

T400-Series Technical Note

Acoustic Couplants for Acute Measurements

Air attenuates (blocks) ultrasound transmission. It is therefore necessary to fill the acoustical window within a Perivascular Flowprobe with an acoustical couplant during acute use. Although couplants are viscous enough to loosely adhere between the Probe and vessel, the combination of temperature and time eventually overcomes surface tension and melts out the couplant. The couplant then has to be replenished. Best results are achieved with close Probe-vessel fits.

In ongoing efforts to improve the accuracy of Perivascular Probes, Transonic® has evaluated the influence of couplants. The following media were tested for acoustical match with blood and vessel wall and were rated for suitability as a coupling agent with Transonic® Perivascular Flowprobes (The coupling media are presented in order of best to worst performance).

1. Surgilube
2. HR Lubricating Jelly (very close to Surgilube, almost as good)
3. Aquasonic-100 (only marginally satisfactory)
4. Nalco 1181 (acceptable if mixed with Surgilube; unacceptable when mixed with saline)
5. Saline (unsatisfactory, gives variable readings)

SURGILUBE

Surgilube proved to be the best acoustical couplant. It is a bacteriostatic surgical lubricant by E. Fougera & Co. Sterile packets (3g, 5g) and tubes (4.25 oz) are available from most hospital supply stores.

HR LUBRICATING JELLY

Acoustically close to Surgilube, HR Lubricating Jelly is a water soluble hospital lubricant by HR Pharmaceuticals Inc.

NALCO 1181

This super-absorbent powder expands into a thick viscous gel when exposed to fluids and can be used in long-term acute experiments. Nalco 1181 added to Surgilube maintains the acoustic characteristics of Surgilube; Nalco 1181 added to saline is less accurate as a couplant and is not recommended. The compound has a low biotoxicity rating (it is used in disposable diapers). It should be used only for acute terminal animal research.

The compound is prepared as follows:

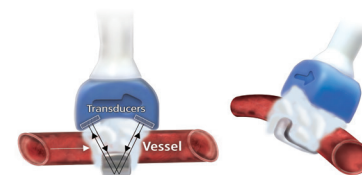
- Homogeneously disperse approximately 0.1g Nalco 1181 powder to 20 ml Surgilube.
- Allow to stand 15 minutes. Then stir again.
- Transfer the gel to a luer lock syringe and centrifuge for 10 minutes to remove air bubbles.
- Result should be a translucent gel with no visible air bubbles.

SALINE

Saline is the worst couplant choice and should be used only in exceptional situations when no other couplant can be used. Saline is an acoustic mismatch to blood and can produce unpredictable variability in flow readings.

COAGULATED BLOOD

This was not tested for acoustic properties in Transonic® trials. We have observed that the use of blood as a couplant can cause spasm and should not be used on small vessels.



PS-Series Probes with ultrasound sensing window filled with acoustic couplant.