Finding Understudied Disorders Potentially Associated with Maternal Morbidity and Mortality

Laritza M. Rodriguez, MD, PhD, Dina Demner Fushman, MD, PhD
Lister Hill National Center for Biomedical Communications, National Library of Medicine, National Institutes of Health, Bethesda, MD

Introduction

Recent reports estimate that each year 1200 women in the USA die from pregnancy-related complications and about 60,000 suffer near fatal complications. The obstetrics and maternal-fetal literature are rich in research on the most frequent causes of maternal morbidity and peripartum complications such as preeclampsia, postpartum hemorrhage, premature rupture of membranes, and diabetes, studies on less common co-morbidities are lacking. We explore sections of the discharge summaries of pregnant or postpartum women admitted to an ICU to identify associated diseases and disorders and then mine the literature to identify knowledge gaps in clinical research.

Methods

Data for the study were discharge summaries from pregnant or peripartum patients in MIMIC databases (1). The patients were found searching the clinical notes for "*pregnancy OR pregnant*". The demographic, procedure and discharge diagnosis data were extracted from the structured tables of the database. We extracted a control cohort to study if there is a difference in comorbidities between pregnant and not-pregnant patients with similar reasons for admission. In discharge summaries, we manually identified comorbidities of the UMLS semantic types Disease or Syndrome, Mental or Behavioral Dysfunction, and Injury or Poisoning. We then used Entrez Programming Utilities (E-Utilities) to query PubMed®. The searches were constructed using the manually extracted disease terms *ANDed* with *pregnancy*. For example, *UMLS preferred term 'Abdominal Compartment Syndrome'|CUI: C1142110|Disease or Syndrome* was extracted from the text in Discharge Summary: "*A diagnosis of abdominal compartment syndrome was made and the patient taken to the operating room for an emergent decompressive laparotomy*." Then, PubMed was searched for: "abdominal compartment syndrome"[All Fields] AND (pregnancy[MeSH Terms] OR pregnancy[All Fields]) AND (2013/01/01[PDat]: 2013/12/31[PDat])".

Results

We identified 246 pregnant and postpartum patients between 16 and 52 years old, with an average age of 33. A control group of 587 not-pregnancy related admissions matched on age and admit diagnosis. Excluding pregnancy related codes, we found overlap of 24.3% discharge diagnoses between the two groups, and 7.5% of the codes exclusively in the pregnancy group. We identified 33 disease mentions not included in the most common reported causes of maternal morbidity and mortality (MMM). Of these, 61% were included in the structured data, and 39% were identified only in the text. Examples of diseases not reported in the literature as causes of MMM and with less than 10 PubMed® citations per year in the last five years were: Abdominal Compartment Syndrome, Brain Injury, Diabetic Ketoacidosis, Drug Abuse/overdose, Intraventricular hemorrhage, Pseudocyst of Pancreas, Posterior Reversible Leukoencephalopathy.

Discussion

Our results demonstrate that clinical notes and structured data help find understudied disorders potentially associated with pregnancy and delivery. Clinical text alone provided 39% of understudied diseases. Automatic methods enhanced with manual review identified pregnancy-associated diseases not reported in the literature as common causes of MMM in the cohort.

References

1. Saeed M et al. Multiparameter Intelligent Monitoring in Intensive Care II: A public-access intensive care unit database*: Crit Care Med. 2011 May; 39(5):952–60.