

**Creation of a Fixed Central Arterial-Venous Anastomosis on Arterial Stiffness and Central Haemodynamics: A Treatment for Hypertension Targeting the Physical Properties of the Arterial Vasculature**

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**Introduction:** Current device based treatments for resistant hypertension target selective modification of the somatic, sympathetic, or parasympathetic nervous systems. The influence of the respective nervous systems on vascular stiffness and haemodynamics is unclear, and there is little data on the effect of current devices nor pharmacotherapy on arterial stiffness often associated with resistant hypertension.

A novel device technology (ROX Coupler, San Clemente, CA) has been developed that causes an immediate, significant and sustained reduction of blood pressure by exploiting the mechanical effects of creation of a low resistance, high compliance venous segment to the central arterial tree. The Coupler creates a 4 mm diameter AV anastomosis between the iliac artery and vein.

To date no data exist on the effect of AV fistula placement on central haemodynamics and arterial stiffness. We present data on central pressure, and aortic pulse wave velocity (aPWV) from a 63yr old woman before and 4 months after AV fistula formation using the ROX Coupler device.

**Methods:** Peripheral blood pressure, central haemodynamics and carotid femoral pulse wave velocity (c-f PWV) were assessed (SphygmoCor AtCor Medical) before and 4 months after insertion of the ROX Coupler. Results are tabulated in (Table 1).

**Results:**

	PRE AV Fistula	POST AV fistula
Peripheral SBP mmHg	184	172
Central SBP mmHg	172	158
Peripheral DBP mmHg	102	84
Central DBP mmHg	102	84
Aix %	34%	27%
HR b/m	66	68
C-f PWV m/s	15.2	13.7
Peripheral MAP mmHg	130	113
Peripheral PP mmHg	82	88
Central PP mmHg	70	74

aPWV decreased by 1.5 m/s from 15.2 to 13.7 m/s and MAP decreased by 17mmHg. Given that a 10mmHg reduction in MAP would produce an approximate reduction in aPWV of 0.5 m/s it would appear that the reduction in aPWV was in part blood pressure independent.

**Conclusions:** Insertion of the ROX Coupler was shown to produce a large reduction in aPWV which may not all be blood pressure dependent. These findings suggest that a mechanical solution to reduced arterial compliance may result in safe and effective lowering blood pressure, and address a mechanism of persistent hypertension unapproached by current therapy. Haemodynamic measurements in larger numbers of patients undergoing ROX Coupler insertion will be necessary to confirm this physiology and better appreciate its potential role in the prevention and treatment of the cardiovascular complications of hypertension.