

Abnormal Blood Pressure Patterns on ABPM Prior to Pediatric Hematopoietic Cell Transplantation: False Alarm or Cause for Concern?

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Background

- ❖ Hypertension (HTN) influences morbidity and predicts renal and cardiovascular outcomes following hematopoietic cell transplantation (HCT).
- ❖ Misclassification of HTN may occur with casual blood pressure (BP) measurements, therefore, ambulatory blood pressure monitoring (ABPM) is recommended in children with high-risk conditions.
- ❖ HTN diagnosed by ABPM correlates with the risk of target organ damage.

Objective

- ❖ We conducted a prospective, pilot, observational study using ABPM to determine BP risk profile of patients (pts) undergoing first HCT at Texas Children's Hospital.

Methods

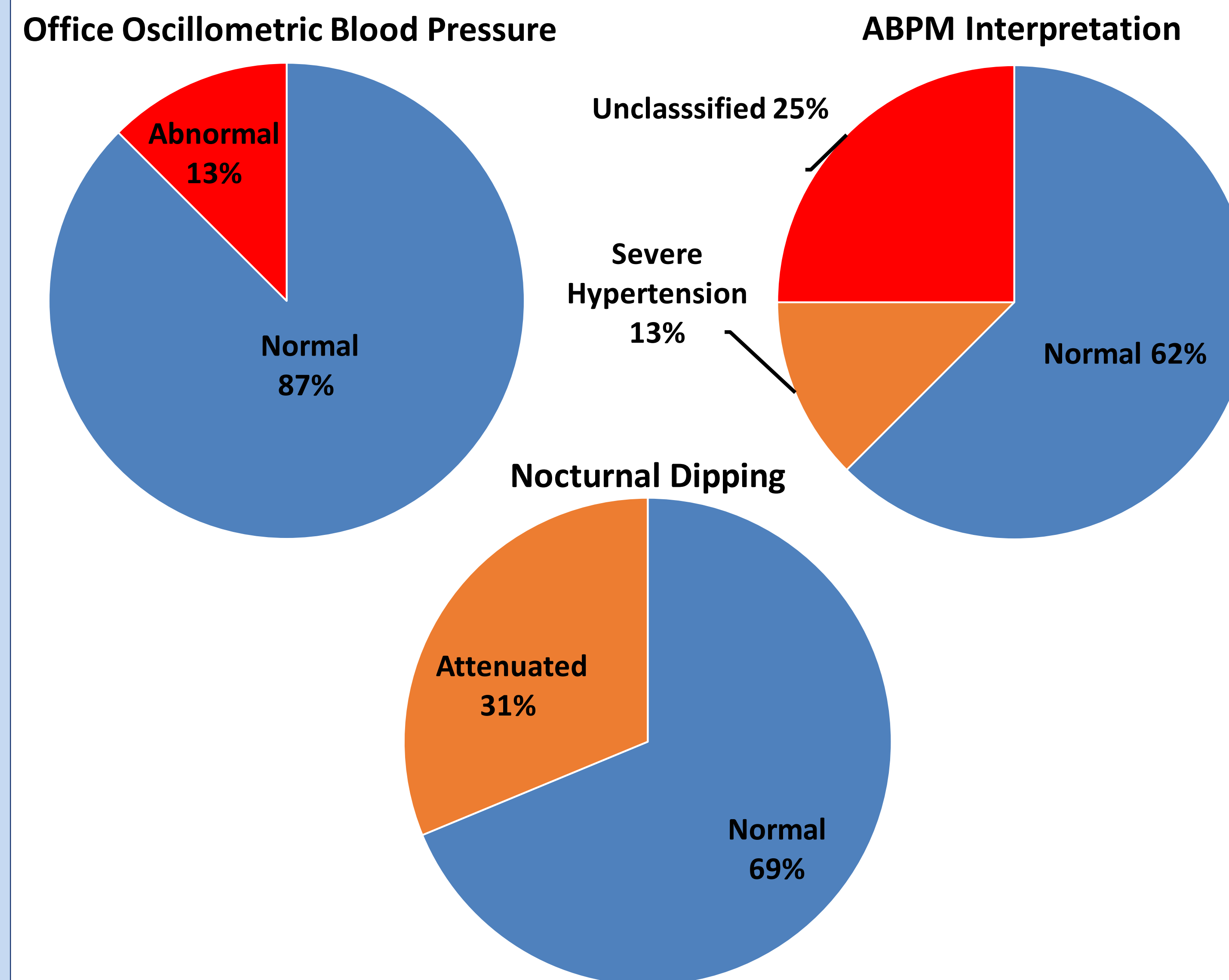
- ❖ Pts 5-21 yrs undergoing first HCT were recruited.
- ❖ Of 25 pts, 19 had APBM placed and 16 were adequate for analysis.
- ❖ Office oscillometric BP was classified as normal or abnormal based on 90thile for age, sex and height or >120/80 mmHg in ≥13 yrs.
- ❖ ABPM was interpreted based on the 2014 American Heart Association (AHA) ABPM Guidelines.
- ❖ Acute kidney injury (AKI) was defined by KDIGO criterion using serum creatinine.
- ❖ Descriptive analysis expressed as proportions, mean or median, and statistical analysis with paired t testing, Wilcoxon-Rank Sum or Exact test.

Results

Table 1: Characteristics of Cohort

Characteristic	Frequency
Age mean ± SD	13.9 ± 4.29
Female Sex n (%)	9 (56.3%)
Ethnicity n (%)	
Caucasian-Hispanic	9 (56.3%)
Caucasian Non Hispanic	5 (31.2%)
Black/African American	2 (12.5%)
BMI Centile median (IQR)	78.5 (60.4-87.2)
Baseline eGFR [creatinine-cystatin C] at time of HCT ml/min/1.73m ² median (IQR)	110 (103-123)
Pre BMT Diagnosis n (%)	
Acute Myeloid Leukemia	4 (25.0%)
Aplastic Anemia	4 (25.0%)
Acute Lymphoblastic Leukemia	2 (12.5%)
Sickle Cell Anemia	2 (12.5%)
Lymphoma	2 (12.5%)
Other	2 (12.5%)
HTN present prior to BMT n (%)	2 (12.5%)

Figure 1: Baseline ABPM

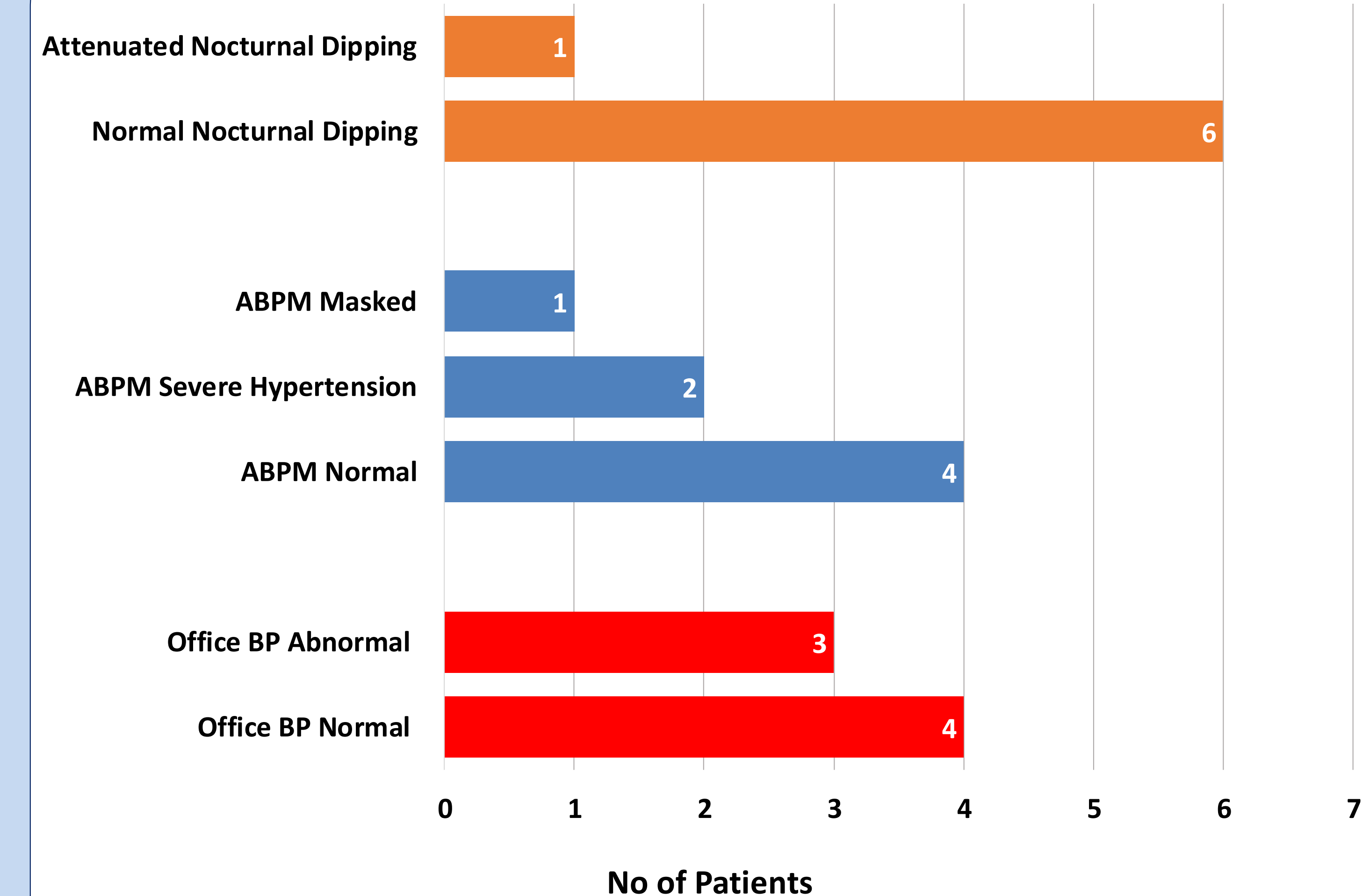


- ❖ Based on the 2014 AHA Guidelines, 10 (62%) were normal and 2 (13%) as severe ambulatory hypertension on ABPM.
- ❖ 25% were categorized as unclassified due to the presence of normal office and average BP but elevated systolic or diastolic load.
- ❖ Blood pressure abnormalities were more frequently identified by ABPM (p=0.03).
- ❖ There was no association with baseline LVMI^{2,7} or proteinuria for pts with HTN by casual BP or ABPM, elevated daytime/nocturnal load, or attenuated dipping.

Table 2: HCT Admission Course

Characteristic	Frequency
Length of admission days, median (IQR)	36 (31-40)
Type of HCT, n (%)	
Autologous	2 (12.5%)
Allogenic Matched Related Donor	7 (43.7%)
Allogenic Matched/Mixed Matched Unrelated Donor	5 (31.3%)
Allogenic Haplo-Identical Donor	2 (12.5%)
Radiation received, n (%)	4 (25%)
Thrombotic microangiopathy, n (%)	1 (0.06%)
AKI, n (%)	9 (56.3%)
Renal Replacement Therapy, n (%)	2 (12.5%)
Graft failure, n (%)	3 (25%)
Death within 6 months of HCT, n (%)	3 (25%)
Antihypertensive on discharge, n (%)	4 (25%)

Figure 2: Follow up ABPM 3-6 months post HCT



- ❖ 2 patients weaned off antihypertensive after discharge
- ❖ 7 pts had follow up ABPM at a median of 110 days post HCT (IQR 103-176 days).
- ❖ There was no significant association between average BP and BP load with the presence of AKI, proteinuria or need for renal replacement therapy.
- ❖ There was no significant relationship between baseline and follow up ABPM.
- ❖ Median eGFR (by creatinine-cystatin C) at follow up decreased from baseline to 97.5 ml/min/1.73m² (IQR 65-111, p=0.01).

Discussion

- ❖ At baseline, office BP significantly underestimates BP abnormalities compared to ABPM (p=0.03).
- ❖ A proportion of pts are found to be unclassified or masked hypertension which may confer a worse cardiovascular risk in the long term.
- ❖ AKI is common post HCT, however, its relation to elevated blood pressures on ABPM is not significant.
- ❖ There is no association of office BP or ABPM findings with evaluation of end organ damage pre or post HCT.

Conclusions

- ❖ Abnormal ABPM patterns, including elevated BP load and masked HTN, are identified in pts receiving HCT highlighting the utility of ABPM in this population.
- ❖ Longer follow up and larger sample size could better delineate the association of ABPM with end organ damage in HCT pts.

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