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CORRESPONDENCE

Letter to the Editor re: Investigation on Radiofrequency and Laser (980 nm) Effects after Endoluminal Treatment of Saphenous Vein Insufficiency in an Ex-vivo Model, by C.G. Schmidt *et al*

Sir,

In the investigation described by Schmedt *et al* in the September 2006 issue of *Eur J Vasc Endovasc Surg*, the cow's foot model was proposed for the evaluation of endoluminal thermal ablation procedures.[1]

We would like to comment on the choice of this model and demonstrate using mathematical modeling why this model should be used with caution, in particular when evaluating endovenous laser treatment (ELT).

The cow's foot model has a subcutaneous vein (*V. Saphena lateralis*). A thick skin layer covers this vein. This is easily observed after dissection. The deeper part of this skin layer is composed mostly of fat. Fat has optical and thermal coefficients different from those of muscle. Our group has recently proposed mathematical modeling of ELT in order to provide a better understanding of the ELT process.[2] The parameters determined in our mode have confirmed and explained the observations emerging from clinical practice.

Using our mathematical model, calculations were performed using the parameters proposed by Schmedt *et al*: wavelength: 980 nm, 600 μm bare tipped optical fibre, power 7W, pulse duration 1.5 s.

Our calculations clearly show that the temperatures obtained inside the intima are different when the vessel wall is in contact with the muscle or the fat tissue. The maximum temperature (74 °C) is reached when the vessel wall is in contact with fat. Due to the poor heat conduction properties of fat, this temperature is maintained for 1.5 s. This temperature is sufficient to lead to transmural tissue destruction. Calculations show that irreversible damage ($\Omega = 10$) is obtained in the vessel wall in contact with the fat. When in contact with the muscle, the temperature reaches only 71 °C and dissipates very rapidly ($\Omega \approx 1$).

In conclusion, the inhomogeneous thermal damage observed by Schmedt *et al* is due mainly to the use of this specific animal model. Moreover, in clinical practice, endovenous laser treatment always is performed after tumescent anesthesia. This tumescent anesthesia acts as a heat sink around the vessel and ensures a uniform distribution of heat inside the vessel.

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