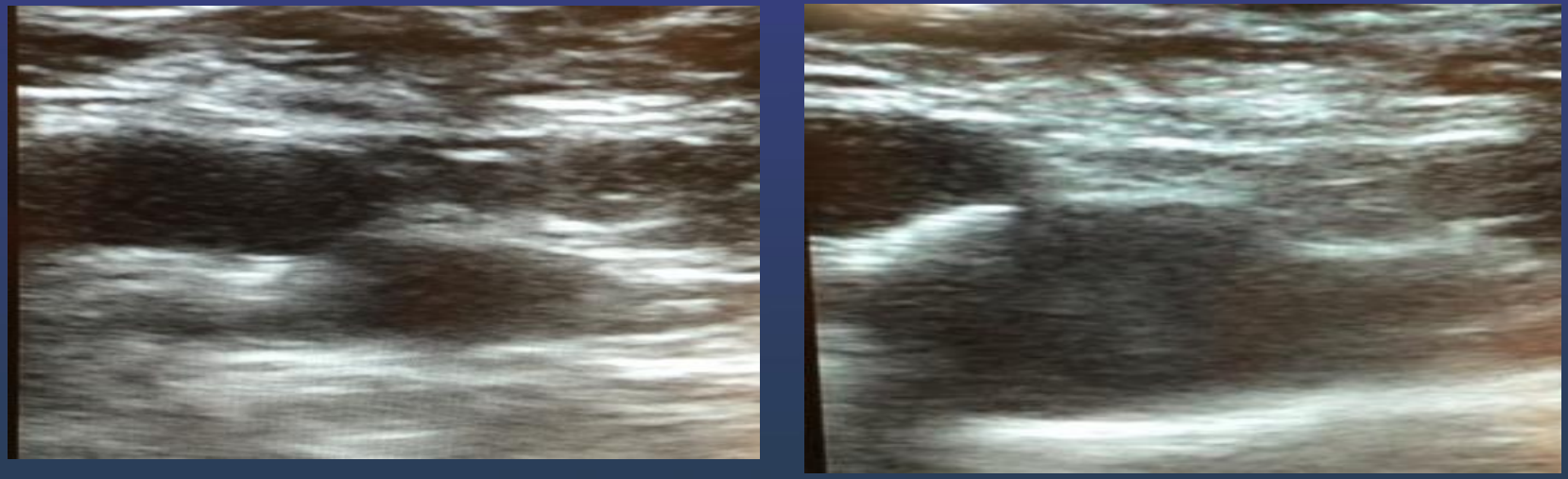

Figure 3. Normal expansion of the femoral vein to less than 2 times larger than the baseline

Excessive Venous Pooling Causing Syncope

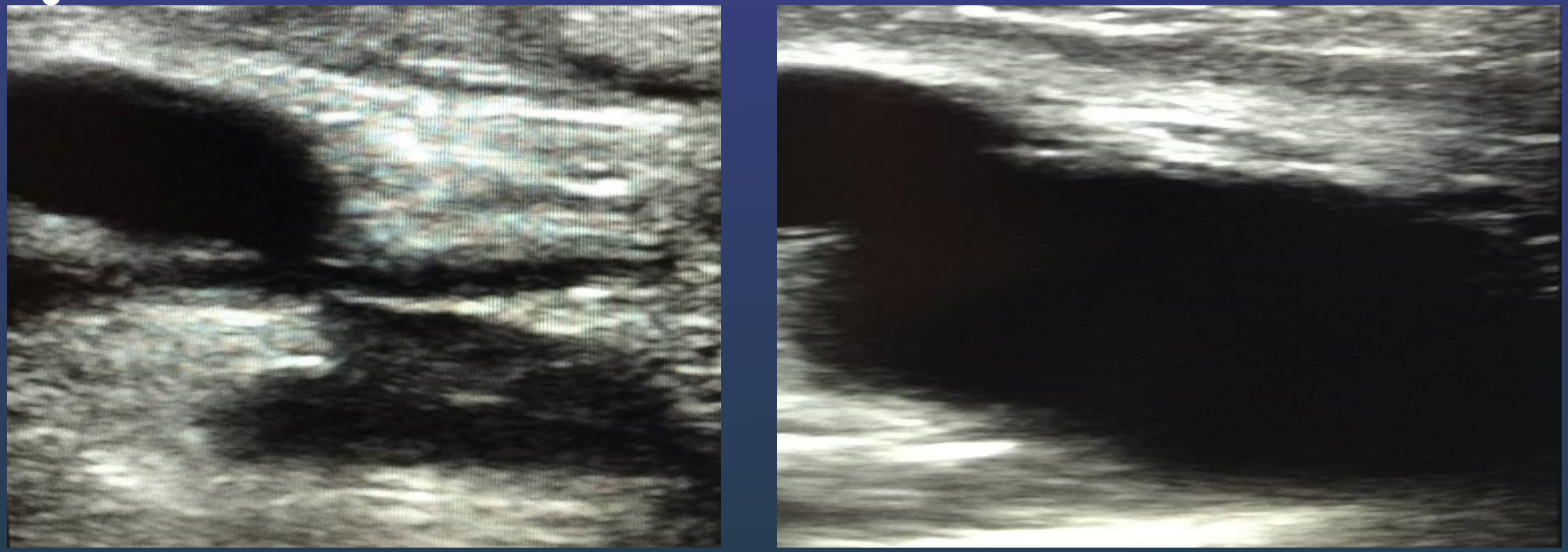

Figure 4. Panel A. The femoral vein at its baseline. Panel B. The femoral vein expanded to a huge volume upon cough. The is the evidence of excessive pooling causing orthostatic hypotension.

Venous Compartment Contraction due to Blood Loss, Dehydration or Pulmonary Hypertension

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  - If the vein does not expand with cough, then the patient could have suboptimal venous capacity (e.g. secondary to dehydration or bleeding). The vein is barely filled with blood and has no extra volume to expand even with higher pressure from the lungs.

Venous Compartment Contraction due to Blood Loss, Dehydration or Pulmonary Hypertension

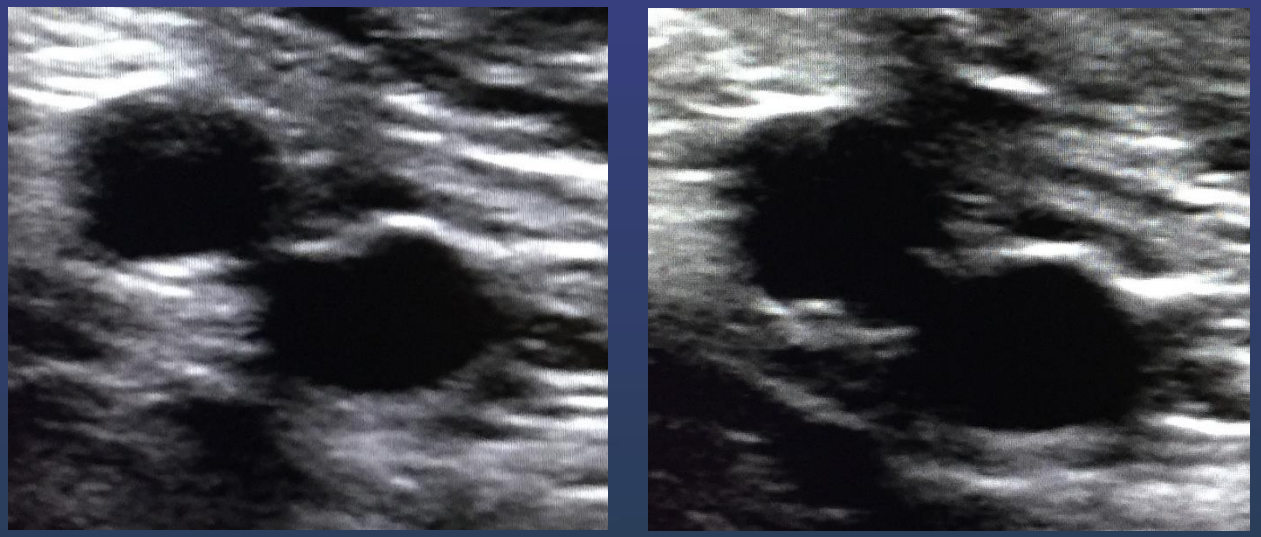
- 

Figure 5. Abnormal expansion of the femoral vein: The vein does not change size upon cough. Either the vein is barely filled with blood (e.g. during bleeding) or due to pulmonary hypertension.

Venous Compartment Contraction due to Blood Loss, Dehydration or Pulmonary Hypertension

- If the SEFV is abnormal, either without expansion or excessive expansion, then the cause of syncope would be due to volume contraction or orthostatic hypotension. There is no functional vasovagal syncope here.

RESULTS

- 20 patients were enrolled from June 2015 to April 2016. All came with history of near syncope or syncope. All patients had negative work-up and some patients were diagnosed of having vasovagal syncope.
- The results showed that 13/20 patients had abnormal SEFV test. All the patients with vague history of near syncope had normal EFV test.

Conclusion

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- The patients with vasovagal symptoms should have the SEFV test early and if the results of the SEFV are normal in combination with a strong history of vasovagal mechanism, the syncope could be considered benign and the patient discharged from the hospital. Larger scale of clinical trial or registries of this new technique are needed.

THANK YOU