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ANATOMIC VARIATIONS OF RENAL ARTERIES IN PATIENTS WITH ESSENTIAL HYPERTENSION: A RETROSPECTIVE STUDY

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Background: Aberrant renovascular anatomy has been reported to occur in up to 80% of patients with Essential Hypertension (EH). In more than 20% of subjects, at least one kidney is found to be supplied by more than one artery arising from the aorta (1).

Methods: We analysed reports of renal Angiographic CT (ACT) scans at our Institution between 2015 and 2017 and searched for anatomic variations of renal arteries, excluding stenosis. Other cardiometabolic variables, such as dyslipidaemia, diabetes mellitus (DM), ischemic heart disease and previous history of stroke and myocardial infarction were also collected.

Results: We identified 235 ACT reports and 24.7% (n = 58) had no significant abnormalities, 55.7% (n = 131) were excluded because of stenotic lesions and 19.6% (n = 46) presented anatomic variations of renal arteries: 6.5% arterial trifurcation; 15.2% arterial duplication; 32.6% superior polar artery; 15.2% inferior polar artery; 13% accessory artery and 15.2% early bifurcation. The right renal artery was the most affected vessel (73.9%). We performed a retrospective analysis of these 46 patients: the mean age was 42.5 years, 52.1% males and 47.9% females. EH was found in 80.4% of them, 23.9% had DM and 28.2% had dyslipidaemia. There was previous history of stroke in 13% of patients. There was no history of ischemic heart disease or myocardial infarction. **Conclusion:** There has been some debate regarding the role of atypical renal vascularization in hypertension pathogenesis. One of the hypotheses defends renin-dependent mechanisms due to impaired renal perfusion through accessory vessels. (1) However, future studies are needed to support these explanations.

References

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RESERVOIR-EXCESS PRESSURE CHARACTERISTICS HELP IDENTIFY PEOPLE WITH HIGH INTRA-ARTERIAL AORTIC SYSTOLIC BLOOD PRESSURE

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Background: High aortic blood pressure (BP) predicts clinical outcomes beyond peripheral BP. Aortic BP may differ according to level of systolic BP (SBP)-amplification but these differences cannot be identified using current non-invasive BP measurement methods. In this study, we sought to determine if high intra-arterial aortic BP could be detected via reservoir-excess pressure characteristics.

Methods: Standard cuff BP, SphygmoCor-derived central BP (CBP), and intra-arterial aortic and brachial waveforms were recorded in 160 participants (61 ± 11 years, 68% male) during coronary angiography. SBP-amplification was defined as ≥5 mmHg increase in SBP across the aortic-to-brachial arteries, whereas no SBP-amplification was defined as 0.20 both). Aortic, but not brachial, reservoir pressure was significantly higher in participants with no SBP-amplification (2506 ± 662 versus 2239 ± 640 Pa/s, p = 0.011). This pattern was also observed for aortic excess pressure (718 ± 304 versus 624 ± 293 Pa/s, p = 0.049) and aortic diastolic rate constant (0.021 ± 0.08 versus 0.025 ± 0.09 s⁻¹, p = 0.002). All differences remained after adjustment for age, sex and intra-arterial aortic SBP.

Conclusions: Reservoir-excess pressure characteristics help identify people with high intra-arterial aortic BP that are otherwise missed using cuff BP or SphygmoCor-derived CBP. Thus, analysis of BP waveforms using reservoir-excess pressure characteristics could be used to refine accuracy of BP measurement.

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ACUTE EFFECT OF AEROBIC, RESISTANCE, AND COMBINED EXERCISE ON BLOOD PRESSURE AND VASCULAR RESISTANCE OF HYPERTENSIVE PATIENTS: RANDOMIZED CLINICAL TRIAL

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Background: Exercise is part of antihypertensive therapy. However, little is known about the effect of different types of exercise on hemodynamic variables in systemic arterial hypertension (SAH). Purpose: To evaluate the effect of an aerobic (AE), resistance (RE) and combined (CE) exercise session on BP, blood flow (BF) and vascular resistance (VR) in hypertensive patients.

Methods: Twenty-nine men with SAH randomly performed 40 min AE (60% of reserve heart rate) or 40 min RE (4 exercises, lower limbs, 4x12rep, 60% 1-maximal repetition) or 40 min CE (20 min ER [2x12rep] and 20 min EA). The BF, RV and BP were analyzed 10 min before, 5-25-55 min after the session. Doppler ultrasound videos were analyzed by CardiovasculareSuit™. Statistics: generalized estimation equation and post-hoc Bonferroni, p < 0.05.

Results: No difference among groups for age: AE 42.13 ± 9.19, RE 42.63 ± 17.43, CE 45.29 ± 7.80; BMI: AE 28.95 ± 3.83, RE 31.03 ± 3.70, CE 30.73 ± 5.48; SBP: AE 131.82 ± 7.87, RE 133.41 ± 9.25, CE 133.20 ± 8.07; and DBP: AE 84.04 ± 10.50, RE 81.51 ± 10.12, CE 77.22 ± 8.06. Compared to baseline, there was a decrease in SBP with AE (25 min: 138.00 ± 5.59 vs. 128.40 ± 5.27 mmHg, p < 0.001; 55 min: 138.00 ± 5.59 vs. 131.50 ± 6.37 mmHg, p = 0.042) and increase for RE (5min: 138.10 ± 3.10 vs. 143.80 ± 3.21 mmHg, p < 0.001). Changes in DBP after AE (5min: 86.40 ± 3.15 vs. 79.00 ± 2.98 mmHg, p = 0.027). Increased in BF (5min: 190.18 ± 29.62 vs. 290.22 ± 36.06 mL/min, p = 0.001) and decreased in RV (5 min: 0.70 ± 0.14 vs. 0.41 ± 0.06 units, p = 0.017) after CE.

Conclusions: AE provided reduction in SBP and DBP levels and CE led to increased BF and reduction in RV. These findings may indicate different acute vascular responses from types of exercise in SAH.

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DISCREPANCY BETWEEN BRACHIAL AND INVASIVE INTRA-AORTIC PRESSURES IN PATIENTS UNDERGOING CARDIAC CATHETERIZATION

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Introduction: Invasive intra-aortic pressures are the gold standard for accurate Blood Pressure (BP) measurement. Hypertension management is guided by brachial cuff BP although its accuracy has been questioned. Hypothesis: We hypothesized that there may be a discrepancy between brachial and invasive intra-aortic BPs.

Methods: Invasive intra-aortic and brachial cuff pressures were recorded in some 3000 patients undergoing coronary angiography (mean age 58.6 ± 28, 23% female) between 2010 and 2016, at King Abdul Aziz Cardiac Centre, Riyadh, Saudi Arabia. Clinical and angiographic data were collected from electronic medical records (Apollo Lx[®]).

Results: Cuff brachial BP underestimated intra-aortic systolic BP (-6.2 mm Hg; 95% CI: -7.2 to -5.4 mmHg; p < 0.0001), but overestimated intra-aortic diastolic BP (2.5 mm Hg; 95% CI: 1.5 to 3.8 mm Hg; p < 0.001). The discrepancy between intra-aortic and brachial systolic BP was significantly higher in women than men (-15 mm Hg; 95% CI: -14 to -17 mm Hg vs. -3.9 mm Hg; 95% CI: -2.8 to -4.1 mm Hg, p < 0.0001). Intra-aortic diastolic BP was overestimated by cuff BP in men (0.9 mm Hg; 95% CI: 0.74 to 1.26, p < 0.0.001) but underestimated in women (-3.6 mm Hg; 95% CI: -3 to -4 mm Hg, p < 0.0001). While brachial BP correctly estimated intra-aortic systolic BP in subjects <50 yr-olds (0.13 mm Hg; 95% CI: -0.57 to 0.85 mm Hg, p = 0.68), there was a large discrepancy in >50 yr-olds (-8.6 mm Hg; 95% CI: -8.1 to -9.5 mm Hg, p < 0.0001).

Conclusions: Brachial BP underestimates intra-aortic systolic BP, particularly in women, older subjects and at higher BPs with implications for HTN management.