Impact of Educational Workshops on Laboratory Evaluation of Preeclampsia in La Paz, Bolivia

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Abstract

Preeclampsia is a hypertensive disorder of pregnancy which is thought to be caused by abnormal implantation of the placenta in the uterine wall, leading to increased risks of both maternal and fetal/perinatal complications. Bolivia, a country in which 2/3 of the population lives at an altitude where the risk of preeclampsia is increased by 33%, has maternal and infant mortality rates more than twice as high as surrounding South American countries. Recent changes in diagnostic criteria for preeclampsia that emphasize symptom and laboratory markers of end organ dysfunction have been recommended, but the degree to which these criteria has been implemented in Bolivia is unknown. Study team members traveled to Bolivia, and, in collaboration with leading obstetric physicians in Bolivia, conducted an educational workshop to target improvements in implementation of new diagnostic criteria. Chart review of patients categorized by Bolivian physicians as being affected by hypertensive disorders of pregnancy was conducted for pregnancies in the year prior to(n=681) and the 9 months following (n=641) this workshop to evaluate the percentage of these patients for whom the recommended laboratory evaluation was completed. Of note, significant increases in the percentage of patients evaluated for proteinuria (56.5% vs 46.3%, p< .01), serum creatinine level (94.2% vs 89%, p< .01), and the full complement of recommended labs (53.4% vs 43.6%, p< .01) were seen. Additionally, the percentage of patients receiving the full complement of recommended laboratory tests increased over time in the 9 months following the workshop (33.8% in months 0-3 vs 70.8% in months 6-9, p< .01). This suggests a notable increase in implementation of recommended laboratory evaluation for preeclampsia in Bolivia, and the additional potential that this effect may be long-lasting.

Introduction

- Preeclampsia is a hypertensive disorder of pregnancy(HDP) which is thought to be caused by abnormal implantation of the placenta in the uterine wall.[1]
- Hypertensive disorders of pregnancy (including preeclampsia) are responsible for 14% of maternal deaths worldwide, making them the 2nd leading cause of maternal mortality behind hemorrhage.[2]
- Fetal and perinatal mortality is three times higher in pregnancies affected by preeclampsia as compared to unaffected pregnancies.[3]
- High altitude is a unique risk factor for preeclampsia; women living above 8,250 feet of elevation are 33% more likely to develop preeclampsia than those living at lower altitudes.[4]
- Bolivia, a country in which 2/3 of the population lives above 8,250 feet, has both maternal and infant mortality rates more than twice as high as surrounding South American countries.[4]
- Recent changes in diagnostic criteria for preeclampsia emphasizing symptom and laboratory markers of end organ dysfunction have been recommended by ACOG to better detect and stratify preeclampsia. [5]

- **Problem statement**: In this before and after study, medical records of women in La Paz, Bolivia affected by HDP will be reviewed in order to determine the effect of a targeted educational workshop on the use of laboratory values in preeclampsia diagnosis.

- **Question**: How does the percentage of patients In La Paz, Bolivia with HDP who receive recommended laboratory evaluation change in the 9 months following a targeted educational workshop?

- **Aim 1**: Evaluate use of recommended diagnostic labs pre- and post-workshop
- **Aim 2:** Evaluate whether any changes in use of labs persist over time

- **Hypothesis**: The percentage of patients evaluated with the recommended array of labs will show an increase overall in the post-workshop time period, with a stepwise decrease in the use of recommended labs in each 3-month time period following the workshop.

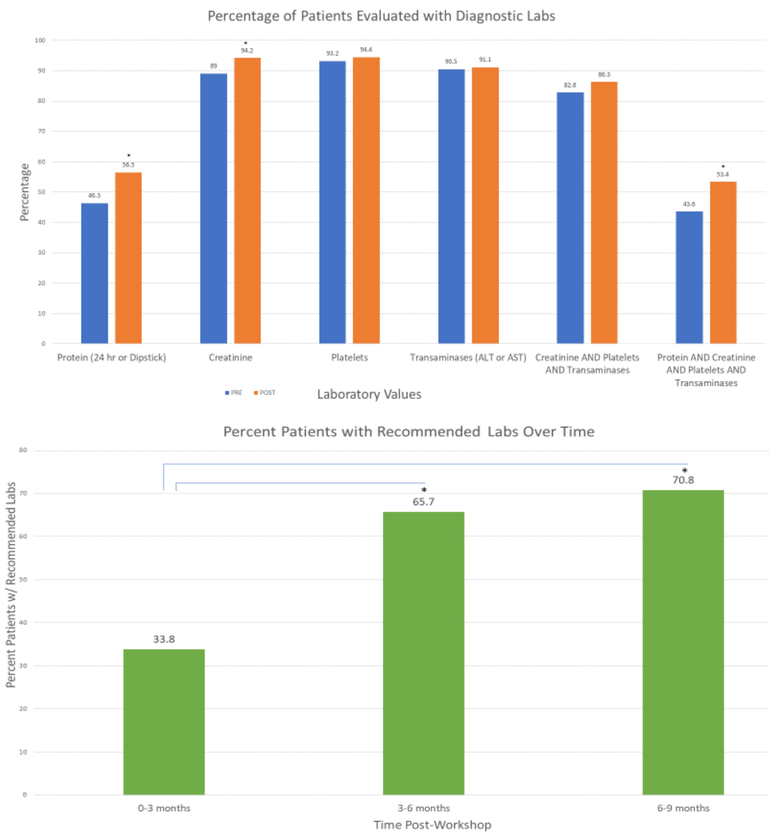
Diagnostic Criteria

Systolic blood pressure ≥160 mmHg or diastolic blood pressure ≥110 mmHg
OR
Systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg
AND
Proteinuria (≥300 mg per 24-hour urine collection, protein:creatinine ratio ≥0.3, or urine dipstick reading ≥1+)
Thrombocytopenia (platelet count <100,000/microL)
Renal insufficiency (serum creatinine of >1.1 mg/dL or a doubling of the serum creatinine concentration)
Impaired liver function (liver transaminase levels at least twice the normal concentration)
Pulmonary edema
Persistent cerebral or visual symptoms

Methods

- All records of patients treated in three major hospitals in La Paz/El Alto, Bolivia affected by HDP(as categorized by Bolivian physicians) in the year prior to(n=681) and 9 months following(n=641) the educational workshop were collected and reviewed.
- Records were reviewed manually and lab value data were input in a REDCap database designed for the project.
- Variables tracked were measures of proteinuria, serum creatinine, platelets, transaminases (AST or ALT), non-proteinuria labs, and all recommended labs in combination.
- Proportion of labs ordered individually and in combination were calculated pre- and post-workshop
- Proportion of patients with recommended complement of labs ordered was calculated for 3-month periods post-workshop
- Statistical analysis to compare pre-and post-workshop proportions done via Chi-square test

Results



Limitations

- Inability to attribute causation to workshop due to study design- no “control” population
- Difficulty identifying reason behind continued increase in evaluation percentage post-workshop

Conclusions

- Significant increases in the percentage of patients evaluated for proteinuria (56.5% vs 46.3%, p< .01), serum creatinine level (94.2% vs 89%, p< .01), and the full complement of recommended labs (53.4% vs 43.6%, p< .01) were seen
- The percentage of patients receiving the full complement of recommended laboratory tests shows a significant increase between months 0-3 and 3-6 post-workshop (33.8% vs. 65.7%, p <.01) and between months 0-3 and months 6-9 post-workshop (33.8% vs 70.8%, p< .01).
- It remains to be seen whether this increase in evaluation of HDP patients with the recommended panel of labs has translated to an increase in overall diagnostic accuracy and/or reductions in complications resulting from underdiagnosed HDP, but these preliminary results are promising.

Disclosures

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