PARAINFLUENZA BACKGROUND

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BIOLOGY AND EPIDEMIOLOGY

• Single-stranded, enveloped, RNA viruses (Paramyxoviridae family).
• Virus is divided into 4 serotypes “with HPIV4 subdivided into two genera (HPIV4a and HPIV4b).”
• Pathogenesis: human parainfluenza viruses (HPIVs) target and infect ciliated epithelial cells of the upper and lower respiratory tracts.
• “Severe disease and fatal pneumonia may occur in elderly and immunocompromised adults.”
• It is estimated that only 1% of respiratory illnesses in adults are caused by human parainfluenza viruses resulting from waning immunity and reinfection after childhood.
• The CDC reports that transmission occurs through direct person-to-person contact or respiratory droplets.
• Infections typically occur:
  o HPIV1 – biennial outbreaks during the fall of odd-numbered years
  o HPIV2 – annually in the fall
  o HPIV3 – seasonal outbreaks in the spring
  o HPIV4 infections have not been well studied.
• Commonality of serotypes
  • HPIV3 (52%)
  • HPIV1 (26%)
  • HPIV2 (12%)
  • HPIV4 (2%)
• Reports list human parainfluenza viruses as the “second most common cause of acute respiratory tract infections” in children under the age of 5, accounting for “up to 17% of [child] hospitalizations.”
• Serological studies suggest that by the age of 6, the vast majority of children will have been infected by HPIV3.
• By the age of 10, 70% to 80% of children will have developed antibodies against the remaining human parainfluenza viruses serotypes.
COMMON SYMPTOMS

- Fever, runny nose, cough, croup, pneumonia, sore throat, wheezing, ear pain.⁴

DIAGNOSIS

- Detection of virus by culture, fluorescent antibody assays, or some other molecular assays using PCR.⁵

TREATMENT

- Currently no antivirals available.
- Corticosteroids are primarily used to treat croup symptoms, while the use of nebulized epinephrine is associated with short-term relief of symptoms after 30 minutes. However, the benefit of nebulized epinephrine generally disappears after 2 hours.¹
- Treatment regimens “utilize aerosolized or systemic ribavirin in combination with intravenous immunoglobulins and/or corticosteroids.”¹
  - Ribavirin is a synthetic nucleoside analog normally used to treat RSV.
    - Despite its use, there does not seem to be much in the scientific literature on its actual effectiveness in treating human parainfluenza viruses.
  - The drug DAS181 appears promising in efforts to treat severe disease in immunocompromised patients.
    - “DAS181 is an inhaled recombinant sialidase fusion protein that interferes with the initial binding of HN with the host cell sialic acid containing receptor.”¹
    - Currently in Phase 2 clinical trials as a treatment option for infected individuals who are immunocompromised.¹

REFERENCES


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