

# Catheter ablation of atrial fibrillation using remote magnetic catheter navigation: a case-control study

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**Aims** To compare the acute and the 6 month outcome of catheter ablation of atrial fibrillation (AF) using irrigated tip magnetic catheter and remote magnetic catheter navigation (RMN) with manual catheter navigation (MCN) in patients with paroxysmal and persistent AF.

**Methods and results** In this retrospective analysis 356 patients (235 male, mean age:  $57.9 \pm 10.9$  years) with AF (70.5%, paroxysmal) who underwent catheter ablation between August 2007 and May 2008 using either RMN ( $n = 70$ , 46 male, mean age:  $57.9 \pm 10.1$  years, 50% paroxysmal) or MCN ( $n = 286$ , 189 male, mean age:  $58.0 \pm 13.9$  years, 75.5% paroxysmal) were included. All patients completed an intensive follow-up strategy. Complete pulmonary vein isolation was achieved in 87.6 and 99.6% of patients in RMN and MCN groups, respectively ( $P < 0.0001$ ),  $13.7 \pm 7.8$  vs.  $34.5 \pm 15.1$  min ( $P < 0.0001$ ), and  $75.4 \pm 20.9$  vs.  $53.2 \pm 21.4$  min ( $P < 0.0001$ ) in RMN and MCN groups, respectively. Seven (10.0%) and 28 (9.8%) patients in RMN and MCN groups received antiarrhythmic medications during the follow-up ( $P = 0.96$ ). All the patients completed the 6 month follow-up. Freedom from AF at 6 months was achieved in 57.8 and 66.4% of the patients in RMN and MCN groups, respectively ( $P = 0.196$ ). In patients without previous AF catheter ablation procedure the freedom from AF at 6 months were 68.2 and 60.5% in the MCN and RMN groups, respectively ( $P = 0.36$ ).

**Conclusion** Catheter ablation using irrigated tip magnetic catheter and RMN is an effective and safe method for catheter ablation of AF. Compared to manual catheter navigation, the procedure and radiofrequency application times were longer and fluoroscopy time was shorter in the RMN group compared with the MCN group.

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## Key Take-Aways

- Retrospective comparison of the magnetic navigation system (MNS;  $n = 70$ ) to manual technique ( $n = 286$ ) for atrial fibrillation (AF) ablation by pulmonary vein isolation (PVI). Magnetic ablation was accomplished with a 8-mm non-irrigated ( $n = 8$ ; Navistar-RMT DS; 60W, 60°C) or 3.5-mm irrigated tip ( $n = 27$ ; Navistar-RMT Thermocool; 35W, 48°C, 30mL/min).
- PVI was confirmed in the MNS group using the automated “bull’s eye” mapping feature after it was observed to be 100% concordant with circular mapping catheters in the first 10 patients.
- The prevalence of arterial hypertension (77.1% vs. 53.8%,  $p < 0.0001$ ) and persistent AF (50.0% vs. 24.5%,  $p < 0.0001$ ) were higher in the MNS group.
- Compared to the manual group, the MNS group was associated with significantly shorter fluoroscopy times ( $34.5 \pm 15.1$  vs.  $13.7 \pm 7.8$  min,  $p = 0.0001$ ) but longer procedure ( $166 \pm 52$  vs.  $223 \pm 44$  min,  $p = 0.0001$ ) and RF ablation ( $53.2 \pm 21.4$  vs.  $75.4 \pm 20.9$  min,  $p = 0.0001$ ) times.
  - The authors attribute the long procedure times in the MNS group with, in part, documented interruptions, which ranged from 25 to 52 minutes per case. Interruptions were attributed to the remote nature of magnetic procedures, which results in the operator being “always available to answer the questions and even help with the other procedures”.
- Although, compared to the manual group, the MNS group was associated with lower acute procedural success (99.6% vs. 87.6%,  $P < 0.05$ ), the groups had equivalent success rates at 6 month follow-up (66.4% vs. 58.5%,  $p = 0.192$ ).
  - The MNS group may have had relatively higher success rates if the groups were better matched by patient characteristics (particularly by hypertension and persistent AF).
  - The authors point out that the learning curve may have affected the MNS group results.
- 12 patients (3.2%) in the manual group experienced major complications (7 pericardial effusion and 1 each of right phrenic nerve injury, PV stenosis, femoral vascular complication, and transient brachial plexus palsy). 1 patient (1.4%) in the MNS group experienced a femoral vascular complication.