

CASE REPORT

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CT can aid as a tool in the diagnostic in influenza A (H1N1)-associated pneumonia

Cristina Asvolinsque Pantaleão Fontes,
Alair Augusto Sarmet Moreira Damas dos Santos,
Solange Artimos de Oliveira, Miguel Abdon Aidê

ABSTRACT

Introduction: In our study, we present a case of influenza A (H1N1)-associated pneumonia where the computed tomography (CT) findings were of great importance in the suspicion of the etiological agent, later confirmed by reverse transcription polymerase chain reaction (RT-PCR). The CT exam is very fast and allows rapid evaluation of the images, with suspected diagnosis, and institution of the treatment, allowing better clinical

evolution of the patient, as well as contributing to reduce the possibility of transmission of the disease. **Case Report:** The patient presented with flu symptoms with progressive worsening, being attended at the Emergency Service already with cough, chest pain, fever, and dyspnea/tachypnea, CT findings showed consolidations and ground-glass opacities, predominating in the lower lobes, which led to the suspicion of influenza A (H1N1)-associated pneumonia, although we do not have an epidemiological history in our city. The patient was admitted directly to the Intensive Care Unit, and influenza A (H1N1) had been confirmed by RT-PCR in the bronchoalveolar lavage and nasopharyngeal smear. **Conclusion:** Although the CT aspects are not specific, the principal findings of consolidation, ground-glass opacities, and the association of these aspects may suggest the disease, especially high resolution series (HRCT) because it allows better study of interstitial lesions. At our hospital we followed cases of pneumonia in the 2009 pandemic, and we also placed a CT exam of this time, performing a comparative study.

Keywords: Consolidations, CT, Ground-glass opacities, HRCT, Influenza A (H1N1), Viral pneumonia

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Cristina Asvolinsque Pantaleão Fontes^{1,2}, Alair Augusto Sarmet Moreira Damas dos Santos^{3,4}, Solange Artimos de Oliveira^{5,6}, Miguel Abdon Aidê^{7,8}

Affiliations: ¹Adjunct Professor, Department of Radiology, Head of Radiology Service, Antônio Pedro University Hospital, Federal Fluminense University, 303 Marquês do Paraná Av., 2nd Floor, Niterói, Rio de Janeiro, Brazil; ²169 ap 1101 Mem de Sá st, Niterói, Rio de Janeiro, Brazil; ³Associate Professor and Vice Chief of the Department of Radiology, Graduate Program in Medical Sciences, Antônio Pedro University Hospital, Federal Fluminense University, 303 Marquês do Paraná Av., 2nd Floor, Niterói, Rio de Janeiro, Brazil; ⁴Coordinator of the Center of Images of the Complex Hospital of Niterói – CHN, Dr Geraldo de Melo Ourívio Avenue, Niterói, Rio de Janeiro, Brazil; ⁵Full Professor, Department of Clinical Medicine—Infectious and Parasitic Diseases, Head of Graduate Program in Medical Sciences, Antônio Pedro University Hospital, Federal Fluminense University, 303 Marquês do Paraná Avenue, 4th Floor, Niterói, Rio de Janeiro, Brazil; ⁶97 Álvares de Azevedo st, Niterói, Rio de Janeiro, Brazil; ⁷Associate Professor of Pulmonology, Department of Clinical Medicine, Faculty of Medicine, Antônio Pedro University Hospital, Federal Fluminense University, 303 Marquês do Paraná Avenue, 4th Floor, Niterói, Rio de Janeiro, Brazil; ⁸182 Lopes Trovão st, Niterói, Rio de Janeiro, Brazil.

Corresponding Author: Cristina Asvolinsque Pantaleão Fontes, 169 ap 1101 Mem de Sá st, 24220-261 Niterói, Rio de Janeiro, Brazil; Email: cfontes@id.uff.br

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INTRODUCTION

Influenza A (H1N1)-associated pneumonia is one of the causes leading to acute respiratory distress syndrome, and chest CT findings help in diagnosis. We studied 140 cases of influenza A (H1N1)-associated pneumonia in the 2009 pandemic and 8 cases in May 2019, and we observed consolidations, ground-glass opacities, and the association of these aspects. In this case of 2019 this patient did not have clinical-epidemiological history, and CT findings aided in the diagnosis. We present more representative CT exam of 2009, comparing the similarity of the aspects. The increase in cases with lethal success shows the importance of early diagnosis and rapid institution of treatment, and the clinical-epidemiological correlation, laboratory, and imaging exams are the most important in the acute phase of infection [1].

CASE REPORT

A 61-year-old woman, not vaccinated against influenza virus (H1N1-2019), presented with fever, cough, a hard sore throat, and sought two different emergency services with diagnosis of flu and with worsening clinically she arrived at our emergency already with cough, chest pain, fever and dyspnea/tachypnea, bibasilar crepitation, and inspiratory crackles in the lower two-thirds of both lungs. Physical examination showed disorientation, tachypnea, peripheral cyanosis, bradycardia, presenting hypoxemia. The patient was admitted directly to the Intensive Care Unit, with pulse oximetry 82% in ambient air, leukocytes 4850/mm³, Hg 32.6%, and erythrocytes 3400 million/mm³. Influenza A (H1N1) virus had been confirmed by RT-PCR in the bronchoalveolar lavage and nasopharyngeal smear. Computed tomography and HRCT performance showed consolidations, ground-glass opacities, and crazy paving areas, being suspected of influenza A (H1N1) findings (Figure 1 A). The diagnostic suspicion of influenza A (H1N1) was confirmed by RT-PCR and treatment was instituted. Initially she was breathing under an oxygen (O₂) mask, but a few hours later she was intubated and mechanically ventilated. We started a third generation cephalosporin, 2 g in 24 hours, associated with macrolides, 1 g in 24 hours 10 days, oseltamivir 75 mg every 12 hours for 5 days, and intravenous methylprednisolone 40 mg every 12 hours for 5 days.

DISCUSSION

Although the number of cases of influenza A (H1N1) pneumonia has declined, it is still a major public health problem [1, 2]. Acute respiratory infections of viral cause are very frequent entities, and in our patient the acute viral respiratory infection was confirmed by RT-PCR, which allowed to detect influenza A (H1N1) [3].

The purpose of this study was to show that CT images can help in the final diagnosis, ruling out other diseases, and it was important in this case where there was no epidemiological history.

There can be a wide spectrum of imaging aspects in CT in influenza A (H1N1) in the acute phase ranging from consolidations that predominate in the periphery of lung, uni- or bilateral, more frequent in the lower lobes, and ground-glass opacities, interlobular septal thickening, small nodules, and findings suggestive of small airways disease. These are best evaluated with the high resolution technique [4–7]. These pulmonary findings in chest X-ray when clinically the patient may be slightly symptomatic, may be normal, but the aspects can already be observed on CT, so it is important to emphasize to clinicians the need to perform the exam, since little dense consolidations and sparse ground-glass opacities cannot be visualized on chest X-ray [8].

Pulmonary abnormalities observed on HRCT of patients affected by virus A (H1N1) were studied in the 2009 pandemic, and according to several authors these are ground-glass opacities, consolidations or the combination of ground-glass and consolidation, with a remarkably peripheral, subpleural, and peribroncovascular distribution, with a predominance of lesions in the lower third of the lungs. These findings are not characteristics of this infection and can be observed in other viral and bacterial pneumonias [4, 7, 8].

Computed tomography findings in influenza A (H1N1) pneumonia included in cases observed in our hospital in 2019 has been associated with aspects like consolidations and ground-glass opacities. Similar aspects were observed in the 2009 pandemic, being more frequent findings with consolidations, ground-glass opacities, and the association of these two aspects [9] (Figure 1B), and in 2019 we have also observed crazy paving. Chest CT findings are correlated with the severity of clinical picture, like other viral diseases, and especially HRCT because it allows better study of interstitial lesions. High resolution series was important in the evaluation of clinical suspicion in 2009, and now advances in CT techniques allow even faster exams with reduction of movement or respiratory artifacts, along with improvements in the software allowing a better study of the pulmonary parenchyma.

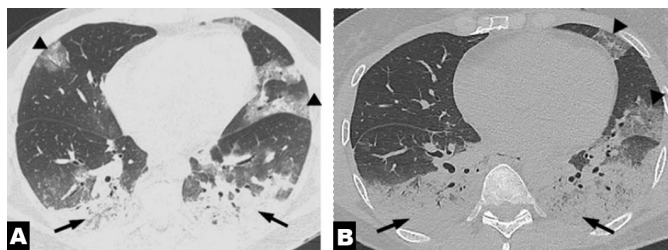


Figure 1: (A) HRCT showing consolidations in the lower lobes, especially subpleural (arrows) and ground-glass opacities bilateral multifocal (arrow head), with crazy paving, in May 2019. (B) Another adult patient during pandemic in July 2009 also with no comorbidities and diagnosis of influenza A (H1N1) confirmed by RT-PCR, showing similar aspects.

For pediatric patients, Yoshinobu study also shows that there may not be imaging differences including CT between adult and pediatric H1N1 influenza and other viral pneumonias [10], and for adult patients the great problem is related to the presence of comorbidities [11, 12].

CONCLUSION

The involvement of patients with comorbidities, hematologic malignancies, and pregnant and postpartum women may be remarkable in influenza A (H1N1) infection, and has a poor prognosis.

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Author Contributions

Cristina Asvolinsque Pantaleão Fontes – Conception of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Alair Augusto Sarmet Moreira Damas dos Santos – Design of the work, Acquisition of data, Interpretation of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Solange Artimos de Oliveira – Design of the work, Acquisition of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Miguel Abdon Aidê – Conception of the work, Acquisition of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Guarantor of Submission

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Consent Statement

Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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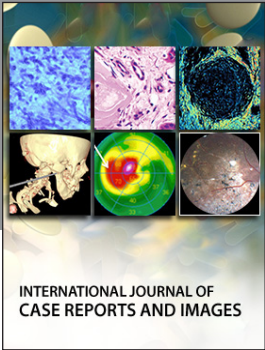
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