Cost-effectiveness of renal denervation for uncontrolled hypertension: An analysis for Sweden based on the SPYRAL HTN-ON MED trial and other contemporary evidence

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Conclusions

Based on model projections, radiofrequency RDN provides a cost-effective alternative in the treatment of uncontrolled hypertension in Sweden, including resistant hypertension.

Objectives

- Renal Denervation (RDN) has been recommended as an adjunctive treatment option to existing therapies, as noted by 2023 consensus statements and guidelines from the European Society for Hypertension (ESH) and the European Society of Cardiology (ESC).[1,2]
- The objective of this study was to assess the cost-effectiveness of radiofrequency renal denervation (RF-RDN) in the context of the Swedish healthcare system.

Methods

- A decision-analytic Markov model (Fig. 1) consisting of seven health states (hypertension alone, stroke, myocardial infarction, other symptomatic coronary artery disease (AP/CHD), heart failure, end-stage renal disease, and death) was used to project clinical events, quality-adjusted survival and costs over 10 years and lifetime.
- Event risks were based on multivariate risk equations (Framingham, PROCAM). Risk reduction associated with changes in office systolic blood pressure (oSBP) in the treatment group was estimated based on a meta-regression of 47 hypertension RCTs.[3]

Table 1 *Key input parameters.*

Parameter	Value	Source
Age (Years)	55.0	SPYRAL HTN-ON MED Trial (full cohort)[4]
Gender (% Female)	19.9%	
Baseline Office Systolic BP	163 mmHg	
Treatment Effect (OSBP vs. sham control)	-4.9 mmHg	
Discount Rate (Costs, Effects)	3.0% p.a.	Swedish Council on HTA, 2017
Costs* (annual)		
Hypertension (Year 1+)	5,895 kr	Swedish Drug database
Stroke (Acute incl. Year 1; Year 2+)	166,355 kr; 42,207 kr	Jendle et al., 2021 / Ghatnekar et al. 2014
MI (Acute; Year 1+)	111,140 kr; 14,593 kr	Jendle et al., 2021 / Gerdtham et al. 2009 / Banefelt et al. 2015 / Janzon et al. 2016
AP Stable (Year 1+); Unstable (Year 1+)	48,504 kr; 103,956 kr	Anderson et al., 1995
HF (Initial; Year 1+)	101,662 kr; 55,729 kr	Mejhert et al. 2012/ Boman et al. 2019
ESRD (Year 1+)	513,396 kr	Jendle et al., 2021 / CPP database / Eriksson et al. 2016
RF-RDN Treatment (one-time procedure at index)	75,243 kr	Estimate based on prior microcosting analysis

- The base case effect size (-4.9 mmHg, observed vs. sham oSBP) was derived from the SPYRAL HTN-ON MED full cohort results.[4]
- Additional analyses were calculated using a pooled estimate of all 2nd-generation RF-RCTs (-5.7 mmHg) and data from the Swedish registry for RDN (-16.0 mmHg vs. baseline). Effect sizes were assumed to be maintained over lifetime.
- The analysis was conducted from a Swedish healthcare perspective, with a 3.0% discount rate applied to costs and effects.
- Relative risks (RR) of 10-year clinical events were assessed and the lifetime incremental cost-effectiveness ratio (ICER) was evaluated against a willingness-to-pay (WTP) threshold of SEK 500,000 per QALY gained.

Results

- RDN resulted in a relative risk reduction in clinical events (10-year RR=0.80 for stroke, 0.88 for myocardial infarction, 0.72 for heart failure, Fig. 1).

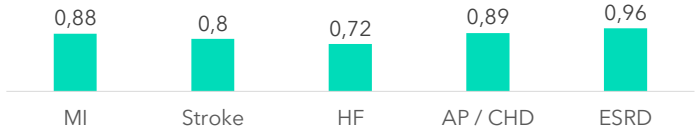

Figure 1 *Ten-Year Clinical Event Risk Reduction (Relative Risks, RDN vs. SoC).*

- Over lifetime, RF RDN added 0.43 QALYs at a concurrent cost increase of SEK 61,791, resulting in an ICER of SEK143,887 per QALY gained for the SPYRAL HTN-ON MED base case.
- All additional cohorts studied in scenario analysis were associated with further outcome improvement and lower ICERs, with the most favorable ICER of SEK 54,891 per QALY gained reached for the Swedish registry cohort (Fig. 2)

Figure 2 *Cost-effectiveness results for base case and explored scenarios.*

- Cost-effectiveness findings were robust, with 98.3% and 100% of simulations in probabilistic sensitivity analysis (PSA) resulting in an ICER below the 250,000 and 500,000 kr per QALY gained, respectively (Fig. 3).

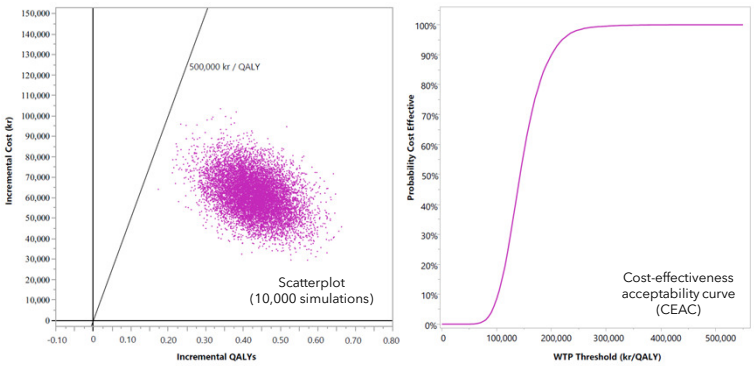

Figure 3 *Probabilistic Sensitivity Analysis (PSA) results for base case.*

References:

[1] Mancia G., et al. J Hypertens. 2023.
[2] Barbato E., et al. EHJ. 2023.
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[4] Kandzari DE et al. SPYRAL HTN-ON MED presentation AHA 2022. JACC 2023 [in print].

Disclosures: *Funding support by Medtronic Inc.*