Changes in Catecholamine and Metanephrine Levels and 24-Hour Ambulatory Blood Pressure Parameters Before and After Catecholamine-Secreting Neuroendocrine Tumor Resection

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BACKGROUND: Catecholamine and metanephrine levels typically normalize after surgical resection of catecholamine-secreting neuroendocrine tumors (NETs) including pheochromocytomas and paragangliomas. Limited data exist about the changes in catecholamine and metanephrine levels following tumor resection and their association with 24-hour ambulatory blood pressure monitoring (ABPM) parameters such as mean systolic blood pressure (SBP) and SBP variability.

METHODS: We performed a prospective observational study of patients evaluated at Penn for suspected catecholamine-secreting NET between January 2014 and December 2016. Plasma and urine catecholamine and metanephrine levels were obtained and patients underwent 24-hour ABPM 1-3 weeks prior to and 6-8 weeks following tumor resection.

Results: 32 patients met inclusion criteria. Median age was 56 years, with 44% males (n=14), 78% Caucasians (n=25), and median body mass index 25.5 kg/m2. Compared to pre-operative values, there was a significant decline in ABPM parameters including post-operative 24-hour mean SBP (133.1 vs.
127.4 mmHg, p=0.036), 24-hour SBP average real variability ([ARV] 10.0 vs. 9.0, p=0.031), 24-hour mean pulse pressure (54.5 vs. 51.6 mmHg, p=0.012), and 24-hour mean heart rate (78.5 vs. 74.0 bpm, p=0.023). Among patients who had masked (n=7), white coat (n=4), or sustained hypertension (n=9) at baseline, 60% had controlled hypertension upon follow up (p=0.002). Greater decline in 24-hour SBP was associated with a greater decline in plasma normetanephrine (Spearman’s rho [r]=-0.43, p=0.017), plasma norepinephrine (r=-0.59, p=0.002), and urine normetanephrine (r=-0.66, p=0.001). Greater decline in 24-hour SBP ARV was associated with a greater decline in plasma norepinephrine (r=-0.46, p=0.024).

**CONCLUSION:** Following resection of catecholamine-secreting NETs, patients had a significant decline in 24-hour mean SBP and SBP variability, and many experienced resolution of white coat, masked, and sustained hypertension. Decline in 24-hour SBP and SBP variability was directly associated with degree of improvement in catecholamine and metanephrine levels.