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TO THE EDITOR: The FIRE AND ICE trial concluded that cryoballoon ablation was not inferior to radiofrequency ablation of pulmonary veins for atrial fibrillation. However, no anatomical variations in pulmonary veins were considered in that trial. We wish to highlight that the anatomical features of pulmonary veins may influence the efficacy of pulmonary-vein isolation and should be taken into account when selecting the ablation method.[1] Only 47 to 81% of hearts have four standard pulmonary veins.[2,3] An additional, separate ostium of the middle right pulmonary vein is the most common variation and is present in approximately 20% of hearts. Because this vein also has the myocardial sleeve, clinicians should be aware of this anomaly.[3] Moreover, the mean (±SD) diameter of this vein (8.2±4.1 mm)[3] is typically too small for a cryoballoon, so with this method the middle right pulmonary vein may easily be omitted. The radiofrequency catheter ablation system may be a better option in atypical pulmonary-vein patterns; the middle right pulmonary vein ostium may even be unintentionally isolated when performing a pulmonary-vein ablation on the right side. The individual pulmonary-vein pattern should always be imaged before ablation to select the appropriate technique and achieve maximum efficacy.[4]

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THE AUTHORS REPLY: In response to Providência et al.: the FIRE AND ICE trial had requirements to ensure that centers were experienced in both cryoballoon ablation and radiofrequency current ablation. Specifically, each center had to provide at least one investigator who was proficient in both techniques (≥50 cases with each technology), and before the use of advanced-generation catheters, each center had to complete at least 10 cases. A test of center effect on the primary efficacy analysis revealed no significant differences (P=0.83).[1] With respect to the radiofrequency catheters used in the trial, there were 46 surround-flow catheters and 93 contact-force–sensing catheters. There were no contact-force–sensing surround-flow radiofrequency catheters, because enrollment was completed in January 2015, and Conformité Européenne (CE)–mark approval was received in May 2014, which did not allow centers time to finish the minimum number of required cases. Importantly, this trial was not powered to investigate further differences between generations of catheters.

In response to Zipursky and Shadowitz: the trial physicians reported no instance of gastroparesis, but there were postprocedural adverse events that had symptoms that are shared with gastroparesis (abdominal pain, diabetic gastroparesis, epigastric discomfort, gastritis, impaired gastric emptying, nausea, and vomiting) (Table S4 in the Supplementary Appendix of the article, available at NEJM.org). For the incidence of these combined events, no significant difference between groups was present (cryoballoon ablation, 3.2% [12 of 374 patients]; radiofrequency ablation, 2.1% [8 of 376 patients]; P=0.38). However, the study by Aksu et al. showed that gastroparesis had resolved in all patients who received cryoballoon ablation, whereas one patient who received radiofrequency ablation had persistent gastroparesis at the 6-month follow-up visit, findings that suggest that the energy source may influence the severity of collateral tissue damage.[2]

In response to Hołda et al.: in the FIRE AND ICE trial, all anatomical pulmonary-vein variations (present at enrollment) were allowed. In fact, the only exclusion criteria regarding pulmonary-vein anatomical features was that patients were