

## The magnetic and sensor-based navigation in catheter ablation

### Summary

**Objectives:** Catheter ablations are increasingly used for treatment of cardiac arrhythmias. Robotic magnetic navigation (RMN) and sensor-based navigation (SBN) in catheter ablation provide alternative for manual catheter ablation (MCA) due to better catheter control and reduced fluoroscopy times but also result in higher procedure costs. The aim was to assess the comparative evidence on the indications, effectiveness and cost-effectiveness of RMN, SBN and MCA and provide a budget impact analysis for these alternatives in Estonian setting.

**Methods:** Literature searches in PubMed database were carried out for the clinical guidelines on cardiac catheter ablation and evidence from randomized trials comparing RMN or SBN to MCA. Current clinical practice was analysed based on 2017–2019 data from Estonian Health Insurance Fund (EHF). Budget impact calculation were performed for 2020–2024.

**Results:** According to the guidelines, catheter ablation is a safe and effective rhythm-control strategy that is indicated for symptomatic patients with atrial fibrillation or ventricular tachycardia. The available evidence indicates that RMN and SBN in catheter ablation have similar clinical effectiveness rates as MCA but the duration of fluoroscopy and resulting radiation exposure to patients and staff is substantially shorter. Due to the lack of evidence on the quantifiable long-term health effects of the reduced fluoroscopy times, no studies on the comparative cost-effectiveness of different ablation procedures were found. One study focusing on the procedure costs using listed prices demonstrated nearly two-fold difference in costs when RMN and MCA were compared indicating that the total costs of procedure are heavily dependent on choice of the catheters and accessories. In Estonia, catheter ablations are performed in North Estonia Medical Centre and Tartu University Hospital. First uses RMN procedure with Stereotaxis Niobe ES, the second performs SBN ablations using MediGuide (Abbott) devices. From 2017–2019, 1763 ablations for total of 1598 patients have been performed. As of 2020, EHF list of health care services did not differentiate RMN and SBN procedures and prices. The total cost for catheter ablation in 2019 (n = 630) was 3.8 million Euros in 2019. The budget impact analysis compared annual and incremental costs for scenarios of a) current list prices (5312.2 Euros per procedure for all ablation techniques), b) actual costs (6070.5 Euros for MCA, 6769.7 Euros for SBN and 8251.7 Euros for MCA). Depending on the assumptions applied, the projected costs for 2020 ranged from 3.45–5.49 million Euros, reaching 4.19–7.33 million Euros by 2024.

**Conclusions:** Although RMN and SBN are being increasingly used for catheter ablations in Estonia, the current EHF list prices are insufficient to cover the actual procedure-related costs. We recommend differentiating RMN, SBN and MCA procedures and updating their list prices.

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