



Monitoring esophageal temperature during catheter ablation

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Abstract

I comment on a paper just appeared on JAFIB, aimed at providing an index quantifying the convenience of monitoring esophageal temperature during catheter ablation. The authors base their calculation on the data from four papers. I point out that the data from the two papers strongly against monitoring should be interpreted differently and I suggest how to retrieve more data for a more reliable determination of the said index. In addition, I briefly discuss the so-called antenna effect, sometimes put forward to discourage temperature monitoring.

Introduction

The just appeared paper by Koranne et al ^[1] has the merit of addressing a question of fundamental importance in the field of catheter ablation for pulmonary veins isolation (PVI): is it recommendable to monitor luminal esophageal temperature (LET)? Very appropriately, the authors try to provide an answer not just suggested by their own experience, but looking for some objective index based on data found in the literature reporting comparisons between monitored and non-monitored patients. The index they come out with is slightly in favor of a positive answer, concerning RF ablation (for cryoablation LET monitoring is rightly defined "vital"). Their determination is based on four papers only (unfortunately, there are not more of the same kind) and a considerable negative weight is brought in by two of them which suggest the existence of an interaction of the metallic body of the thermal sensors with the RF field, later become known as the "antenna effect", supposed to heat up the sensors, thus producing lesions on the surrounding tissue. About this phenomenon, Koranne et al quote a paper by Perez et al, where, based on a mathematical model, it is shown that conduction, and not the electromagnetic field, is the prevailing heat transfer mechanism towards sensors. Since around the antenna effect there has been a lot of misinformation with potentially dangerous implications, I wish to add a few comments. Fasano et al ^[2] have calculated the thermal and the electric field generated by an RF ablator during PVI, showing that the power deposited on the closest sensor is less than one millionth of a Watt. The reason for the electric field to be so weak in the esophageal region is that the field is strongly diverted towards the heart, owing to the larger electrical conductivity of blood. In addition to theoretical explanations, the following practical consideration explains very clearly that the antenna effect does not have any role: when the ablator is switched off it is commonly observed that LET keeps increasing for a while, thus proving that heat is flowing from the esophagus to the sensor (and with a timescale typical of conduction),

not vice versa as the antenna effect would imply. That said, let us come back to Koranne's index. The data entering its determination are the number of lesions reported in the two group of patients. In the two papers against monitoring the ratios found were 5:0 and 12:1 (monitored vs. non-monitored). Nevertheless, erythemas (so just slight irritations, probably of mechanical rather than thermal origin) were included among lesions, along with real ulcers. Removing them, the ratios become 2:0 and 2:1, which would neatly push Koranne's index in favor of monitoring. I understand it would not be simple, but more data could be retrieved taking into account papers in which LET has been monitored and papers in which it has not. For instance in the paper by Sause et al ^[3] it was found that monitoring LET in a group of 184 patients with a cut off LET of 40°C reduced the incidence of lesions occurrence to a mere 1.6%, almost one tenth of the known average, which obviously includes non-monitored procedures. For lack of space here I cannot quote many other papers proving the importance of LET monitoring. It would be important for the benefit of patients that the authors of the paper here discussed could share at least part of my considerations.

Disclosures

None.

References

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Key Words

Atrial Fibrillation, Ablation, Esophageal lesions, Esophageal Temperature.