

HYPERTENSION

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Conflicts of Interest

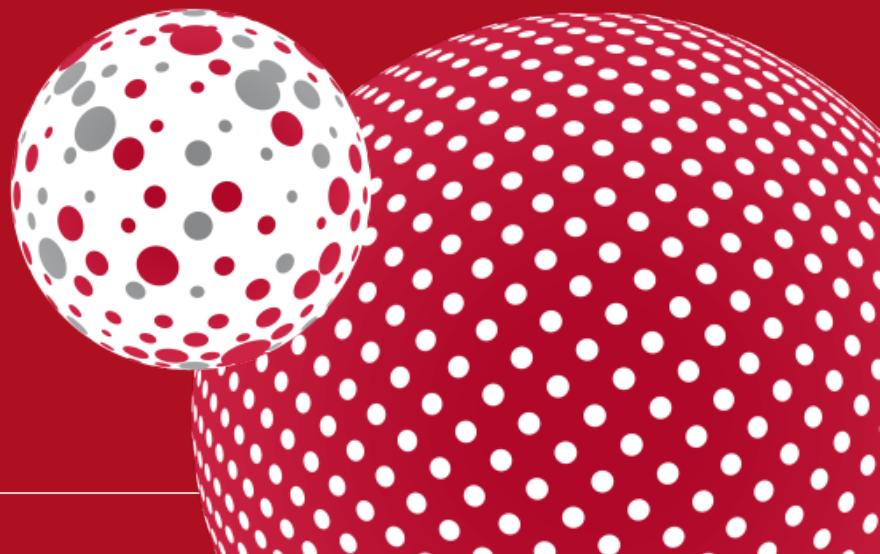
Research grants: Deutsche Forschungsgemeinschaft (DFG TRR219), Deutsche Hochdruckliga, Deutsche Gesellschaft für Kardiologie, Saarländisches Ministerium für Wissenschaft und Forschung, Medtronic, Recor. Consultant/Lecture fee: Medtronic, Recor, Berlin Chemie, Boehringer Ingelheim.

Contents

- **Epidemiology**
- **Management of hypertension**
- **Device-based hypertension treatment**

● HYPERTENSION

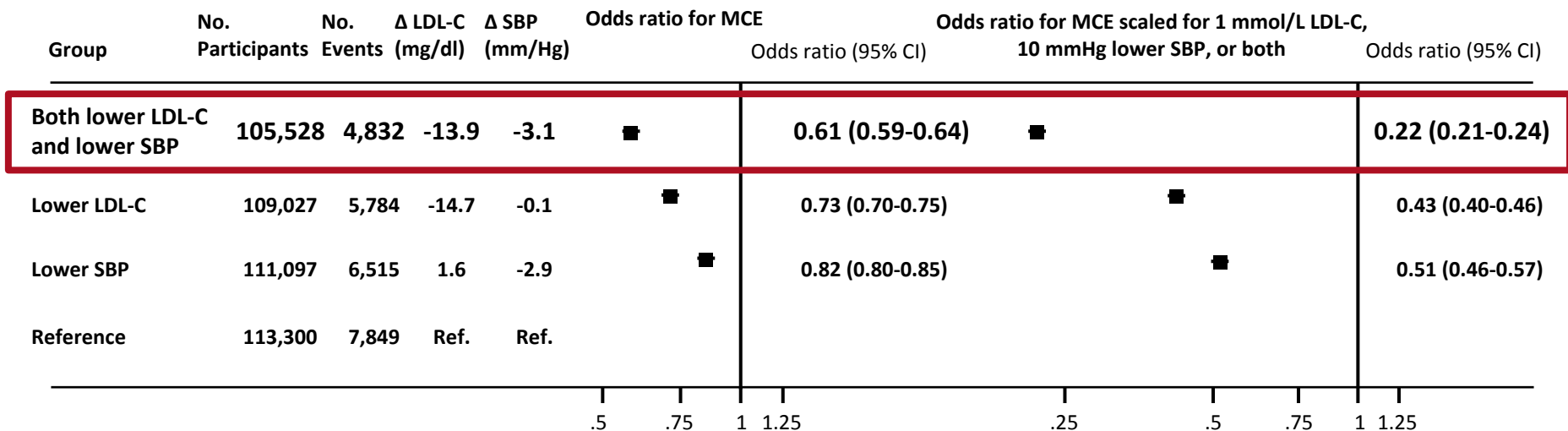
EPIDEMIOLOGY



Combined effect of lower LDL-C and lower SBP on the lifetime risk of cardiovascular disease

- Association between long-term exposure to the combination of both lower LDL-C and lower SBP on the lifetime risk of cardiovascular events using naturally randomised evidence
- **Study population**
 - 438,952 participants enrolled in the UK Biobank
- **Primary clinical outcome**
 - Major coronary events (MCE): non-fatal MI, coronary revascularisation or coronary death

Effect of lower SBP and LDL on lifetime risk of cardiovascular disease



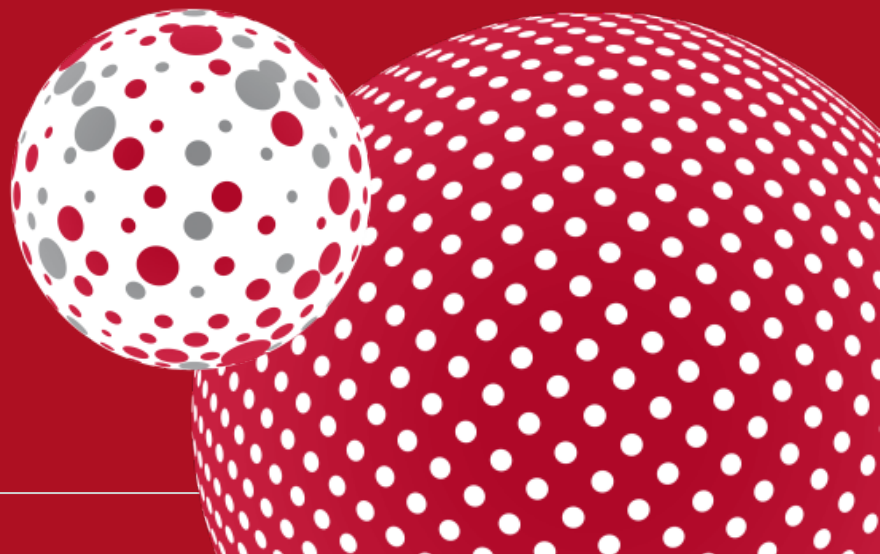
Effect of lower SBP on lifetime risk of cardiovascular disease

Conclusion

Lifetime exposure to lower LDL-C and lower SBP have independent, additive, and dose-dependent effects on the lifetime risk of cardiovascular disease.

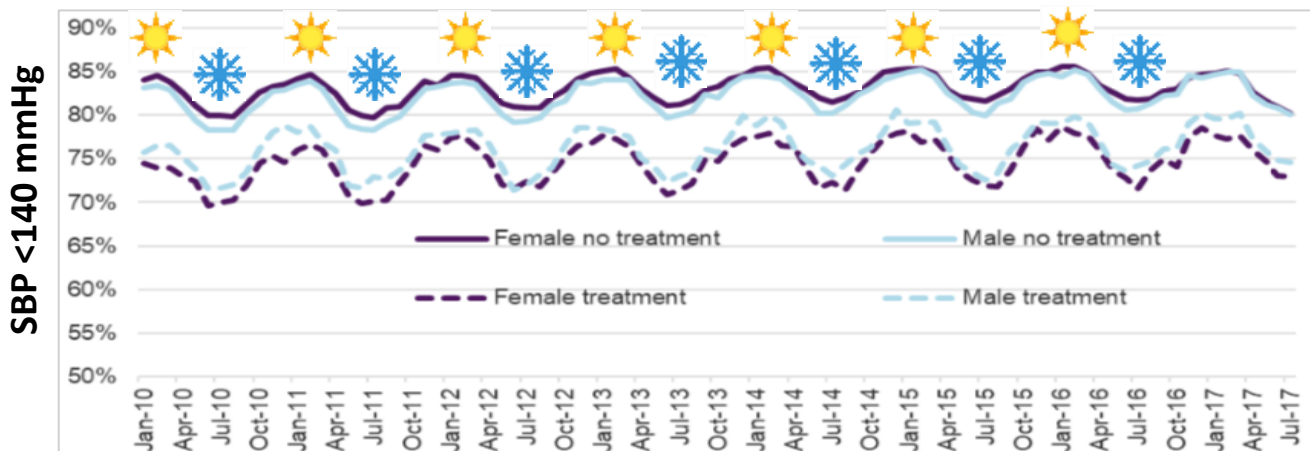
Lifetime exposure to the combination of 1 mmol/L (39 mg/dL) lower LDL-C and 10 mmHg lower SBP was associated with an 80% lower lifetime risk of cardiovascular disease and a 68% lower lifetime risk of cardiovascular death.

MANAGEMENT OF HYPERTENSION



Ambient temperature and seasonal effects on blood pressure in 2.6 Mio Australians

- Patients from 30-90 years, at least 1 BP measurement, 2010-2017
- Each 10°C increase in ambient temperature = -1.8 mmHg in mean SBP

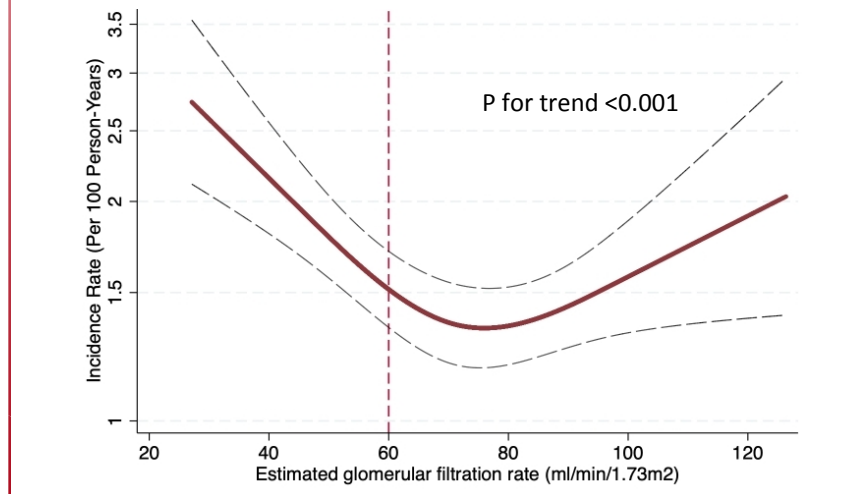


Conclusion

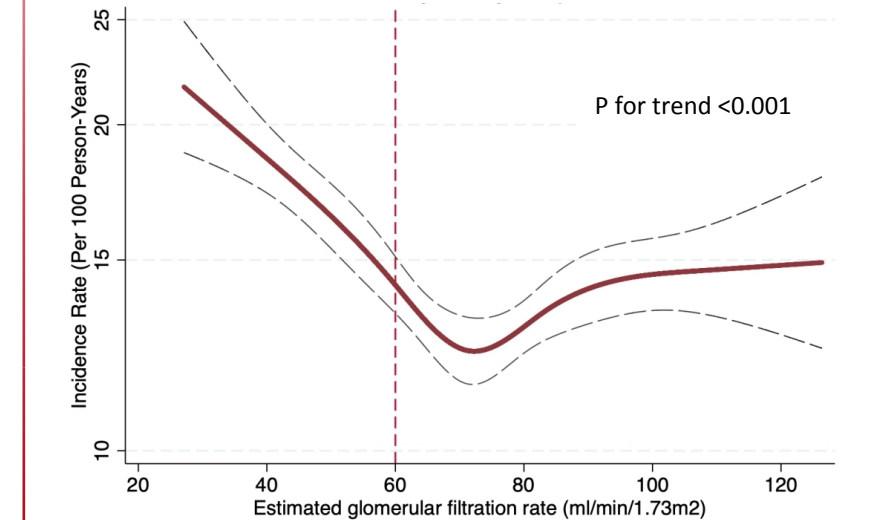
BP control rates vary by season. The clinical and public health relevance of this phenomenon is expected to increase with increasing climate changes.

SPRINT: Renal function and intensive blood pressure lowering in high-risk adults without diabetes

- Relationship between renal function, treatment response to intensive blood pressure lowering, and cardiovascular outcomes in SPRINT
- eGFR < 60 mL/min/1.73 m², n=2650 (28%)
- COMPOSITE OF ACS, STROKE, HEART FAILURE, OR DEATH FROM CARDIOVASCULAR CAUSES

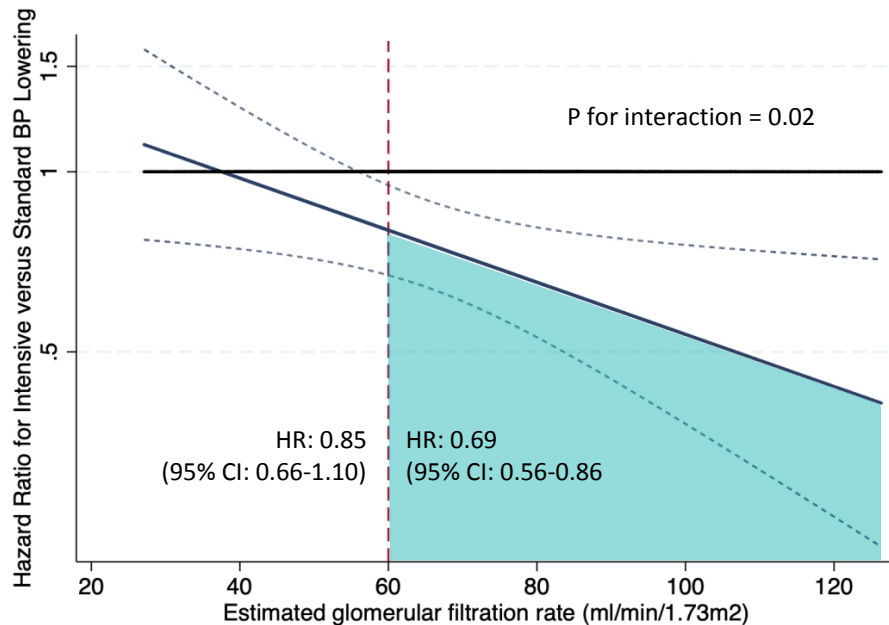


SERIOUS ADVERSE EVENTS



SPRINT: Treatment effect according to baseline eGFR

● COMPOSITE OF ACS, STROKE, HEART FAILURE, OR DEATH FROM CARDIOVASCULAR CAUSES



SPRINT: Renal function and intensive blood pressure lowering in high-risk adults without diabetes

Conclusion

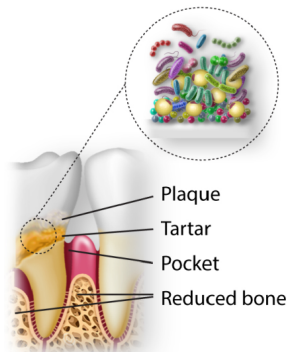
Lower eGFR → cardiovascular events ↑, serious adverse events ↑

Patients with higher eGFR → more benefit from intensive blood pressure lowering

Causal association between periodontitis and hypertension: evidence from Mendelian randomization and a randomized controlled trial of non-surgical periodontal therapy

Periodontitis

Systemic inflammation
Vascular inflammation
Sympathetic activation
Endothelial dysfunction



RCT
(intensive vs. conventional
periodontal treatment)

Simple association or cause-effect?

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Genetic inference



1. Using genetics for determining causal inference between periodontitis and hypertension

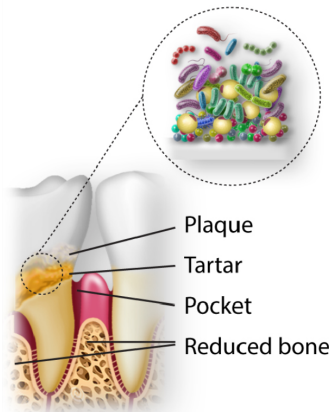
Mendelian Randomisation

Genetic predisposition

Single Nucleotide Polymorphisms



4 SNPs previously
associated
with periodontitis



Periodontitis



Detected nominally
significant causal
association between
periodontitis-linked
SNPs and SBP, DBP, PP

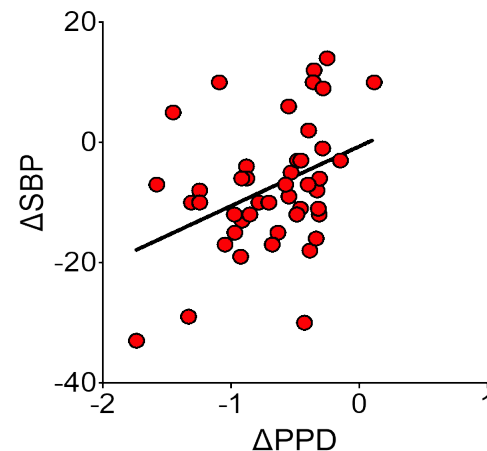
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2. Effects of intensive versus conventional periodontal therapy in hypertensive individuals

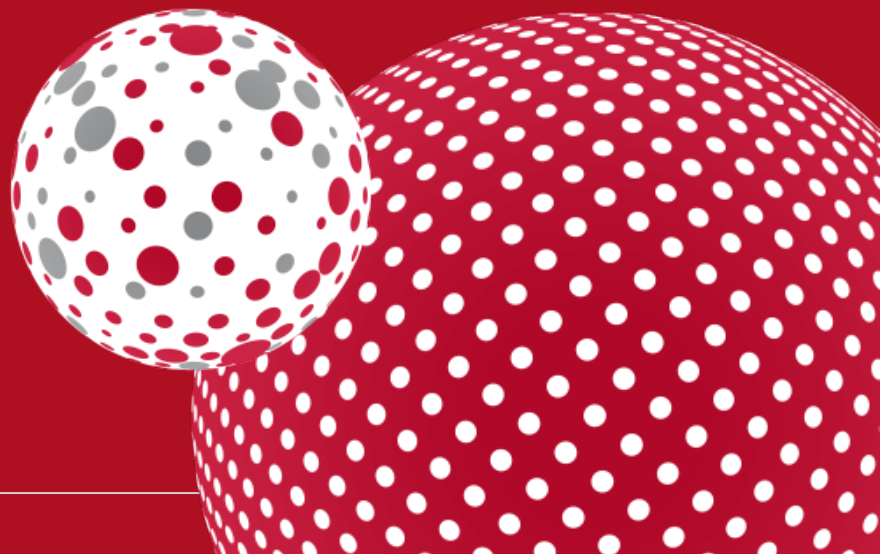
- 101 hypertensive patients with moderate/severe periodontitis randomised to intensive or control periodontal treatment
- Intensive treatment compared with standard
 - improved periodontal status at 2 months
 - reduction in mean SBP was 11.1 mmHg, $p < 0.001$
 - diastolic BP and endothelial function improved
 - reductions in circulating inflammatory markers

Conclusion

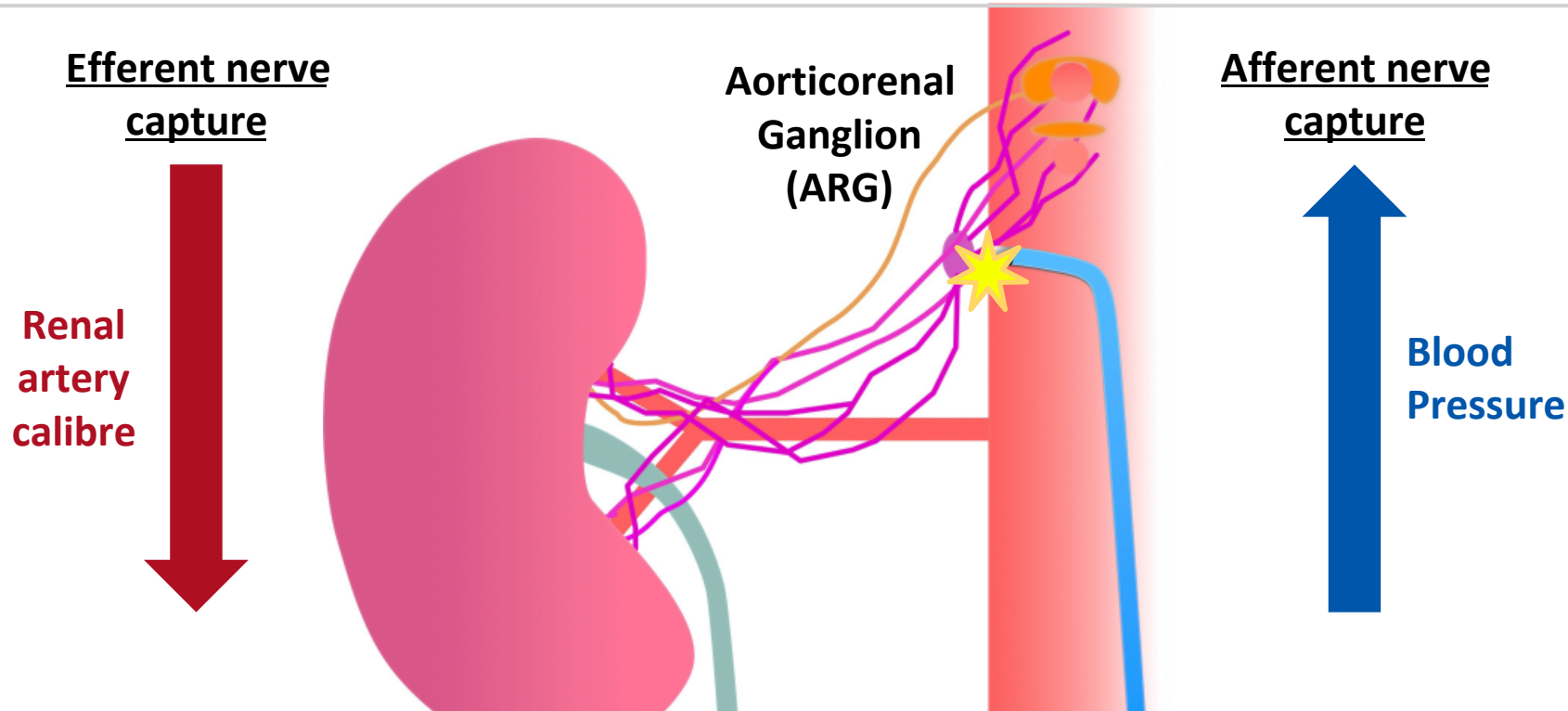
A causal relationship between periodontitis and BP was observed providing proof of concept for development of clinical trial in a large cohort of hypertensive patients



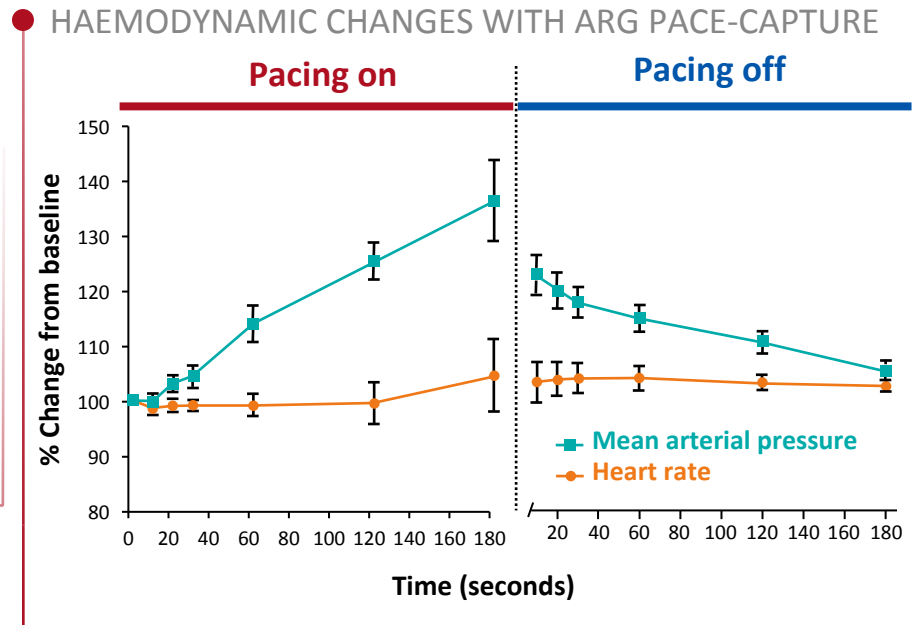
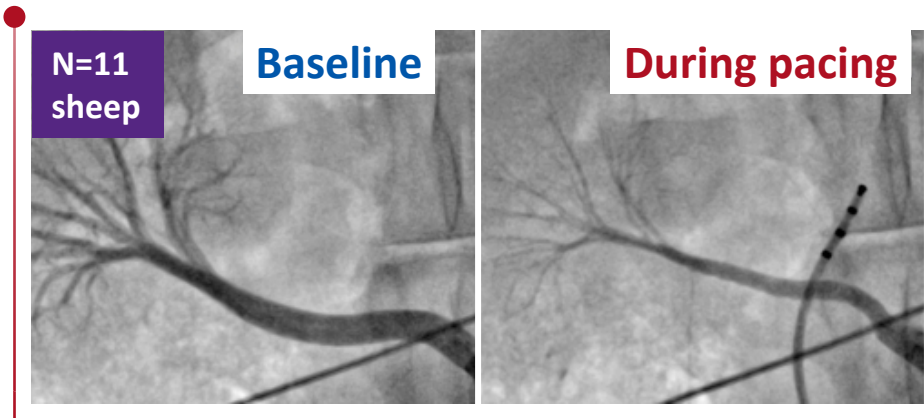
DEVICE-BASED HYPERTENSION TREATMENT



Transvascular pace-capture of aorticorenal ganglia provides a testable procedural endpoint for renal denervation



Aorticorenal ganglion pacing capture produced hypertension and lateralised renal vasoconstriction



Microwave renal denervation abolished aorticorenal ganglion pacing capture induced renal vasoconstriction

