Title: Utility of B-Type Natriuretic Peptide in Evaluating Dyspneic Pregnant or Postpartum Women

Authors: Niharika Mehta[1], MD, Chris Raker[2] ScD, Athena Poppas[1] MD.
[1]Department of medicine, division of Obstetric medicine, [2]Department of research Women and Infants' Hospital and Warren Alpert medical school of Brown University Providence, RI.

Background and purpose: Despite widespread use of BNP in the non-pregnant population to establish or exclude a cardiac cause for dyspnea, literature about the use of this test for similar indication in pregnancy is lacking. We sought to establish utility of BNP in evaluating a dyspneic obstetric patient.

Methods: We conducted at retrospective chart review of all pregnant and postpartum women who had a BNP level drawn at our institution between Feb 2011 and March 2015. A total of 102 women were identified: 48 antepartum and 54 postpartum.

Results: Seventy-eight patients (77%) had BNP level tested for indication of dyspnea and 17 (17%) for cardiac indication. Thirty patients (29%) had pulmonary edema. The mean BNP value in pulmonary edema patients was 290 pg/ml vs 75 pg/ml in those without pulmonary edema ($p<0.0001$). Mean BNP was higher among patients whose pulmonary edema was felt cardiac in origin (369 pg/ml vs 228 pg/ml in those whose pulmonary edema was felt to be preeclampsia-related). Twenty-six patients had preeclampsia and mean BNP level in preeclamptics was 206 pg/ml. Using linear regression to adjust for both preeclampsia and pulmonary edema, preeclampsia alone did not explain the association between higher BNP and pulmonary edema.
Echocardiograms were available on 55 patients of which 12 showed left ventricular dysfunction. BNP level was higher (mean 237 pg/ml) with ventricular dysfunction, but it was not significant ($p=0.4$), likely limited by small sample size.

Conclusion: Our study shows that BNP levels were significantly elevated in pregnant or postpartum patients with pulmonary edema. Higher levels were noted in those patients with pulmonary edema of cardiac etiology. BNP was elevated in preeclampsia, but in pulmonary edema patients, this elevation was not explained by preeclampsia alone. BNP testing can be helpful in guiding further investigation and management of the dyspneic obstetric patient.

Title: **Feasibility of an intervention to improve the cardiovascular health of postpartum women with a history of hypertensive disorders of pregnancy**

Authors: Deborah Younger-Lewis[1] RN BScN, Lisa McDonnell[1] MSc MBA, Courtney Westcott[1] MSc, Nadine Elias[1] BSc, Suzanne Perron[1] BEPS, Natalie Martin[1] BSc, Sarah Ives[1] MA, Andrew Pipe[1] MD, Robert Reid[1] PhD MBA, Kara Nerenberg[2] MSc MD

1- University of Ottawa Heart Institute
2- University of Calgary

Background and Purpose

Women with hypertensive disorders of pregnancy (HDP) represent one of the highest risk populations for premature cardiovascular disease (CVD). They have high risk of premature CVD, chronic hypertension, type-2 diabetes and dyslipidemia within 10 years postpartum. Lifestyle modifications are recommended as first line therapy for CVD prevention. To meet the unique behaviour change needs of early postpartum women with HDP, we adapted the University of Ottawa Heart Institute's CardioPrevent® program. The objective of this study was to assess the feasibility of CardioPrevent® in postpartum women with HDP.

Methods

The CardioPrevent® program provides an evidence-based, cardiovascular prevention program for patients deemed at risk for CVD. Once enrolled, women completed a full CVD risk factor screening followed by 23 sessions with a trained health coach over 12 months. Women received education and programming supported by behavioural-based counseling, frequent follow-ups, and referral to community resources. Program feasibility was measured by rate of enrollment, attendance, and satisfaction.

Results

Thirty-five postpartum women with recent HDP were referred to the CardioPrevent® program of which 32 consented to participate, resulting in a 91% enrollment rate. Thirty-one percent were lost to follow up. Of the 69% active participants, 20/23 sessions were completed, resulting in a high attendance rate (87%). Overall participant satisfaction score was high (5/5).

Conclusion

Pilot results indicate that the CardioPrevent® program provides a feasible CVD prevention strategy for postpartum women with a recent HDP and their providers. Post-partum CardioPrevent® was associated with high participant engagement and satisfaction as well as successful program adherence.

Incidence of Myocardial Infarction in Pregnancy: A Systematic Review and Meta-analysis of Population-based Studies

Paul Gibson, Mariam Narous, Matthew James

Background and Aims: Cardiac disease is the leading cause of maternal death, and myocardial infarction is one of its most common mechanisms. There are no recent high-quality systematic reviews that summarize the population-based data on this important topic. Our primary objective for this study was to determine the overall incidence of pregnancy-associated MI. We also sought to determine the rates of mortality and case-fatality due to maternal MI.

Methods: Articles were obtained by searching electronic databases (MEDLINE: 1946-2015; EMBASE: 1980-2015; PubMed:1960-2015; CENTRAL; and Web of Science Core Collection: 1899-2015), bibliographies and conference proceedings with no language or date restrictions. Two reviewers independently selected population-based cohort and case-control studies reporting on incidence, mortality and case-fatality rates for pregnancy-associated MI. These studies were assessed for inclusion and quality, and data was extracted for analysis. A meta-analysis was performed to pool maternal incidence, mortality and case-fatality rates using fixed and random effects models. Stratification and meta-regression were performed to explore heterogeneity.

Results: Based on 15 included studies, the pooled incidence of maternal MI and maternal mortality were 3.02 and 0.21 per 100,000 pregnancies, respectively. The case-fatality rate was 4.74%. Heterogeneity was observed in the pooled incidence estimates of maternal MI and its associated mortality. Stratification and meta-regression analyses suggested country of study and study start date to be potential explanations for the observed heterogeneity, although results did not reach statistical significance.

Conclusion: This study provides a comprehensive and global estimate of the incidence and mortality/case fatality of pregnancy-associated MI. We identified higher rates of maternal MI in the USA (relative to Canada and European countries) and rising rates over time. Given the ongoing trends of rising maternal age, as well as the increasing prevalence of obesity and diabetes, further attention and research regarding this population is warranted.

Admission to the Intensive Care Unit Pre- and Post- Establishment of an Obstetric High-Dependency Unit: A Single Center Experience

Authors: Lindsay Porteous[1,2], Niharika Mehta[1,2]

1. Department of Obstetric Medicine, Brown University, Providence, RI
2. Women & Infants Hospital, Providence, RI

Background: A high-dependency unit (HDU) within the obstetric setting has many advantages, including multi-disciplinary care with both obstetric and critical care expertise and availability of on-site critical care facilities. We sought to examine the incidence and distribution of obstetric transfers to the intensive care unit (ICU) at our institution, after the establishment of a HDU.

Methods: This is a retrospective chart review examining all obstetric admissions to the ICU during a 3 year period after the establishment of a HDU. We compare our findings to a similar study at our institution done prior to the establishment of a HDU.

Results: From 2012 to 2015, there were 39 obstetric admissions to the ICU, with a rate of 1.5 ICU admissions per 1000 deliveries. During a similar 3-year period, prior to the establishment of the HDU, there were 93 obstetric ICU admissions. In the current study, 51% (20/39) of ICU transfers were due to obstetric causes, whereas 49% (19/39) were due to non-obstetric causes. Most ICU admissions occurred in the postpartum period (62%, 24/39). The three most common reasons for admission to the ICU were hemorrhage (31%), sepsis (28%) and respiratory failure (21%). Compared to ICU admissions prior to establishment of HDU, transfers for hypertensive disorders of pregnancy decreased from 18% to 3% (1/39). There were also no transfers for asthma after the establishment of the HDU, compared to 18 (19%) admissions previously.

Conclusions: At our institution, establishment of a HDU decreased the total number of obstetric ICU admissions. A decrease was also noted in transfers due to common pregnancy complications such as hypertensive disorders of pregnancy, allowing for better continuity of care by nurses and providers specializing in the care of obstetric patients and preventing mother-infant separation.

Impact of Pregnancy Complications on Presentation, Severity and Outcomes of Acute Coronary Syndrome

Sophie Grand'Maison MD MSc candidate,[1,2] **Louise Pilote** MD MPH PhD, [1,2,3] **Natalie Dayan** MD MSc. [2,3]

[1] Department of Epidemiology, Biostatistics and Occupational Health, McGill University, Montreal, Quebec, Canada.
[2] Research Institute, McGill University Health Centre, Montreal, Quebec, Canada.
[3] Division of General Internal Medicine, McGill University Health Centre, Montreal, Quebec, Canada

Background and Purpose: Women who experienced gestational diabetes (GDM) and/or hypertensive disorders of pregnancy (HDP) have approximately twice the risk of cardiovascular disease (CVD) compared with women with normal pregnancy. However, the impact of GDM or HDP at the time of a cardiovascular event is unknown. The aim of this study is to assess the impact of prior pregnancy complications on clinical presentation, severity and major adverse cardiovascular outcomes (MACE) in women with premature acute coronary syndrome (ACS).

Methods: GENESIS-PRAXY (GENdEr and Sex determInantS of cardiovascular disease: from bench to beyond-PRemature Acute Coronary SYndrome) is a multicentre, prospective cohort study of young adults (≤ 55 years old) hospitalized with ACS. The current study included only parous women. Pregnancy history was collected through self-reported questionnaires at study entry.

Results: A total of 310 women had at least one pregnancy; 156 reported prior normal pregnancies and 95 prior complicated pregnancies divided afterwards in 3 mutually exclusive groups (GDM: 19, gestational hypertension: 33, preeclampsia: 26). Women with prior pregnancy complications were younger than the normal group (49.1 ± 5.6 vs. 47.4 ± 6.2 years) and presented more traditional risk factors. Women with prior preeclampsia were more hypertensive (92% vs. 79% for gestational hypertension vs. 63% for GDM) and had more STEMI. The clinical severity of the ACS measured by the GRACE score and MACE at 12 months were similar in all groups.

Conclusion: Women with prior pregnancy complications are younger and have more atherosclerotic risk factors at the time of a premature ACS than women with prior normal pregnancy. Moreover, women with prior preeclampsia are more hypertensive and presented more with STEMI, which may indicate a different pathway between preeclampsia and CVD.