The magnetic navigation system improves safety and allows high efficacy for ablation of arrhythmias

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Itroduction: The magnetic navigation system (MNS) has the potential for improving safety and efficacy based on an atraumatic catheter design and superior navigation. Feasibility of MNS has been shown for ablation of various types of arrhythmias; however, early reports included only small numbers of patients and failed to demonstrate superiority. *Purpose*: The aim of this study was to evaluate the safety and long-term efficacy of MNS in a large number of patients with consistent technique and workflow. *Methods*: In this study, 446 consecutive patients underwent ablation. Patients were divided into two age- and sex-matched groups. Ablations were performed either using MNS (group MNS, 214 patients, age 45,8±19,1 y, 117 male) or using conventional manual ablation (group MAN, 232 patients, age 50,6±15,8 y, 142 male). The same team performed all of the procedures over the entire study duration. The following parameters were analyzed: acute success rate, fluoroscopy time, procedure time and complications (major: pericardial tamponade, permanent atrioventricular (AV) block, major bleeding or death; minor: minor bleeding, temporary AV block). Recurrence rate was assessed during follow-up (12,4±6,9 months). Subgroup analysis was performed for the following groups: atrial fibrillation, atrial flutter, atrial tachycardia, AV nodal re-entrant tachycardia, circus movement tachycardia and ventricular tachycardia (VT). *Results*: The use of MNS was associated with a lower major complication rate (0,467% vs. 2,59%, p<0,05). The total numbers of complications were lower in Group MNS (2,80% vs. 7,33%, p<0,05). There were fewer but no statistical differences in minor complications (2,33% vs. 4,74%, p=NS). MNS was equally effective as MAN in acute success rate for the overall groups (93,9% vs. 93,9%, p=NS). In the subgroups only VT results were different, where MNS was more successful (94,7% vs. 77,8%, p<0,05). Less fluoroscopy was used in Group MNS (32,2±27,1 vs. 39,4±27,6 min, p<0,01). There were no differences in procedure times and recurrence rates (170±76 vs. 162±72 min, p=NS, 22,9% vs. 19,0%, p=NS; respectively). *Conclusions:* Our data suggest that the use of MNS improves safety without compromising efficiency of ablations. MNS is more effective than manual ablation for VTs.

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Key Take-Aways

- Comparison of the MNS (n=214) to manual technique (n=232) for ablation of a broad sample of arrhythmias. Patients were assigned to each group in a functionally randomized fashion based on practical constraints on lab availability. The same team performed each procedure.

- Analysis was performed for the sample as a whole as well as for the following subgroups: ventricular tachycardia (VT), atrial fibrillation, atrial flutter, atrial tachycardia, AV nodal re-entrant tachycardia, and "circus movement" tachycardia.

- The MNS group was associated with significantly improved safety relative to the manual group for the overall study population, which was the primary endpoint of the study.
  - Major complication rate was significantly lower in the MNS group (.467% vs 2.59%, $p < 0.05$).
  - Fluoroscopy time was significantly lower in the MNS group (32.2 ± 27.1 vs 39.4 ± 27.6, $p < 0.01$).

- In subgroup analysis, ventricular tachycardia (VT) ablation was demonstrated to have an acute success rate that was significantly higher in the MNS group (94.7% vs 77.8%, $p < 0.05$).

- The MNS and manual groups were not significantly different for the overall study population in terms of:
  - acute success: 93.9% vs 93.9%
  - recurrence rate: 22.9% vs 19.9%
  - procedure time: 170 ± 76 vs 162 ± 72 minutes

- The authors conclude that magnetic navigation improves safety without compromising efficiency for a wide range of EP ablations.