

3. Doppler ultrasound

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Q: Is there a difference between a sonogram and a Doppler or are the terms used interchangeably?

A: There is a difference and terms are not interchangeable.

When looking for a deep vein thrombosis, one often performs a Doppler-ultrasound study. This consists of two parts, and both parts are typically done in the same examination session:

1. Ultrasound (=sonogram)
2. Doppler

Both examinations use sound waves and both parts are necessary for full and solid evaluation.

The ultrasound looks at the anatomy of the blood vessel. A picture of the anatomy is created with help of sound waves (therefore "sonogram", from Latin "sonos"=sound, and from Greek "gram"= picture). One can see the blood clot in the vein. The images on the screen typically are black and white. The way the clot looks often tells the examiner whether it is fresh or old, but that may also be difficult or impossible to tell. Several weeks or months after the acute event, the clot may have disappeared, partially dissolved, partially reopened (=recanalized), shrunk, or condensed (organized). These changes may be seen on ultrasound as residual clot, as partial reopening (=recanalization), or as scarring in the vein. The clot now often looks different in density compared to a fresh clot.

The Doppler looks at the flow of the blood in the vessels: sound waves are reflected by the flowing blood. The way they are reflected tells the examiner, whether the blood is flowing, how fast it is flowing, and which direction it is flowing. The screen often shows red and blue colors in the vessels, depending on which direction the blood is flowing. Often the examiner also turns on the loudspeakers, so that the flow of the blood, as detected by Doppler, can be heard. The examination is named after a physicist, Christian Doppler, who discovered the phenomenon of change in frequency in sound waves moving towards or away from a receiver. If the patient has clot in his/her vein, there is no flow. If there is partial obstruction of the vein, flow is seen in one part of the vein, but not in the other. Often the examiner squeezes the calf during this part of the examination or asks the patient to bear down, because this changes the flow in the blood vessels. These changes tell the examiner about possible vein valve insufficiency (=valvular insufficiency), which may be seen weeks to months after the acute clot.