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Case report

Hospitalization in pregnancy due to human respiratory syncytial virus associated disease

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ABSTRACT

Background: Despite pregnancy being a state of physiologic immune alteration, it has not previously been described as a risk factor for hospitalization due to human respiratory syncytial virus (RSV).
Case: This retrospective case series describes two cases of hospitalization due to RSV associated illness in pregnancy.
Conclusion: It remains to be determined if the current RSV surge is more dangerous to pregnant patients than those in seasons past. These cases support the importance of maintaining RSV on the differential for respiratory illness in pregnancy.

Introduction

CDC surveillance data has demonstrated an increase in human respiratory syncytial virus (RSV) detection and hospitalizations for the current season, October 2022 through September 2023 [1]. Despite associations of increased morbidity of RSV infections in immunocompromised populations, increased morbidity has not been reported in pregnancy. Pregnant patients have been shown to have increased morbidity and mortality to other respiratory viruses including influenza and SARS-COV-2 [2–4]. We present two cases of RSV-associated hospitalizations in pregnancy.

Cases

Case 1

Our first patient was a 40-year-old gravida 4, para 2, who transferred to our facility from an outlying hospital at 39 weeks gestation with significant respiratory distress. Medical history was significant for obesity with body mass index of 47 and limited prenatal care. Upon arrival to our facility, the patient was afebrile, BP 194/108, HR 127, RR 48, O2 sat 74% on room air. She was emergently intubated and immediately transferred to the operating room for cesarean delivery due to maternal compromise. Delivery was uncomplicated, resulting in the birth of a healthy male infant. After delivery, laboratory assessment was notable for leukocytosis to 23.7 × 10(9)/L, anion gap of 16, and arterial gases of pH 7.19, pCO2 47, pO2 78, HCO3- 18. Chest x-ray demonstrated consolidation and volume loss in both lower lungs. Broad antibiotic coverage was initiated with ceftriaxone and azithromycin. Infectious work-up returned positive for RSV on respiratory panel polymerase chain reaction (PCR) as well as streptococcus pneumoniae on bacterial culture of bronchoalveolar lavage. She was extubated on post-operative day one and eventually recovered with an antibiotic course and supportive cares.

Case 2

Our second patient was a 32-year-old gravida 4, para 3, admitted to our facility at 35 weeks gestation with complaints of dyspnea, wheezing, and oxygen saturations of 93% on home pulse oximetry. Medical history was significant for obesity with body mass index of 31 and prior hospital admission at 29 weeks due to reactive airway disease thought to be a sequela of mild COVID-19 illness six weeks prior. She was afebrile and normotensive, HR 98, RR 24, and O2 sat 96% on 1 L/min nasal cannula. Laboratory analysis was unrevealing and chest x-ray and EKG were unremarkable. Respiratory panel was positive for RSV by PCR. She was started on scheduled ipratropium, albuterol, and fluticasone inhalers. On hospital day 2, her dyspnea worsened, and oxygen requirements increased to 3 L/min nasal cannula. Intravenous dexamethasone was initiated, and she was able to be weaned to room air and transitioned to oral prednisone. In addition, her pregnancy was diagnosed with fetal growth restriction with normal umbilical artery Doppler flow. Estimated

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fetal weight and abdominal circumference were in the 14th and 3rd percentiles, respectively.

The day after discharge she was readmitted to the hospital due to increasing shortness of breath associated with home pulse oximeter saturations of 92–93%. Repeat chest x-ray demonstrated no significant changes. Computed tomography chest angiogram did not show evidence of pulmonary embolism. It was concluded that her airway disease flared in the setting of her prednisone taper and her prednisone dose was increased to 40 mg/day with clinical improvement.

Given that the pregnancy was complicated by fetal growth restriction in the setting of difficult to treat airway disease and intermittent hypoxemia, it was decided to deliver the pregnancy at 37 weeks gestation. Induction of labor was initiated resulting in an uncomplicated vaginal delivery of a small for gestational age but otherwise healthy female infant weighing 2570 g (6th percentile). Both mother and baby were discharged on postpartum day two.

Discussion and conclusion

Risk factors for severe lower respiratory tract infection due to RSV in adults include age exceeding 50 years, immunocompromising conditions (leukemia, hematopoietic cell transplant, solid organ transplant, etc.) underlying lung and cardiac disease including persistent asthma, and residence at higher altitude [5–8]. Case 1 did not have any of these risk factors. While obesity has not been associated with increased morbidity from RSV, it is possible that the combination of pregnancy and obesity, both of which increase susceptibility to infection, may have placed our patient at heightened risk [9,10]. Our patient also had a bacterial co-infection with *S. pneumoniae*. In adults hospitalized with RSV, 42.3–79.7% of cases were associated with bacterial co-infection, with *S. pneumoniae* being the most common pathogen, found in 12.1% of RSV co-infections [11,12]. Bacterial co-infection is known to increase morbidity and likely contributed to our patient's respiratory failure [12].

RSV has been known to exacerbate reactive airway disease, specifically asthma and chronic obstructive pulmonary disease [6]. Interestingly, Case 2 reported no history of reactive airway disease prior to her SARS-CoV-2 infection at 23 weeks gestation. Post-COVID obstructive airway patterns were found in 7% of patients undergoing pulmonary function testing post-infection in one systematic review [13]. Important confounding variables in this study included differing definitions of obstructive airway patterns used among studies, as well as the likely overestimation of new onset obstructive airway disease due to underlying undiagnosed obstructive airway conditions. Whether SARS-CoV-2 infection can cause obstructive pulmonary disease is subject to debate at this time. However, the idea does carry interesting implications for the possibility of increased susceptibility to and morbidity from future respiratory infections.

Both of our patients' initial symptomatology included nonproductive cough, the most common symptom reported amongst patients with RSV who present for evaluation at a medical center [8]. These cases highlight the importance of maintaining RSV on the differential for cough and shortness of breath in pregnancy. It remains to be determined if the 2022–2023 RSV season is more dangerous to pregnant patients than seasons past. We should continue to counsel pregnant patients on general infectious precautions. Pregnant populations should be considered for inclusion in ongoing trials for RSV vaccination [14].

Ethical approval

This case report is IRB exempt.

Consent

Written informed consent was obtained from the patients for publication of this case report. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Dr. Janelle Santos was the primaryauthor of this case report. Drs. Theiler and Szymanski reviewed and edited thiswork for content.

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CRediT authorship contribution statement

Janelle Santos: Investigation, Writing – original draft, revision of draft, approved final draft. **Regan N. Theiler**: Conceptualization, Supervision, Writing – revision of draft, approved final draft. **Linda M. Szymanski:** Supervision, Writing – revision of draft, approved final draft.

Declaration of Competing Interest

Dr. Regan N Theiler reports having a know-how license and research funding from HeraMED and is on the medical advisory board for Delfina. Dr. Janelle Santos and Dr. Linda Szymanski have no conflicts of interests to report.

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