Respiratory syncytial virus: Should we be concerned in pregnancy?

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Introduction

Respiratory syncytial virus (RSV), a single-stranded RNA virus of the *Paramyxoviridae* family, is typically recognised as a paediatric respiratory pathogen. When occurring in adults, the presentation is usually milder and nonspecific, so the diagnosis of RSV infection is frequently overlooked. Reports suggest up to 22% of adults presenting to their general practitioner with influenza-like symptoms, may be affected by RSV (Zambon et al. 2001). The virus has been known to cause severe infection in certain adult groups. Herein, we present an unusual case of infection during a pregnancy to highlight the importance of excluding this common condition, which can lead to respiratory failure and thus has the potential to produce significant consequences for both mother and fetus.

Case report

A 40-year-old woman of South Asian origin was admitted in her second pregnancy at 32 weeks' gestation, with bleeding per vaginam and abdominal pain. The patient also reported coryzal symptoms but no fevers. Examination revealed an upper respiratory tract infection (URTI) and premature rupture of membranes (PROM). She was given steroids, oral antibiotics and managed as an outpatient.

Five days later, she re-presented with increasing shortness of breath and lower abdominal pain. Arterial blood gases revealed a low PaO_2 and chest radiograph showed patchy consolidation. BiPAP was started due to worsening respiratory function (respiratory rate 44/min). Later, her deteriorating symptoms necessitated intubation and an emergency caesarean section at 33 weeks' gestation was performed for maternal reasons.

CT pulmonary angiogram excluded pulmonary embolus. Echocardiography revealed previously undiagnosed tricuspid regurgitation and right ventricular dilatation. Microbial screen revealed influenza A, B and H1N1 negative, legionella/pneumococcal antigen negative, placental swabs negative and urine showed no

growth. The initial antibiotic regime of augmentin and clarithromycin was subsequently changed to teicoplanin, tazocin and clarithromycin. Two days later, the infecting organism was confirmed to be RSV and a diagnosis of respiratory failure following RSV pneumonitis and sepsis, was made. Ribavirin antiviral therapy was started and the paediatrics team was informed to watch the neonate for symptoms.

Successful extubation was possible four days after starting the Ribavirin therapy. The patient continued to have some respiratory support but, after three weeks on the intensive therapy unit, was discharged home for outpatient cardiology review.

Discussion

Adult RSV infection is generally self-limiting and resolves without intervention. However, high-risk patients (elderly, underlying cardiopulmonary disease, pregnant, immunocompromised) are susceptible to severe disease (Walsh and Falsey 2012). Our patient's cardiac diagnosis is likely to have been an important influencing factor in the severity of her infection. High nasal viral load is thought to be a risk factor for respiratory failure and a strong association exists between underlying cardiopulmonary disease and risk of hospitalisation (Duncan et al. 2009).

Little work has been done on severe RSV infections in pregnancy. Its incidence and consequences for mothers and neonates are unclear, but it is useful to draw parallels from the knowledge of other RTIs. Numerous studies done following the H1N1 influenza pandemic of 2009 demonstrated that pregnancy was a risk factor for infection-related hospitalisation (Creanga et al. 2010). Hospitalisation was in turn linked with an increased rate of pre-term and emergency caesarean deliveries (Pierce et al. 2011). A possible explanation for this observation relates to increased prostaglandin and matrix-degrading enzyme production during infection – a phenomenon not dissimilar to factors thought to be implicated in mechanisms of labour and preterm labour (Stiller-Timor et al. 2010). Interestingly, our patient first presented with PROM but an association between RTIs and this complication is yet to be established.

Pregnancy significantly affects respiratory function. As the diaphragm is elevated, functional residual capacity and residual volume decrease. Furthermore, there are increased oxygen requirements, so respiratory infections often have more severe consequences (Harris and Sheiner 2013). Alterations of the immune system also increase maternal susceptibility to infection, with reduced responses from cell-mediated immunity and reduced Th1 function (Harris and Sheiner 2013). For these reasons, timely and effective treatment of respiratory infection is paramount. H1N1 studies demonstrated a better outcome in pregnant women who commenced antiviral therapy early (≤ 2 days from symptom onset) compared with those given Oseltamivir ≥ 3 days after symptom onset (Creanga et al. 2010; CDC 2010). For our patient, it is likely that earlier recognition of the infecting organism and rapid commencement of antiviral therapy would have expedited her recovery.

Unfortunately, treatment options for RSV infection are limited. Ribavirin, the only licensed antiviral agent, is of questionable usefulness in non-immunocompromised adults and is primarily used in infants (Walsh 2011). It is contraindicated in pregnancy and breast-feeding (our patient did not breast-feed while on therapy). Prophylaxis for neonates in the UK is in the form of Palivizumab, a humanised monoclonal antibody vaccination used for high-risk groups, including premature infants. Promoting passive immunity in the neonate, through RSV vaccination in the third trimester, has also shown potential for protecting infants early in life when they are most at risk of severe infection (Munoz et al. 2003).

Conclusion

Traumatic emergency deliveries and protracted hospital admissions can have a significant impact on both maternal and fetal wellbeing. This case highlights the need for vigilance in pregnant women presenting with respiratory symptoms and perhaps the need to maintain a lower threshold for suspecting RSV infection in pregnancy.

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