ATRIAL FIBRILLATION

INNOVATIVE TECHNIQUES

High-frequency, Low Tidal Volume Ventilation: Improving Catheter Stability During Atrial Fibrillation Ablation

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Introduction

Catheter stability is integral to a successful atrial fibrillation ablation and jet ventilation has been used to minimize catheter motion. We describe a novel technique; high frequency, low tidal volume (HFLTV) ventilation, to accomplish the same goal using only a conventional anesthesia machine and ventilator.

Results

A 57-year-old male with long-standing, persistent atrial fibrillation underwent a radiofrequency ablation under general anesthesia using a Datex-Ohmeda Aespire View (GE Healthcare, Madison, WI) anesthesia machine. The total procedure time was 93 min, including 8.6 min of fluoroscopy and 58.1 min of radiofrequency (RF) ablation time. Using 35–40 mmHg end tidal CO₂ (ETCO₂) as a baseline, our team alternated between hyperventilating the patient to 30 mmHg ETCO₂ for approximately 5 minutes, and then, for the subsequent 15 min we utilized 100 mL tidal volumes at a rate of 80 breaths per minute. While ETCO₂ levels trended upwards during HFLTV ventilation, this effect was mitigated by the intermittent hyperventilation. Respiratory motion was substantially reduced, resulting in increased catheter contact.

Conclusions

Catheter stability improves RF energy delivery and creates better ablation lesions. Our case study reports a previously undescribed technique that substantially improves stability and can be easily implemented in the electrophysiology laboratory with a conventional anesthesia ventilator.
HFLTV Ventilation ACCURESP™ Waveform (CARTO 3, Biosense Webster)

Standard Ventilation ACCURESP™ Waveform (CARTO 3, Biosense Webster)

Figure 1: HFLTV ventilation vs. standard ventilation respiratory motion comparative view via Biosense Webster CARTO® 3 ACCURESP module.