The methods used by Dr. Haacke's team find the average stenotic patient's flow rate. Pressure can drop across a stenosis, if there is not a low enough resistance. The values of pressure drop and flow rate will vary inversely, with a ratio which is determined by resistance to the blood flow. The difference between upstream and downstream pressures (pressure drop), and the corresponding flow value yields the resistance of any obstruction.

Pressure drop is difficult to measure in a vein, because of the low local values.

However, the value of the pressure drop need not be measured directly. I think the missing piece is viscosity. Combined with flow rate, length, and radius, viscosity may provide the value of the pressure drop. Using the Poiseuille equations:

$$\Delta P = \frac{8\mu LQ}{\pi r^4}$$

or

$$\Delta P = \frac{128\mu LQ}{\pi d^4}$$

where, in compatible units (e.g., SI),

ΔP is the pressure differential between two ends of the vein segment
L is the length of vein segment
μ is the viscosity in Pa · seconds
Q is the volumetric flow rate in cubic meters per seconnd
r is the internal radius of the vein
d is the internal diameter of the vein
π is the mathematical constant Pi.

The viscosity of blood is measured with a viscometer. These are standard equipment in some labs, because of tests for blood viscosity disorders. [i]

The pressure drop, across a non-stenotic length of vein of constant diameter, is a non-zero value. It may be calculated using the flow, viscosity, length, and radius measurements . It can be compared with the pressure drop measured across the problem area, If there is a stenosis, blockage, or other impediment, it will show, probably in both flow and pressure drop,, reciprocally, depending on the stenosis' resistance.

Flow values are obtained by Doppler equipment, and viscosity can be measured using a viscometer. Pressure is difficult to measure in a vein, because of the low local values. Viscosity can be obtained from a vein blood sample. Blood should be taken at the same point in all patients within the same study. Care also must be taken to assure always using blood at the same temperature.

This assumes a round vein, and major veins are frequently not circular in cross-section. For that, and other reasons, these are only useful approximations, for the purpose of comparing pressure drops.

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[i] Clinical laboratory measurement of serum, plasma, and blood viscosity.

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