Severe Adenovirus Infection in an Immunocompetent Host : A case report

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INTRODUCTION

Adenovirus is a frequent cause of mild respiratory tract infection and gastroenteritis in children, it can cause severe respiratory illness in immunocompromised patients. Outbreaks and aggressive respiratory symptoms have been reported in military camps [1]. Epidemics are well known to occur in close or crowded settings [2].

We report a case of severe adenovirus pneumonia in a young immunocompetent female, presenting with fever associated with mild respiratory symptoms that progressed rapidly to severe pneumonia with bilateral consolidation on chest X-ray and ground glass opacities on high resolution Computed Tomography.

We describe the case of a 34-year-old female, who lives in a refugee camp in Co. Wexford, Ireland. She shares a single room with her nine family members, she has no background medical history, is a nonsmoker and she is not on regular medication. She denied previous history of hospitalization or recurrent chest infection.

She presented to the Emergency Department at Wexford General Hospital, with complaints of high-grade fever, productive cough and mild abdominal discomfort that began three days previously. She denied any other associated symptoms. She is a mother of three, her 8-year-old daughter was seen on the same day at the pediatrics department with a sore throat and fever. Our patient reported that her other two children had developed mild gastroenteritis.

Serology / Blood test
Anti CCP, ANA, ANCA, RF, negative
HIV not detected Anti-CMV IgG detected, IgM not detected Anti EBV IgG detected, IgM not detected VZV IgG detected
Serum immunoglobulins within normal range
Anti Hep B/C not detected
C3/C4 normal
HB A1C normal
β D glucan level & galactomannan level Negative

Culture/ Microbiology
Blood Cultures * 3 . No growth .
Extended viral panel nasopharyngeal swab Adenovirus Detected Adenovirus DNA detected at **1.31 x 10^7 copies/ml Genotype 3B**
Sputum cultures, No growth
AFB stain, No organsim seen
MRSA , VRE, CPE Negative
Urine culture, No growth
Quantiferon Negative

TIMELINE AND HOSPITAL COURSE

Day 1

The patient was vitally stable; despite high grade temperature she did not require oxygen support. Her CRP was in excess of 120 mg/l with normal WCC and differential. Other blood tests including liver function tests were unremarkable. Chest X-ray showed right side consolidation (Figure 1). Examination revealed harsh vesicular breathing over the right side of the chest, no skin rashes or signs of joint inflammation were observed. Throat examination showed no signs of tonsilitis or pharyngitis. She was commenced on broad-spectrum antibiotics according to the microbiology guidelines. Covid and influenza A and B were undetected on the day of admission. Furthermore, bacterial throat swab showed no organism.

Day 2 and 3

She started to develop frequent bowel motions with mild abdominal discomfort, originally considered to be attributable to antibiotic. *Clostridium difficile* assay and stool culture came back negative. She continued to spike temperatures with mild respiratory distress that required low flow-oxygen of 1-2 liters. Extended viral panel nasopharyngeal swab detected adenovirus, with all other organisms undetected. Stool also yielded detected adenovirus DNA. Bacterial / fungal and TB cultures were negative. HIV and other viral serology was negative, in addition to autoimmune panel which shows negative results. Both pneumococcal and legionella urinary antigen were undetected. Antibiotics were escalated and full MRSA, VRE and CPE screens were requested. These subsequently returned negative. Chest X-ray showed worsening right-side consolidation and her CRP continued to rise despite broad spectrum antibiotics.

Day 4 to Day 7

Patient deteriorated rapidly transferred to the intensive care unit, with increased oxygen support, and was changed to Airvo, requiring high flow oxygen up to 80% FiO_2 to maintain her saturations around 93% with pO_2 around 8kPa. Her chest X-ray showed feature of ARDS. At the time, the patient was fully covered with broad-spectrum antibiotics, including cover for potential hospital acquired organisms. **Serum Adenovirus PCR detected 1.31 x 10^7 copies/ml**. Sequence analysis determined the adenovirus to be Genotype 3B. High resolution CT Thorax revealed multiple opacities with ground glass appearance. The Microbiology advised that there was no indication for antiviral therapy as the patient is immunocompetent.

Day 7 to Day 11

Day 7 to day 11, the patient improved significantly on supportive measures which included respiratory support and symptomatic measures. Inotropes were not required. She was weaned slowly from oxygen and her inflammatory markers improved. Repeated Adenovirus serum PCR at 5 days showed a decrease to 9.37 x 10^5 copies/ml.

Discharged on day 14

The Patient was discharged from the hospital on day 14. Follow-up chest X-ray after 10 days revealed complete resolution of the pneumonic patches. Figure 2

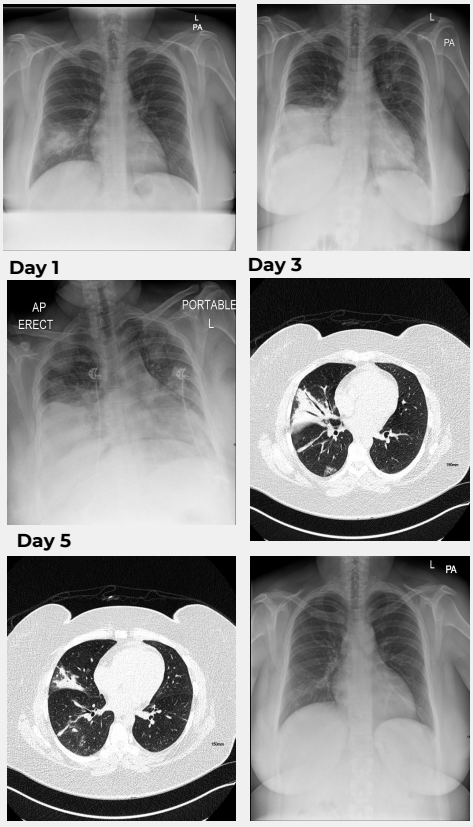

Figure 1. Chest X-ray showing worsening pneumonic patches and HRCT showing ground glass opacities
Figure 2. resolution of the pneumonic patch

DISCUSSION & CONCLUSION

- **Severe adenovirus infection can cause severe morbidity and mortality in immunocompromised patients, but it can also rarely cause severe infection in immuno-competent healthy patients. In 2001, two deaths were associated with severe adenovirus pneumonia in previously healthy immunocompetent patients in military recruits [3]. Typical radiological features of adenovirus infection can range from consolidation that can rapidly progress to bilateral consolidation and ground glass opacities on CT imaging[4].**
- **This case demonstrates a rapidly progressive respiratory course. Specific groups including refugee camps, military recruits etc, should be evaluated and assessed cautiously to prevent outbreaks and poor outcomes. Signs of mild viral illness in the population should be handled carefully with a high index of suspicion and early isolation of specific groups including immunocompromised patients is advisable[5].**
- **Collection of nasopharyngeal swabs in the community should be considered in any suspected viral illness to prevent spread. The risk of transmission to the population is very low, though outbreaks in the refugee population should be considered due to poor living conditions, not least among children[6].**

REFERENCES

1 –Emerg Infect Dis 2012 Mar; 18(3):507-509, 2 –Semin Respir Crit care Med 2016 Aug; 37(4): 586–602, 3 –JAMA 2001 Aug 15;286(7):782-3, 4 –Korean J Radiol 2016 Nov-Dec; 17(6): 940–949, 5 -BMJ 2015 Sep; 351:h4808, 6 –Epidemiol Infect 2021; 149: e199