3rd Place: Kidney Disease in Pregnancy: Initial Blood Pressure as a Risk Factor for Preeclampsia

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Kidney Disease in Pregnancy: Initial Blood Pressure as a Risk Factor for Preeclampsia

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Background

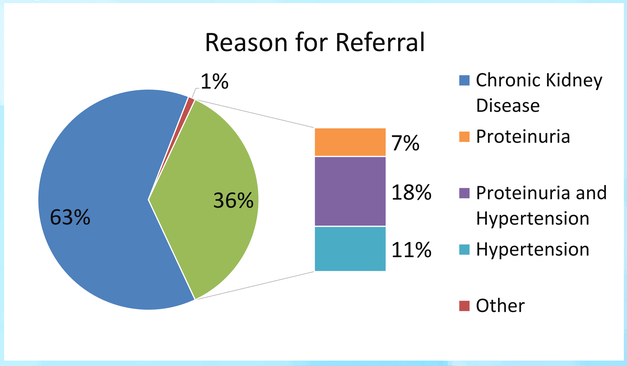
The Pregnancy Hypertension Kidney Center (PHKC) is a multi-disciplinary program started in 2012 to manage pregnancies that are at high risk due to hypertension or kidney disease. Pregnant patients with hypertension and/or kidney disease. were managed by the program. High blood pressure and protein in the urine are symptoms that can eventually turn into preeclampsia, a syndrome that can cause serious maternal or fetal complications.[1] The presence of hypertension in pregnancy is dangerous in general, with a strong association of preeclampsia complications.[2] Different kidney diseases can put mothers at a higher risk for developing preeclampsia, but even healthy mothers have some risk.

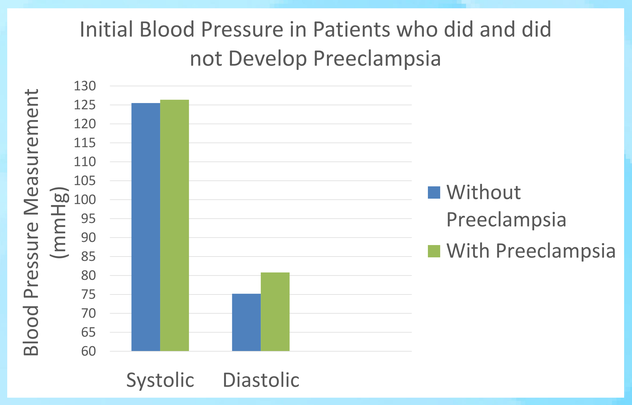
The goal of this project was to develop a database to describe the PHKC patient population and to allow for research investigations. Specifically, we seek to evaluate the association between blood pressure at initial PHKC visit and subsequent development of preeclampsia.

Table 1: Study demographics at baseline	
Age (mean, SD)	31.16 (5.68)
Race	
White	57 (59.4%)
Black/African-American	13 (13.5%)
Unknown	20 (20.9%)
Other	6 (6.3%)
Current tobacco use	12 (12.4%)
Preexisting diabetes mellitus	8 (8.2%)
Hypertension	64 (66%)
Chronic kidney disease (CKD)	61 (62.9%)
CKD etiology	
Diabetic nephropathy	5 (8.2%)
Lupus nephritis	6 (9.8%)
Polycystic kidney disease	12 (19.7%)
Reflux nephropathy	3 (4.9%)
FSGS (Focal Segmental Glomerulosclerosis)	2 (3.3%)
IgA Nephropathy	2 (3.3%)
Membranous Nephropathy	2 (3.3%)
Other	21 (34.4%)
Unknown	8 (13.1%)
Prior preeclampsia	
Yes	25 (25.0%)
No	73 (73.0%)
Unknown	2 (2.0%)
Gestational age at 1st PHKC visit (median, range)	19.70 (31.70)
Systolic BP at 1st PHKC visit (median, range)	124.50 (60.00)
Diastolic BP at 1st PHKC visit (median, range)	79.50 (58.00)
Antihypertensive medication	
Beta-blocker	25 (26.3%)
Methyldopa	8 (8.4%)
Calcium channel blocker	8 (8.4%)
Thiazide diuretic	4 (4.2%)
Hydralazine	1 (3.0%)
None	61 (64.2%)
Serum creatinine (mean, SD)	0.6 (1.53)
Proteinuria (median, range)	0.42 (8.88)

Objectives

1. To construct and populate a research database describing clinical features and pregnancy outcomes among women treated at the Pregnancy Hypertension Kidney Center
2. Determine if there is an association between blood pressure at the initial PHKC visit and the subsequent development of preeclampsia among pregnant women followed in the PHKC program





Methods – A Retrospective Study

1. Build and refine the database using RedCap, a web-based research database platform
2. Collect data from the electronic medical record, including EHMR, CE, CPO, EPIC.
3. Configure relevant data for statistical analysis
4. Conduct an independent subjects t-test comparing the mean systolic and diastolic blood pressure in women who were diagnosed with preeclampsia vs. those who were not
   - Conditions: we are assuming independence, normality, and identical population variance

Results

The PHKC database includes data from 112 subjects. Data collected includes 262 fields in 5 forms. Table 1 shows demographic and clinical characteristics of the patient population. 66% of subjects had chronic hypertension; 25% developed preeclampsia. The most common reason for PHKC referral was chronic kidney disease.

There was no statistically significant difference in systolic blood pressure in women who did vs those that did not go on to develop preeclampsia. However, the diastolic blood pressure was significantly higher in women who later developed preeclampsia, as compared to those that did not. Hence, women diagnosed with preeclampsia did on average have a higher diastolic measurement at their initial visit than those who were not diagnosed with preeclampsia.

We may have failed to detect a true difference in systolic blood pressure due to the following limitations:

- small sample size,
- the nature of the research question prevented randomization
- women with pre-existing hypertension are on medication to control it
  - 41% of women diagnosed with preeclampsia were on medication to control blood pressure at the time of the readings

Conclusion

We succeeded in building a database describing the PHKC patient population, which will be used in future research studies. We found a significant association between diastolic blood pressure at initial PHKC visit and later development of preeclampsia. Next steps could include expanding the database, or focusing on patients who only had hypertension rather than a wide range of kidney problems. Future analyses could control for the use of hypertension medications in order to better assess the effect of initial blood pressure on the development of preeclampsia.

References

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