

RSV In Immunocompromised Patients

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Background

- Human respiratory syncytial virus (RSV) is a single and negative strand RNA virus. RSV is transmitted via respiratory droplet, and has an incubation period post inoculation of 2 - 8 days. it typically manifests as an upper respiratory illness.
- Typically causes seasonal outbreaks worldwide, peak season in the northern hemisphere occurs from October to May.
- Estimated for approximately 33 million lower respiratory tract illnesses, three million hospitalizations, and approximately 199,000 childhood deaths
- RSV in the immunocompromised adult can lead to significant morbidity and mortality.
- An immunocompromised individual is someone whose immune system is weakened or impaired, making them more susceptible to infections and illnesses. Immunocompromised individuals may have malignancies, chronic illnesses, cancers, etc.
- RSV manifests in most cases as an upper respiratory tract infection (URTI) with a combination of symptoms, including fever, myalgia, cough, wheezing, rhinorrhoea, nasal congestion, sinusitis, headache, otitis media and generalized malaise. However, in immunocompromised hosts, RSV infection can lead to prolonged viral shedding or progress to a lower respiratory tract infection (LRTI), which is often associated with high mortality.
- Treatment of RSV-infected adults is limited to antiviral therapy with ribavirin (aerosolized, oral, intravenous) and immunomodulation with intravenous immunoglobulins, corticosteroids, and palivizumab.

Objective

- To summarize the current literature of RSV in cancer patients.
- To discuss appropriate resources, treatments and preventative measures that can be used to aid in clinical decision making regarding cancer patients and RSV.

Methods

- Information was gathered and collected for accurate and up-to-date research on the Human Respiratory Syncytial Virus (RSV) in October 2023.
- A literature search was conducted using PubMed electronic database and the Center for Disease Control (CDC).
- The most common themes, ideas and interventions were included and summarized in this review

Discussion

- **Treatment**
 - The treatment of lower respiratory tract infection caused by RSV is supportive care. This ranges from using supplemental oxygen for hypoxia, management of respiratory secretions and mechanical ventilation for respiratory failure.
 - Interventions that have shown to be proven beneficial include single agent or combination therapy with ribavirin, IVIG, palivizumab, and/or glucocorticoids.
 - Intravenous RSV Immunoglobulins (RSV-IVIG) was approved by the U.S FDA in 1996 for use to treat preterm infants and in children with bronchopulmonary dysplasia. Although no longer used, IVIG was shown to prevent RSV replication in the lung tissues and reduce pulmonary viral loads in pulmonary tissue. It was taken off the treatment guidelines as it had shown that there was no reduction in the length of hospital stay, intensive care unit or the use of supplemental oxygen.
 - In animal models, concomitant therapy using ribavirin with palivizumab can boost the clearance of pulmonary viral loads, whereas the use of glucocorticoid reduces the progression of obliterative bronchiolitis associated with RSV in the immunocompromised host.
 - Ribavirin, a viral nucleoside inhibitor can be administered in oral, IV, or aerosolized forms to treat RSV
 - Optimal dosing has not been established yet, usually 600 to 800 mg 2 to 3 times daily or single 10mg/kg loading dose, followed by 20mg/kg/day in 3 divided doses
 - For lung transplant patients, oral inhalation Ribavirin use is suggested, and infected patients can be pretreated with albuterol if necessary
 - Mechanically ventilated patients should receive 6 grams over 12 - 18 hours daily
 - Non mechanically ventilated patients should receive 2 grams over 2 to 4 hours, every 8 hour or 6 grams over 2 - 6 hours every 6 to 8 hours via SPAG2 or nebulized.
- **Prevention:**
 - RSV prophylaxis is not recommended for all patients; prophylaxis with Palivizumab is mainly recommended in pediatric patients with a history of premature birth (> 35 weeks gestational age), and who are < 6 months at the beginning of RSV season, bronchopulmonary dysplasia that have required treatment within a previous 6 months, and who are < 24 months at the beginning of RSV season, or ped patients with hemodynamically stable congenital heart disease who are < 24 months at the beginning of RSV season
 - Vaccination Recommendation
 - There are two RSV vaccines licensed for use in adults aged 60 years and older in the United States: RSVPreF3 (Arexvy, GSK) and RSVpreF (Abrysvo, Pfizer).
 - CDC recommends that adults 60 years of age and older may receive a single dose of RSV vaccine using shared clinical decision-making (SCDM)
 - Pfizer's bivalent RSVpreF vaccine (Abrysvo) is recommended for use during pregnancy (maternal RSV vaccine). It is given during RSV season to people who are 32 through 36 weeks pregnant.
 - Babies born to mothers who get RSV vaccine at least 2 weeks before delivery will have protection and, in most cases, should not need an RSV immunization later.
 - As of 2023 according to AAP (American Academy of Pediatrics), Beyfortus (Nirsevimab, a monoclonal antibody) can be used in newborns and infants during or entering their first RSV season. It is administered intramuscularly and the effects last for approximately 5 months.
 - Dosing
 - Infant's first RSV season
 - Weight <5 kg: One 50 mg intramuscular (IM) dose
 - Weight ≥5 kg: One 100 mg IM dose
 - Child's second RSV season
 - One 200 mg IM dose
 - Although, Nirsevimab is currently recommended, it is not yet widely available, so prophylaxis treatment with Palivizumab is still considered acceptable.

Conclusion

- The current treatment for RSV in immunocompromised individuals are Ribavirin, Palivizumab and/or glucocorticoids.
- For pediatric patients, usually those entering their first RSV season, Nirsevimab can be given intramuscularly and the effects last about 5 months.
- Prophylaxis with Palivizumab is strongly recommended in pediatric patients with a history of premature birth, < 6 months old and starting their first RSV season, or those with a congenital heart disease who are < 24 months old.
- For prevention; patients who are older than 60 years of age can get either the Arexvy or Abrysvo intramuscular vaccine. Otherwise, it is always important to maintain good hygiene (washing your hands, cleaning commonly used surfaces etc.)

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