Topic: Doppler Principles and the Applications of CW-Doppler

Date: Tuesday 18th September, 2007
Time: 0845-0905

Speaker:

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Conference:

Australian College of Phlebology 2007 Scientific Meeting and Workshops
Basic Phlebology Certificate Course (Phlebology Part 1)
18-21 September, Stamford Plaza Double Bay, Sydney, Australia

Session Content

- Indications
- Examination Types
- Results/Reporting
- Sensitivity & Specificity
- Limitations

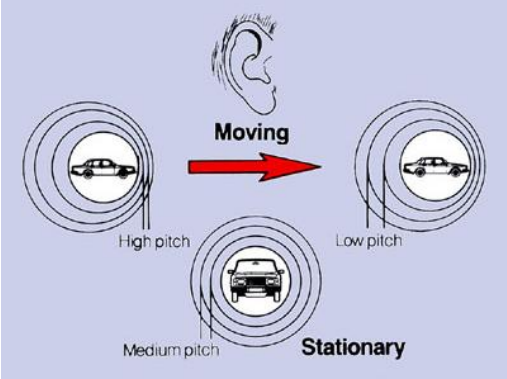
Audience Survey

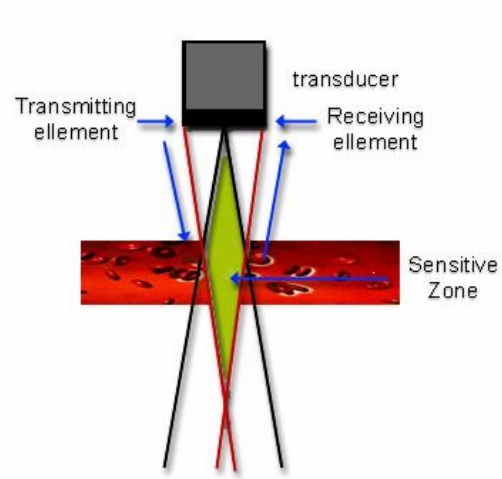
- Use of CW doppler

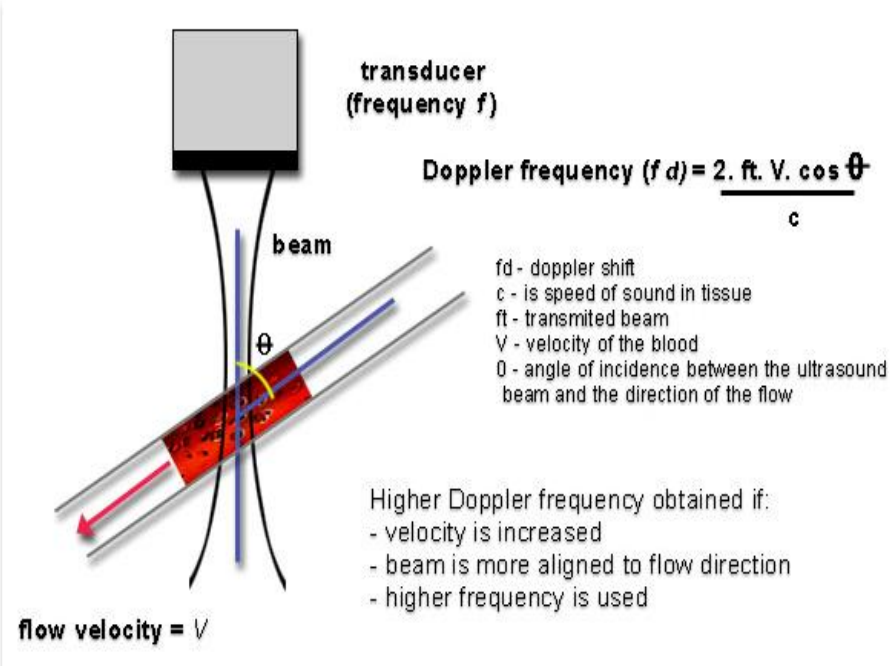
Indications

- Screening for venous reflux
- Assessment prior to micro-sclerotherapy
- Exclude co-existent perforator vein, truncal vein &/or tributary vein reflux
- ABI

CW Doppler Principles







Lower Limb Venous Framework

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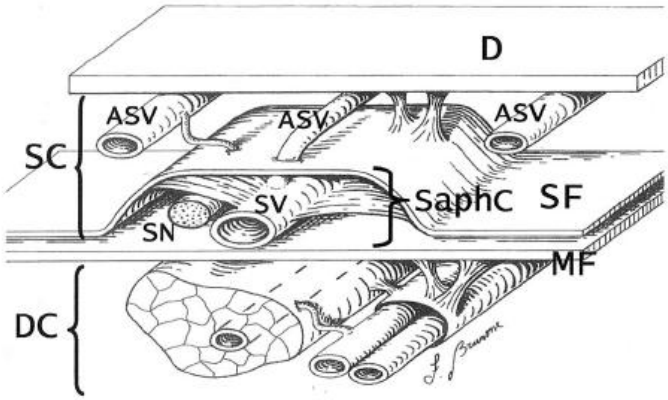

GSV Anatomy

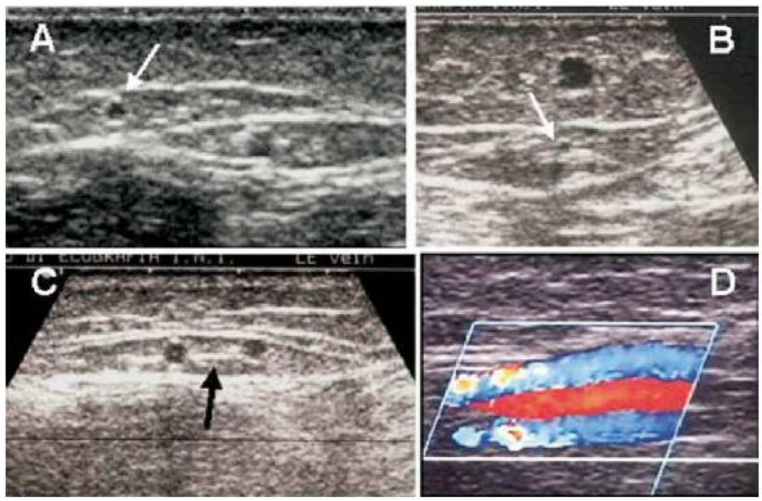

Fig 3. *A*, At the groin, the anterior accessory of the great saphenous vein (GSV) *(arrow)* courses deeply in the subcutaneous layer, and below a hyperechoic fascia that resembles the GSV covering. **B,** The small lumen of a hypoplastic GSV as seen by duplex scan. Note the compensatory enlargement of the overlying saphenous accessory. **C,** Real double GSV. The two veins course within the saphenous compartment and are connected by the saphenous ligament *(arrow)*. **D,** Real double femoral vein. The two veins *(in blue)* course close to the femoral artery *(in red)*.

Results/Reporting

- Venous Map
- Report

Results Examples

Limitations & Examples

–Anatomical
–?SPJ or PV
–?SFJ or FV
–?Perforator Vein or Saphenous Trunk

- Operator

–Training
–Skill
–Experience

Ankle Brachial Indices (ABI)

1. LEFT ARM PRESSURE - With patient lying down, take the left brachial pressure. Record the value on the ABI/ Risk Assessment Form.
2. RIGHT ARM PRESSURE - Take the right brachial pressure and record the value on the report form.
3. RIGHT ANKLE WAVEFORM*- Acquire arterial pulse with the Doppler at the right foot and print the waveform prior to taking the ankle pressure. Attach the waveform to the report form and mark the appropriate boxes.
4. RIGHT ANKLE PRESSURE – Take the right ankle pressure and record the value on the report form.
5. LEFT ANKLE WAVEFORM * -Acquire arterial pulse with the Doppler at the left foot and print the waveform prior to taking the ankle pressure. Attach the waveform to the report form and mark the appropriate boxes.
6. LEFT ANKLE PRESSURE - Take the left ankle pressure and record the value on the report form.
7. CALCULATE ABI VALUES - Calculate the ABI for both sides.
(For each side, divide the ankle pressure by the higher of the two arm pressures.)

Ankle/Brachial Index Chart

Brachial Pressure (mmHg) \ Ankle Pressure (mmHg)	200	195	190	185	180	175	170	165	160	155	150	145	140	135	130	125	120	115	110	105	100	95	90	85	80	75	70	65	60	55	50	45	40
200	1.00	.98	.95	.93	.90	.88	.85	.83	.80	.78	.75	.73	.70	.68	.65	.63	.60	.58	.55	.53	.50	.48	.45	.43	.40	.38	.35	.33	.30	.28	.25	.23	.20
195	1.03	1.00	.97	.95	.92	.90	.87	.85	.82	.79	.77	.74	.72	.69	.67	.64	.62	.59	.56	.54	.51	.49	.46	.44	.41	.38	.36	.33	.31	.28	.26	.23	.21
190	1.05	1.03	1.00	.97	.95	.92	.89	.87	.84	.82	.79	.76	.74	.71	.68	.66	.63	.61	.58	.55	.53	.50	.47	.45	.42	.39	.37	.34	.32	.29	.26	.24	.21
185	1.08	1.05	1.03	1.00	.97	.95	.92	.89	.86	.84	.81	.78	.76	.73	.70	.68	.65	.62	.59	.57	.54	.51	.49	.46	.43	.41	.38	.35	.32	.30	.27	.24	.22
180	1.11	1.08	1.06	1.03	1.00	.97	.94	.92	.89	.86	.83	.81	.78	.75	.72	.69	.67	.64	.61	.58	.56	.53	.50	.47	.44	.42	.39	.36	.33	.31	.28	.25	.22
175	1.14	1.11	1.09	1.06	1.03	1.00	.97	.94	.91	.89	.86	.83	.80	.77	.74	.71	.69	.66	.63	.60	.57	.54	.51	.49	.46	.43	.40	.37	.34	.31	.29	.26	.23
170	1.18	1.15	1.12	1.09	1.06	1.03	1.00	.97	.94	.91	.88	.85	.82	.79	.76	.74	.71	.68	.65	.62	.59	.56	.53	.50	.47	.44	.41	.38	.35	.32	.29	.26	.24
165	1.21	1.18	1.15	1.12	1.09	1.06	1.03	1.00	.97	.94	.91	.88	.85	.82	.79	.76	.73	.70	.67	.64	.61	.58	.55	.52	.48	.45	.42	.39	.36	.33	.30	.27	.24
160	1.25	1.22	1.19	1.16	1.13	1.09	1.06	1.03	1.00	.97	.94	.91	.88	.84	.81	.78	.75	.72	.69	.66	.63	.59	.56	.53	.50	.47	.44	.41	.38	.34	.31	.28	.25
155	1.29	1.26	1.23	1.19	1.16	1.13	1.01	1.06	1.03	1.00	.97	.94	.90	.87	.84	.81	.77	.74	.71	.68	.65	.61	.58	.55	.52	.48	.45	.42	.39	.35	.32	.29	.26
150	1.33	1.30	1.27	1.23	1.20	1.17	1.13	1.10	1.07	1.03	1.00	.97	.93	.90	.87	.83	.80	.77	.73	.70	.67	.63	.60	.57	.53	.50	.47	.43	.40	.37	.33	.30	.27
145	1.38	1.34	1.31	1.28	1.24	1.21	1.17	1.14	1.10	1.07	1.03	1.00	.97	.93	.90	.86	.83	.79	.76	.72	.69	.66	.62	.59	.55	.52	.48	.45	.41	.38	.34	.31	.28
140	1.43	1.39	1.36	1.32	1.29	1.25	1.21	1.18	1.14	1.11	1.07	1.04	1.00	.96	.93	.89	.86	.82	.79	.75	.71	.68	.64	.61	.57	.54	.50	.46	.43	.39	.36	.32	.29
135	1.48	1.44	1.41	1.37	1.33	1.30	1.26	1.22	1.19	1.15	1.11	1.07	1.04	1.00	.96	.93	.89	.85	.81	.78	.74	.70	.67	.63	.59	.56	.52	.48	.44	.41	.37	.33	.30
130	1.54	1.50	1.46	1.42	1.38	1.35	1.31	1.27	1.23	1.19	1.15	1.12	1.08	1.04	1.00	.96	.92	.88	.85	.81	.77	.73	.69	.65	.62	.58	.54	.50	.46	.42	.38	.35	.31
125	1.60	1.56	1.52	1.48	1.44	1.40	1.36	1.32	1.28	1.24	1.20	1.16	1.12	1.08	1.04	1.00	.96	.92	.88	.84	.80	.76	.72	.68	.64	.60	.56	.52	.48	.44	.40	.36	.32
120	1.67	1.63	1.58	1.54	1.50	1.46	1.42	1.38	1.33	1.29	1.25	1.21	1.17	1.13	1.08	1.04	1.00	.96	.92	.88	.83	.79	.75	.71	.67	.63	.58	.54	.50	.46	.42	.38	.33
115	1.74	1.70	1.65	1.61	1.57	1.52	1.48	1.43	1.39	1.35	1.30	1.26	1.22	1.17	1.13	1.09	1.04	1.00	.96	.91	.87	.83	.78	.74	.70	.65	.61	.57	.52	.48	.43	.39	.35
110	1.82	1.77	1.73	1.68	1.64	1.59	1.55	1.50	1.45	1.41	1.36	1.32	1.27	1.23	1.18	1.14	1.09	1.05	1.00	.95	.91	.86	.82	.77	.73	.68	.64	.59	.55	.50	.45	.41	.36
105	1.90	1.86	1.81	1.76	1.71	1.67	1.62	1.57	1.52	1.48	1.43	1.38	1.33	1.29	1.24	1.19	1.14	1.01	1.05	1.00	.95	.90	.86	.81	.76	.71	.67	.62	.57	.52	.48	.43	.38
100	2.0	1.95	1.90	1.85	1.80	1.75	1.70	1.65	1.60	1.55	1.50	1.45	1.40	1.35	1.30	1.25	1.20	1.15	1.10	1.05	1.00	.95	.90	.85	.80	.75	.70	.65	.60	.55	.50	.45	.40
95	2.11	2.05	2.0	1.95	1.89	1.84	1.79	1.74	1.68	1.63	1.58	1.53	1.47	1.42	1.37	1.32	1.26	1.21	1.16	1.11	1.05	1.00	.95	.89	.84	.79	.74	.68	.63	.58	.53	.47	.42
90	2.22	2.17	2.11	2.06	2.0	1.94	1.89	1.83	1.78	1.72	1.67	1.61	1.56	1.50	1.44	1.39	1.33	1.28	1.22	1.17	1.11	1.06	1.00	.94	.89	.83	.78	.72	.67	.61	.56	.50	.44
85	2.35	2.29	2.24	2.18	2.12	2.06	2.0	1.94	1.88	1.82	1.76	1.71	1.65	1.59	1.53	1.47	1.41	1.35	1.29	1.24	1.18	1.12	1.06	1.00	.94	.88	.82	.76	.71	.65	.59	.53	.47
80	2.50	2.44	2.38	2.31	2.25	2.19	2.13	2.06	2.0	1.94	1.88	1.81	1.75	1.69	1.63	1.56	1.50	1.44	1.38	1.31	1.25	1.19	1.13	1.06	1.00	.94	.88	.81	.75	.69	.63	.56	.50

Index	Assessment/Condition
Above 1.30	Incompressible Artery
0.90 to 1.30	Normal
0.70 to 0.89	Mild Disease
0.40 to 0.69	Moderate Disease
0.39 and Below	Severe Disease

Resources

Books

–Gent, R (1997), Applied Physics and Technology of Diagnostic Ultrasound, Women's and Children's Hospital, South Australia.