

A Case of Severe H1N1 Pneumonia Complicated with Spontaneous Pneumomediastinum and Pneumothorax

Spontan Pnömomediastinum ve Pnömotoraksla Komplike Olan Ağır H1N1 Pnömonisi Olgusu

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Abstract

Cases of spontaneous pneumomediastinum and spontaneous pneumothorax related with influenza A (H1N1) infection in adults are quite rare. The case presented here was a 33-year old female patient admitted to the emergency room with high fever, severe dyspnea, cough and altered consciousness. Pneumomediastinum and bilateral pneumothorax were detected on a chest roentgenogram and thoracic computerized tomography imaging. The H1N1 virus was identified in a nasal smear and in tracheal aspirate samples. Clinicians should be aware of this rare complication of the Influenza A virus that has started to be seen in literature.

Key words: H1N1 virus, pneumothorax, pneumomediastinum.

Özet

Erişkinlerde influenza A ile ilişkili spontan pnömomediastinum ve spontan pnömotoraks olguları oldukça nadirdir. Olgumuz acil servise yüksek ateş, ciddi dispne, öksürük ve bilinç değişikliği ile başvuran 33 yaşında bir kadındı. Akciğer grafisi ve bilgisayarlı toraks tomografisinde pnömomediastinum ve bilateral pnömotoraks tespit edildi. Nazal sürüntü ve trakeal aspirasyon örneklerinde H1N1 virüsü tespit edildi. Klinisyenler literatürde görülmeye başlayan Influenza A'nın bu nadir komplikasyonu hakkında dikkatli olmalıdırlar.

Anahtar Sözcükler: H1N1 virüs, pnömotoraks, pnömomediastinum.

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The Influenza A (H1N1) virus mostly causes acute, infectious respiratory tract infections (1). It is one of the leading causes of the seasonal epidemics that result in serious disease and even death almost every year (2). Spontaneous pneumomediastinum (SPM) is a very rare complication of an H1N1 infection (3). The rare cases of SPM related with Influenza A infections are reported mostly in pediatric cases (4).

The early initiations of antiviral medication along with an appropriate antibiotic regime for possible co-infections are strongly recommended (5). We present here a case with H1N1 virus accompanied by both SPM and spontaneous pneumothorax.

CASE

A 33-year old female patient was brought to the emergency department with severe dyspnea, cough, high fever and altered consciousness. Her general condition was poor, and her vital signs were: blood pressure: 80/60 mmHg, heart rate: 126/min, respiration rate: 28/min, SPO₂: 84% and body temperature: 38.7°C. There were no abnormal findings on physical examination other than bilateral extensive rales. The laboratory results of the patient were WBC: 29,560, Hb: 12.2 g/dL, Htc: 37.7%, Plt: 376,000, CRP: 345 mg/L, AST: 70 U/L, ALT: 100 U/L, BUN: 8 mg/dL, creatinine: 0.53 mg/dL, Na: 138 mmol/L, K: 3.2 mmol/L, Ca: 7.6 mg/dL and Cl: 97 mmol/L. An arterial blood gas analysis showed pH: 7.14, PCO₂: 84.5 mmHg, PaO₂: 65.2 mmHg, SO₂: 86.2%, HCO₃: 21.1 mEq/L and lactate 3 mmol/L. Bilateral and partly intensified extensive infiltration zones and linear air density at the edge of mediastinum were identified in the patient's chest roentgenogram (Figure 1). A subsequent chest computerized tomography imaging revealed parenchymal infiltration accompanied by pneumomediastinum and bilateral pneumothorax (Figure 2 and 3). The patient was admitted to the intensive care unit, and was simultaneously intubated and subjected to a bilateral tube thoracostomy (Figure 4). The vital signs of the patient after intubation were BP: 80/60 mmHg, HR: 124/min, SPO₂: 99% and body temperature: 37.8°C. An arterial blood gas analysis revealed pH: 7.17, PCO₂: 87.5 mmHg, PaO₂: 141 mmHg and HCO₃: 32.8 mEq/L. There were rough sounds and rales upon physical examination. A fiberoptic bronchoscopy revealed intensive mucosal edema, inflammation and hyperemia; after which a nasal smear and tracheal aspirate samples were obtained. The H1N1 virus was identified in the obtained samples, and antiviral treatment (oseltamivir phosphate) was initiated in

the early period. Empirical antibiotherapy was added to the treatment for the treatment of possible secondary bacterial infections (imipenem+cilastatin sodium combined with vancomycin). There was no air leakage from either chest tube. The left chest tube was removed on the third day and the right one was removed on the fifth day. The patient was extubated on the eighth day of follow-up, and was discharged on the 15th day with healing (Figure 5 and 6).

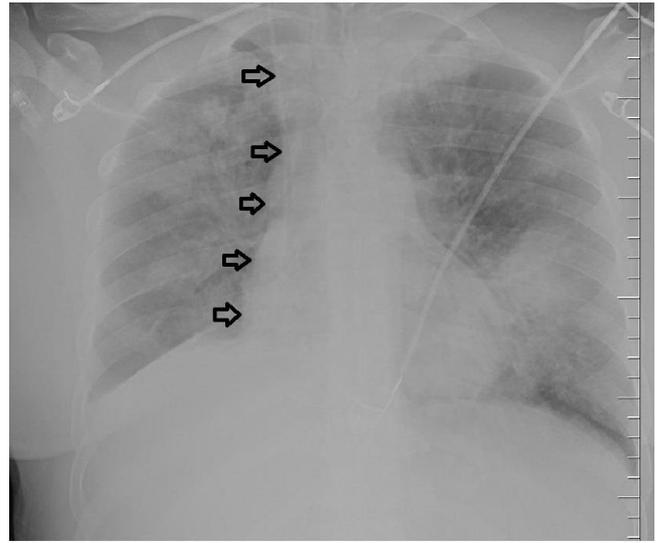


Figure 1: The appearance of pneumomediastinum on an antero-posterior roentgenogram of the patient at the first application. Black arrows indicate the edge of the paracardiac air densities

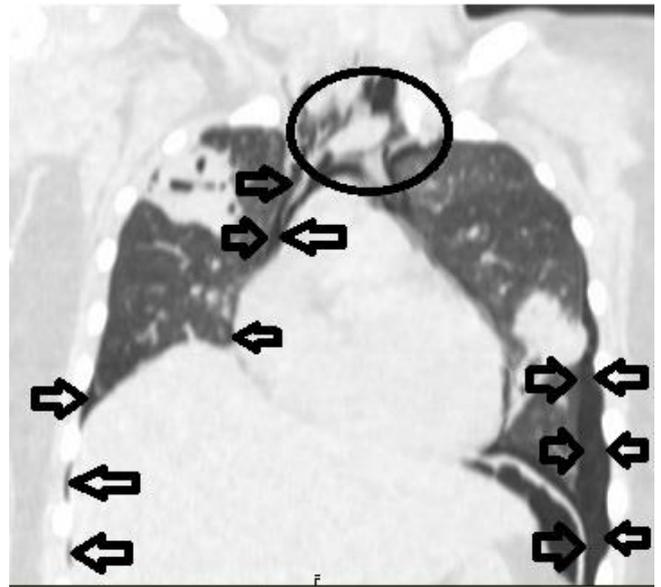


Figure 2: A coronal chest multidetector CT view of the lung window upon the first application of the patient. Inflammatory consolidated parenchyma areas can be seen. The black arrows indicate the edges of the bilateral pneumothorax, and the black circle shows the boundary of the pneumomediastinum

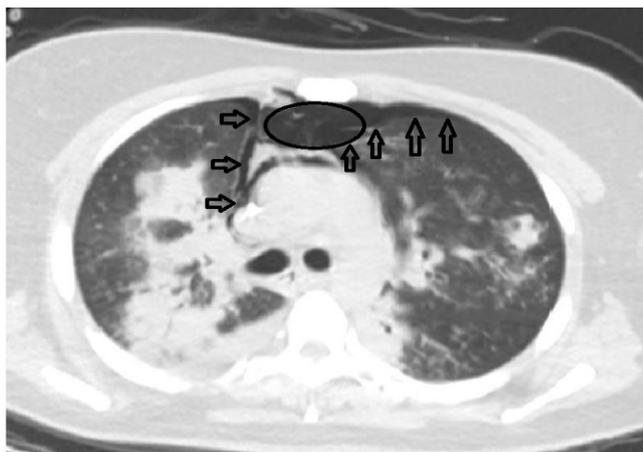


Figure 3: An axial chest multidetector CT view from the lung window upon the first application of the patient. Inflammatory consolidated parenchyma areas are outstanding. The black arrows show the edges of the bilateral pneumothorax, the black circle shows the boundary of the pneumomediastinum

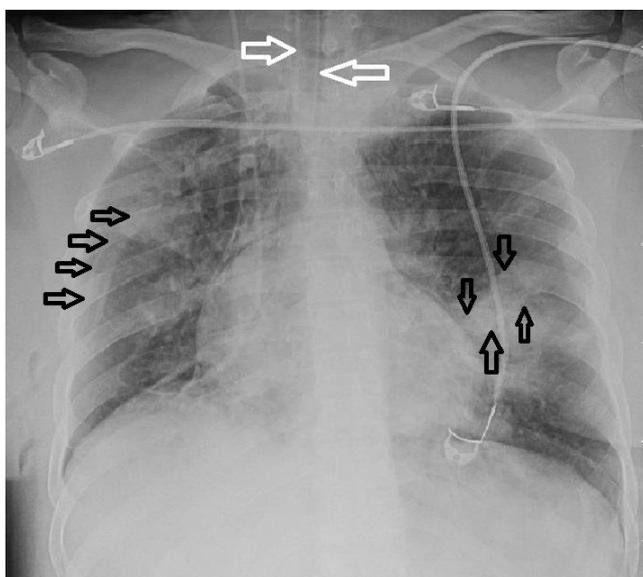


Figure 4: Antero-posterior CXR image of the patient after the insertion of a chest tube and intubation. The black arrows indicate the bilateral chest tubes. The left chest tube is partially superposed with the costa, and was directed to the mediastinum. The white arrows indicate the endotracheal intubation tube

DISCUSSION

Clinical presentations of H1N1 infections may begin as an upper respiratory tract infection with fever. They may cause such severe clinical conditions as pneumonia, pneumomediastinum and ARDS with secondary bacterial infections (1). There have been few studies to date describing radiological findings in patients with H1N1 admitted to the ICU. Rohani et al. (6) reported that the most common radiological findings of patients with severe H1N1 pneumonia admitted to the ICU were ground-glass opacities, consolidation and a reticular pattern. Less frequently, pleural effusion and mediastinal lymph node

enlargement have been described. It is known that H1N1 pneumonia can cause pneumomediastinum and pneumothorax, although they are rare complications in H1N1 infections. In a study by Valente et al. (7), eight of 50 patients with a severe clinical course of H1N1 infection had pneumothorax, and four of those had pneumomediastinum. That said the presence of SPM and pneumothorax together, or whether or not the pneumothorax was bilateral was not clearly apparent in the text. SPM as a complication of Influenza A infection was first reported in a Mexican patient, and then in three cases in Ottawa (Canada) and one case in India. All of the cases detailed in literature came from the pediatric population (3). The present case was an adult with severe H1N1 pneumonia complicated with SPM and bilateral pneumothorax. To the best of our knowledge, this is the first case report detailing concomitant bilateral pneumothorax and SPM in global literature (4).

There is a lack of any definitive information or descriptions of the development mechanism of pneumomediastinum secondary to H1N1 infection in literature. In our case, we observed a clinical presentation that started as upper respiratory tract infection, that progressed rapidly and that caused pneumonia. We believed that the destructive inflammation caused by the H1N1 virus and the co-infections caused by the impaired immune response of the host caused alveolar and respiratory tract injuries, while also promoting pneumomediastinum and pneumothorax. Although we did not observe a major tracheal or bronchial injury during our evaluation with a flexible bronchoscopy, we concluded that the observed intensive inflammation and edema could also cause direct air leakage from the trachea.



Figure 5: An antero-posterior CXR image of the patient after discharge

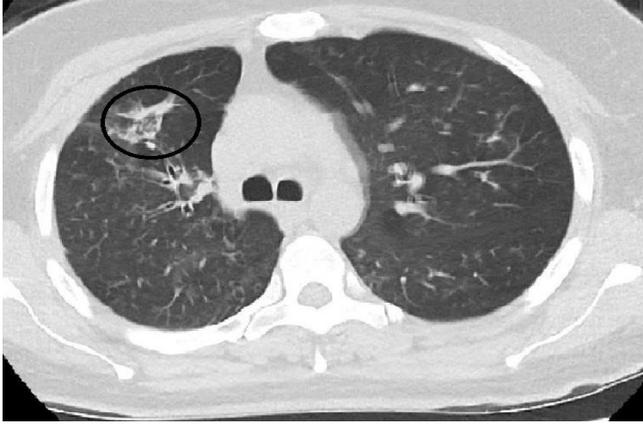


Figure 6: An axial chest multidetector CT view from the lung window after discharge. The right hemithorax has shrunk, the mediastinum is deviated to the right, and there are parenchymal ground glass opacities. The area within the circle shows scar tissue healed with fibrosis

The H1N1 virus is seen frequently as an infection causing pandemics in our country and around the world, causing mortalities. The identification of the virus in body fluids can be difficult in underdeveloped and developing countries. The early initiation of antiviral treatment, if the parameters of the infection suggest a viral infection, and even adding empirical antibiotic treatment for possible secondary infections in cases requiring hospitalization, are necessary. Being aware of all complications that H1N1 infections may cause is important. Diagnoses of spontaneous pneumomediastinum are based on imaging (4,5). Although a linear air image in the paracardiac area on a chest roentgenogram is diagnostic, a definitive diagnosis is made from computerized tomography imaging.

CONCLUSION

Clinicians must be aware of the rare life-threatening spontaneous pneumothorax and pneumomediastinum complications of the Influenza A virus, which have started to be seen in literature.

CONFLICTS OF INTEREST

None declared.

AUTHOR CONTRIBUTIONS

Concept - F.K., Ö.G.; Planning and Design - F.K., Ö.G.; Supervision - F.K., Ö.G.; Funding -; Materials - Ö.G., F.K.; Data Collection and/or Processing - Ö.G., F.K.; Analysis and/or Interpretation - Ö.G., F.K.; Literature Review - F.K.; Writing - F.K.; Critical Review - Ö.G.

YAZAR KATKILARI

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REFERENCES

1. Mjid M, Cherif J, Toujani S, Mokedem S, Saada I, Ben Salah N, et al. Influenzae A (H1N1): about 189 cases. *Tunis Med* 2014; 92:748-51.
2. Liu M, Zhao X, Hua S, Du X, Peng Y, Li X, et al. Antigenic patterns and evolution of the Human Influenza A (H1N1) Virus. *Sci Rep* 2015; 5:14171. [\[CrossRef\]](#)
3. Chekkoth SM, Supreeth RN, Valsala N, Kumar P, Raja RS. Spontaneous pneumomediastinum in H1N1 infection: uncommon complication of a common infection. *J R Coll Physicians Edinb* 2019; 4:298-300. [\[CrossRef\]](#)
4. Padhy AK, Gupta A, Aiyer P, Jhajhria NS, Grover V, Gupta VK. Spontaneous pneumomediastinum: a complication of swine flu. *Asian Cardiovasc Thorac Ann* 2015; 23:998-1000. [\[CrossRef\]](#)
5. Harish MM, Ruhatiya RS. Influenza H1N1 infection in immunocompromised host: A concise review. *Lung India* 2019; 36:330-6. [\[CrossRef\]](#)
6. Rohani P, Jude CM, Chan K, Barot N, Kamangar N. Chest radiological findings of patients with severe H1N1 pneumonia requiring intensive care. *J Intensive Care Med* 2016; 31:51-60. [\[CrossRef\]](#)
7. Valente T, Lassandro F, Marino M, Squillante F, Aliperta M, Muto R. H1N1 pneumonia: our experience in 50 patients with a severe clinical course of novel swine-origin influenza A (H1N1) virus (S-OIV). *Radiol Med* 2012; 117:165-84. [\[CrossRef\]](#)