Transonic
Laser Doppler
Protocol #112

Clinical Perfusion Measurement in the Sternum

APPLICATION

Measurement of perfusion of the sternum before and after mobilization of the internal thoracic arteries (ITA).
It has been suggested that blood flow to the sternum is profoundly reduced when using both ITA for coronary artery bypass grafting. In a study involving 24 patients undergoing ITA bypass, no significant reduction of sternal perfusion was found.

Site:	sternum
Species:	human
Age:	52-85
Duration:	acute

PROBE

type:	R *(right angle)*
modification:	with suture holes

Type R (Right Angle) (ABLPHR)

head: epoxy, diameter, 15 mm
height, 7 mm
suture holes optional

SURGICAL APPROACH

Perform laser Doppler perfusion measurement on the sternum during thoracic surgery involving a mediam sternotomy.

Immediately after retracting the halves of the sternum, apply the probe to the cut surface of the sternum at the fourth intercostal space. Secure the probe head by placing two sutures through the anterior and posterior leaves of the periosteum. Record the perfusion measurement as the opening flow value.

Perform the surgical procedure(s) and note the response to sternal perfusion to the patient's hemodynamic changes. Finally, at the completion of the procedure(s) once again record laser output as closing flow value.

FLOW RANGES OBSERVED

Opening flow values	1.1 to 23 TPUs *(Tissue Perfusion Units)*
Closing flow values*	0.8 to 14 TPUs *(Tissue Perfusion Units)*

**After mobilization of the internal thoracic arteries.*

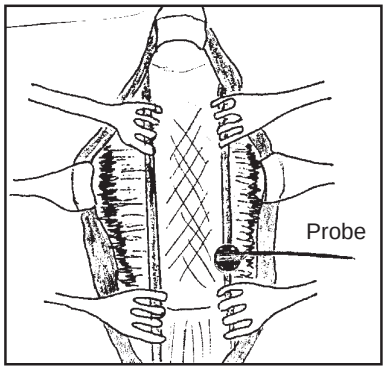

Fig. 1: After mediam sternotomy, retractors separate the edges. The probe is placed on the cut surface of the sternum and is sutured to the periosteum.

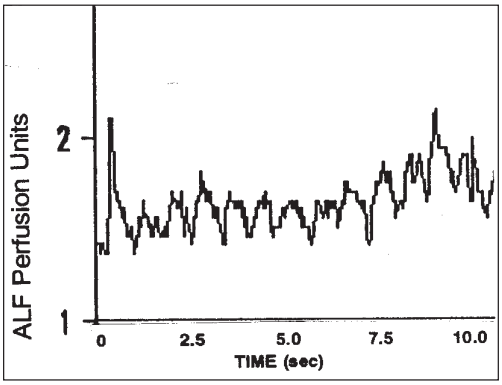

Fig. 2: Laser Doppler output showing perfusion in the sternum. Note the heartbeat synchronous pulsatility recorded using optional serial port and *FLOWTRACE* software.

ACKNOWLEDGEMENT

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References

Green, G.E., Swistel;, D.G., Castro, J., Hillel, Z., Thorton, J., "Measurement of Sternal Blood Flow during Mobilization of the Internal Thoracic Arteries," Annals of Thoracic Surgery, Vol. 55, p. 967-70, 1993.

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