



Newsletter No. 69

27th Annual International Atrial Fibrillation (AF)
Symposium 2022: Mechanisms and New Directions in Therapy

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In January 2022, the 27th Annual International Atrial Fibrillation (AF) Symposium (programme: <https://www.afsymposium.com/program-nav>) was held in person in New York City. Over three days, this symposium brought together the world's leading experts in the field of atrial fibrillation. Excitingly, one of the most repeated words in the meeting was Electroporation or Pulsed Field Ablation (PFA). Why is that?

PFA is the term adopted in the electrophysiology medical community to name the use of irreversible electroporation for the ablation of cardiac tissue in the treatment of cardiac arrhythmias. Ablation – the selective destruction of areas of cardiac tissue – has been established as the therapeutic option in patients not responding to medication. Specifically, in the field of atrial fibrillation (AF), which has become an important public health problem in western countries (nearly 60 million people affected worldwide [1]), PFA has made remarkable advances in the last 5 years. If the safety and efficacy that PFA has shown in the first clinical studies is confirmed, experts envision that PFA could replace the current standard ablation technologies (radiofrequency and cryoablation) in the next few years.

Within the US\$8000 million electrophysiology ablation market, well-established companies and emerging start-ups are rapidly developing PFA technology. The AF Symposium provided a display of the technology and regulatory status of current PFA systems with at least 10 companies/systems at different stages of development. The first commercial PFA system was made available in Europe in 2021, and more than 2000 patients have now been treated. It is expected to arrive in USA mid-2023. Other systems are currently enrolling patients for their pivotal studies to obtain final CE and FDA clearance. Finally, other systems are developing now in early-stage first-in-human studies.

The results from the multiple clinical studies under development presented during the AF Symposium, including cutting edge clinical case live transmissions as well as pre-recorded cases, showed feasibility and confirmed one of the most important advantages of PFA technology: safety. Due to the well-known non-thermal nature of irreversible electroporation, adverse events that may occur during ablation procedures are almost eliminated.

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Another feature that was repeatedly highlighted during the symposium is the reduced treatment duration compared to current ablation technologies. However, all these studies were performed by a limited number of investigators in a limited number of patients. Now that PFA is approved in the European Union, the first reports from real-world experiences are becoming available [2], but we will still need to wait for long-term results. These results will determine whether PFA will be the leading treatment option in the future.

Despite all the promising advancements shown, the leading experts in the technology development also highlighted several unknowns and challenges that are still waiting for an answer. Among the multiple points of discussion, the supposed tissue selectivity, the observed collateral stimulation, the limited tissue depth of the lesions, and the vascular effects are still subjects of controversy, as pointed out also in two recent editorials [3, 4].

The low number of studies characterizing the basis of the technology opens a big opportunity to the ISEBTT members. As electroporation experts, ISEBTT community should take a leading role in scientifically supporting this technology and actively contributing to its improvement and, eventually, final establishment in the clinical practice. If all the promises currently ascribed to PFA technology come true, we are on the verge of what may become the most widely used application of electroporation in medicine.

Finally, we would like to take this opportunity to invite you all to attend and/or contribute to the special session about Cardiac Electroporation that will be organized during the next World Congress on Electroporation (<https://wc2022.electroporation.net>) in October in Copenhagen.

[1] Roth GA, Mensah GA, Johnson CO, et al. Global Burden of Cardiovascular Diseases and Risk Factors, 1990-2019: Update From the GBD 2019 Study. *J Am Coll Cardiol.* 2020; 76(25). doi: [10.1016/j.jacc.2020.11.010](https://doi.org/10.1016/j.jacc.2020.11.010)

[2] Gunawardene MA, Schaeffer BN, Jularic M, et al. Pulsed-field ablation combined with ultrahigh-density mapping in patients undergoing catheter ablation for atrial fibrillation: Practical and electrophysiological considerations. *J Cardiovasc Electrophysiol.* 2022; 03 Jan. doi: [10.1111/jce.15349](https://doi.org/10.1111/jce.15349)

[3] Haines DE. What is different about pulsed-field ablation ... everything? *J Cardiovasc Electrophysiol.* 2022; 10 Jan. doi: [10.1111/jce.15353](https://doi.org/10.1111/jce.15353)

[4] Baykaner T, Fazal M, Verma A. Taking the “pulse” of pulsed-field ablation: Real-world experience. *J Cardiovasc Electrophysiol.* 2022; 03 Jan. doi: [10.1111/jce.15348](https://doi.org/10.1111/jce.15348)

Forthcoming events

8th School on Pulsed Electric Field Applications in Food and Biotechnology

Compiègne, May 30 – June 3, 2022

<https://pefschool2022.electroporation.net>

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AF Symposium live, face-to-face again. On the photo Moussa Mansour, MD, is presenting the most advanced PFA systems.

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