Experience in Treatment of Patients with Severe Influenza with Viral Pneumonia in ICU

Abstract

Objective: To explore the experience of severe influenza A viral pneumonia treatment.

Methods: The clinical data and treatment of 6 cases of severe influenza with virus RNA-positive pneumonia were analyzed.

Results: 3 cases of new H1N1 influenza, 3 cases did not do further nucleic acid subtype identification, patients were treated with oseltamivir. 3 patients with invasive pulmonary aspergillosis, 4 patients received invasive mechanical ventilation, 2 cases of pneumothorax. 3 patients received continuous hemofiltration for acute renal injury, 4 with ventilator-associated pneumonia in 5 patients with mechanical ventilation, and 5 patients died.

Conclusion: Suffering from severe underlying disease, the use of glucocorticoids, deep sedation, secondary pulmonary infection of influenza A virus causes severe pneumonia and high mortality.

Keywords: Influenza A virus; Pneumonia; Acute respiratory distress syndrome; Mechanical ventilation

Introduction

China has been infected with highly pathogenic avian influenza, H7N9 avian influenza and influenza A H1N1 influenza as a class B infectious diseases, group management [1-3], to control disease outbreaks, reduce mortality, play an important role. Along with the dangers of influenza virus to reduce, on November 4, 2013 national influenza a viruses according to the seasonal flu management [4], and release of human infection with highly pathogenic avian influenza and H7N9 category management, and the lifting of human infection with highly pathogenic avian influenza and H7N9 class A management. Lack of scientific understanding of influenza a viruses, fears of its harmful effects, affect the success rate of treatment of such diseases.

From February 25 to May 25, 2016, Qilu Hospital Molecular Biology Laboratory tested influenza virus nucleic acid for 73 respiratory specimens and another 3 specimen of broncho-alveolar lavage fluid (BALF) to Beijing Chaoyang Hospital to detect influenza A virus. The 14 people were diagnosed with influenza A, given oseltamivir capsules 150mg, twice a day. Respiratory distress was not relief, at 12:00 on 12th January with "severe pneumonia and lung-derived ARDS (severe)" admitted to Qilu hospital. During admission patient was severely ill, APACHE II 11, SOFA 5 on 13th January 2016 8:00 neck subcutaneous emphysema was found, CT showed double-lung grindstone-like exudation, mediastinal emphysema. From January 12 to January 16, intravenous methylprednisolone 80mg, q 12h; 1 17th January 19 intravenous methylprednisolone 120mg, q12h; 1 20th January 23 intravenous methylprednisolone 40mg.

Clinical information

In case 1: A 54 years old woman was well before. Gastrointestinal endoscopy was done on 28th December 2015 due to abdominal pain. On 6th January 2016 patient developed dyspnea and intermittent fever. On 8th January 2016 severe pneumonia and lung-derived ARDS (severe) admitted to Qilu hospital. During admission patient was severely ill, APACHE II 11, SOFA 5 on 13th January 2016 8:00 neck subcutaneous emphysema was found, CT showed double-lung grindstone-like exudation, mediastinal emphysema. From January 12 to January 16, intravenous methylprednisolone 80mg, q 12h; 1 17th January 19 intravenous methylprednisolone 120mg, q12h; 1 20th January 23 intravenous methylprednisolone 40mg.
Case 3: A 63 years old women, with H/O chronic obstructive pulmonary disease (COPD), repeated wheezing, cough, spu tum for more than 20 years which increased with fever for 10 days, highest temperature of 39.5°C. White blood cells 9.07 × 10^9/L, the proportion of neutrophils 75.6%, CRP 88.9mg/L. CT showed chronic bronchitis, interstitial pneumonia, arterial blood gas PH 7.49, PaCO2 31mmHg, PaO2 54mmHg. Outside the hospital to give piperacillin/tazobactam treatment for 9 days. On March 16th, 2016 16:56 with “acute decompensated respiratory acidosis and hypoxemia” admitted to the second ward of intensive care medicine department, oral tracheal Intubation was done for mechanical ventilation. On March 9th and March 14th, BALF specimens confirmed that influenza A (universal) influenza virus and influenza A (H1N1) were positive for influenza virus, nasal administration of oseltamivir 150 mg twice daily. March 10 subcutaneous empolysema, chest radiograph showed mediastinal empysiema and pneumothorax, emergency thoracic closed drainage and tracheotomy were done. March 7th serum, March 8th and March 14th BALF specimens GM were 0.03, 0.22 and 4.82 (reference value <0.5). Disease was worsens, On March 14th at 16:00 patient was declared clinically death.

Case 4: A 46 years old male, was well enough, he was engaged for a long time in interior decoration and housing demolition. On March 1st, 2016 due to “fever and cough for 5 days” stayed in a local hospital, his white blood cells were 4.8 × 10^9/L, 72.1% neutrophils, chest radiograph shows bronchitis. Given roxithromycin as treatment, wheezing, shortness of breath increased, with lips cyanosis. On March 3rd, CT showed double-lung diffuse grinding glass changes, suggesting that infectious lesions. On March 4th arterial blood gas shows PaO2 24mmHg, lactic acid 3.7mmol/L. Tracheal intubation was done for invasive mechanical ventilation, methylprednisolone, imipenem, oseltamivir and other treatment were given. On March 6th at 9:09 admitted to the second ward of intensive care medicine department, APACHE II 29 points, SOFA 11 points. PiCCO showed extravascular lung water 21mg/kg, permeability index 4.6. On March 8th at 10:00 tracheotomy was done, analgesic and sedative and muscle relaxation strategies to maintain RASS-2 points to +1 points. Tracheal microscope lumen a lot of watery mucus congestion and erosion, bleeding of mucous membrane of airway, ETA specimen shown in negative influenza a viral antigen detection (colloidal gold), viral (common) flu virus influenza A (H1N1) influenza virus RNA positive. Feeding oseltamivir 150mg, twice a day. On March 14th and March 21st, On March 25th influenza A (H1N1) influenza virus nucleic acid is still positive. Serum GM 0.21 and 0.20, respectively on March 6th and March 15th, On March 6th, March 8th, and March 14th, and March 25th GM BALF samples were 4.0, 3.0, 3.99, 3.25, combined with voriconazole and caspofungin in IPA. Disease progression, patients with acute kidney injury, between March 14th and March 9th at 22:00 CRRT intervention but hypoxemia is improving steadily. On March 17th methylprednisolone intravenous infusion 40mg QD, On March 23rd tracheoscopy tracheal mucous membrane as shown in a large number of white pseudo-membranous attachment, mucosal erosion bleeding, tracheal mucus examination of Aspergillus fumigatus hyphae. In patients with refractory cough, man vs computer obviously, combined with dextromethorphan, Atracurium and other sedative and muscle relaxant. Oxygen demand enhanced and worsen, septic shock, on March 27th at 7:41 patient was death.

Case 5: A 54 years old women, farmer, history of hypertension and bronchiectasis for 20 years, with the history of nephrotic syndrome and chronic renal insufficiency for 1.5 years. Edema
occurs after February 19th, 2016 colds and wheezes increased 550μmol/L creatinine. Received Continuous dialysis in 5 times, from February 28th to March 1st, methylprednisolone isolated impact 3
days, sequential high-dose chemotherapy. March 3 cough up blood, approximately 150mL, with yellow-purulent sputum, a temperature of 38.5 degrees Celsius, on March 5th at 8:07 stay in Nephrology. 12.9x109/L white blood cells, neutrophil percentage 89.3%, haemoglobin 63.2g/L, TC 6.3mmol/L, 6.89mmol/L triglycerides, creatinine 606 μmol/L, 24h urine protein 3.9g. Acute hemodil dilution 1, asthma deterioration associated with hypoxemia. March 9th at 10:59 transfer to Intensive Care Medicine, cumulative prednisone dose 4315mg, continuous NPPV treatment, lose red blood cells, the CRRT therapy. On March 10th sputum specimen shows a (Universal) positive influenza virus nucleic acid, influenza a (H1N1) influenza virus nucleic acid negative, and given oseltamivir 150mg, twice a day. On March 5th and March 9th, sputum culture for Aspergillus fumigatus, serum GM 6.0 and 1.1 respectively on March 10th and March 23rd, caspofungin injection and voriconazole tablets in the treatment of invasive pulmonary aspergillosis. On March 12th at 8:05 transferred to the urology department, Dyspnea and hypoxemia deteriorate, CT double lung infection, bronchiectasis and multiple infections, some of the Mucus plug. On April 3rd, patient was discharged. 5 days after discharge from hospital, patient was died.

Case 6: A 28 years old male, was well enough then he developed “cough, and sputum for 20 days, fever for 8 days, wheezing for 3 days” takes treatment outside the hospital but did not cured. On March 2nd, 2016 at 22:05 emergency admission to the second ward of ICU d. On February 28th chest CT showed multiple pulmonary nodules, patchy high-density shadow, part of the ground-glass-like changes. The white blood cells were 5.42 × 109/L, the proportion of neutrophils was 87.6%, PCT was 0.195ng/mL and CRP was 21.1mg/L. Suspected viral pneumonia, given oseltamivir 150mg twice a day. Nasal oxygen, no breathing distress. On March 3 sputum specimens showed influenza A virus negative antigen test (coloidal gold method), influenza A (generic) influenza virus nucleic acid and influenza A (H1N1) virus nucleic acid negative. On March 4th, once again sent to the sputum specimens show type (general) influenza virus nucleic acid and influenza A (H1N1) virus nucleic acid positive. March 8 13:20 transfer isolation treatment, was discharged from hospital.

Discussion

At present, Centers for disease control and prevention (CDC) is responsible for the influenza virus Antigen screening, influenza virus typing and confirmation work [6]. Swine flu virus causes severe viral pneumonia, lower respiratory tract virus load than the upper respiratory tract and clear the slow, lower respiratory tract specimens should be at this time. Sensitivity of influenza virus Antigen by coloidal gold poor, mainly used in the screening test for influenza a virus. Influenza virus nucleic acid detection high sensitivity and specificity, is the gold standard for diagnosis of viral pneumonia. For example, information on 4 cases of swine flu screening test for virus Antigen test was negative, six cases of influenza a virus RNA positive. Therefore, high-risk patients with swine flu should be repeatedly reviewed influenza antigens or viral nucleic acid testing. The information on three cases of swine flu and the other three cases could not confirm whether H7N9 or H5N1. Main reasons and clinical viral nucleic acid testing projects, specimen submission channel flow and other factors [6]. Past swine, H7N9, H5N1 influenza as a class b infectious disease, and take a class infectious diseases preventive and control measures, Guo Wei Ji control 28 disarm the disease group a regulations. Large doses of oseltamivir (150 mg/times, 2 times a day), on the basis of long-term treatment (at least7-10 days) [7], influenza virus Detox time still extended, severe pneumonia, impaired immune function and lead to effective virus removal, or cannot effectively absorb the antiviral drug-related. BALF nucleic acid positive influenza a virus specimens, undoubtedly in crease the enthusiasm of staff fear and active care [5,8]. BALF samples after treatment against influenza virus nucleic acid positive reflect viral activity and pathogenicity, disputed [9,10]. At this point, the isolation of influenza a virus and determine its activity [11]. Home to carry out the technique, refer to the incubation period of influenza viruses reasonably isolated. The morbidity > after 7 days in hospital, does not have a contagious influenza virus.

Take the standard precautions, medical staff in this ward were not infected with swine flu. GM has limited value in serum of patients with non-severe agranulocytosis is recommended based on Bronchoscopic diagnosis IPA [12]. Developing severe influenza viral pneumonia in patients above 60 years old, or suffering from multiple diseases, such as COPD, diabetes, chronic kidney disease [1-3]. Severe cases with invasive pulmonary aspergillosis (IPA), a high mortality rate, this case 3, case 4, 5 patients were dead [13,14]. Large doses of corticosteroids are IPA not only risk factors also increase mortality in patients with severe influenza virus pneumonia [7,15].

Hormone lack secondary to viral pneumonia improve the curative effect of pulmonary fibrosis and the adverse effects of increased pulmonary infection, do not recommend hormones for the treatment of patients with influenza virus pneumonia [16-18]. This group of patients with paroxysmal cough violently, mechanical ventilation during the fight against severe, 2 cases of tension pneumothorax (50%). Such patients of ventilator-induced lung injury (VILI), with the exception of influenza virus-induced severe challenges to protective strategy of mechanical ventilation in patients with ARDS [19,20], and cough after viral infection of high sensitivity syndrome (CHS) about [21,22].

Therefore, diphenhydramine, and dextromethorphan, codeine and other drugs, not only to mitigate the adverse effects of intractable cough due to CHS [23] and avoid relying too much on deep sedation to improve human-machine synchronization to harm [24]. One-sided pursuit high oxygen and index led to evacuation breathing machine delay, especially concerns flu virus infection sex and take closed sucking phlegm, and fear pipeline accident of implementation deep calm and real rational constraints, measures [24,25], deterioration phlegm liquid drainage not Chang against, following sent to multiple resistance drug Bowman not moving Bacillus mainly of breathing machine correlation pneumonia [26], and blood flow infection, is patients mortality home high not drop of important factors one of.

Study on the shortcomings of the present study is limited to a single Ward and small number of cases.
Local Hospital Fund Projects


References