Respiratory Investigation
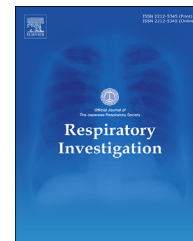
Editorial

Atypical pneumonia due to SARS-CoV-2: Clinical differentiation using the JRS pneumonia guidelines

The term "atypical pneumonia" was first applied to viral pneumonia, which was clinically and radiologically distinct from bacterial pneumonia. To prevent antimicrobial resistance, the Japanese Respiratory Society (JRS) pneumonia guidelines recommend the exclusion of potential and broad-spectrum antibiotics for empiric therapy and pathogen-specific treatment using rapid diagnostic methods [1]. The JRS proposed differentiating between diagnoses of bacterial and atypical causes of pneumonia for the selection of an appropriate antibiotic using a rapid and simple scoring system [1]. Several studies have demonstrated high rates of conformity with the six parameters of the JRS scoring system among patients with *Mycoplasma pneumoniae* pneumonia [2−5].

Since 2020, the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has become the major causative microorganism of pneumonia [6]. In Japan, the 1st to 3rd Coronavirus disease 2019 (COVID-19) waves occurred with conventional strains (from January 2020 to March 2021), the 4th wave occurred with lineage B.1.1.7 (Alpha variant) (from April 2021 to June 2021), the 5th wave occurred with lineage B.1.617.2 (Delta variant) (from July 2021 to October 2021), and the 6th and 7th waves occurred with lineage B.1.1.529 (Omicron variant BA. 1, BA. 2, and BA. 5) (from January 2022 to June 2022 and from July 2022, respectively). The early identification of novel SARS-CoV-2 is important because it reduces the risk of outbreaks. Thus, I evaluated whether the JRS scoring system could be adapted to diagnose COVID-19 pneumonia and if radiographic findings could distinguish between COVID-19 pneumonia and *M. pneumoniae* pneumonia.

The study demonstrated that the rates of conformity in parameters 1 (age <60 years), 2 (no or minor comorbid illness), and 3 (presence of stubborn cough) in the COVID-19 pneumonia non-Delta (conventional and Alpha variant) variant group were 42.2%, 57.8%, and 10.4%, respectively, which were significantly lower than those associated with *M. pneumoniae* pneumonia [7]. However, as COVID-19 vaccination progressed, the rates of conformity in parameters 1 and 2 increased significantly in the Delta variant group more than those in the non-Delta variant group [8]. Therefore, the diagnostic sensitivity increased significantly in the Delta variant group than that in the non-Delta variant group (80.2% vs. 58.3%, p < 0.0001) [8].

Although *M. pneumoniae* pneumonia is significantly more common in younger patients [1−5]; the median age of patients with COVID-19 pneumonia is higher than that of patients with *M. pneumoniae* pneumonia, but lower than that of patients with bacterial pneumonia [7−9]. We subsequently evaluated the accuracy and usefulness of the JRS scoring system in different age groups. The diagnostic sensitivity was the highest among patients aged 20−29 years and decreased in order from the youngest to the oldest age group. There was a clear difference between elderly (aged ≥60 years) and non-elderly (aged <60 years) patients with COVID-19 pneumonia in both the Delta and non-Delta variant groups [7,8]. The diagnostic sensitivity for COVID-19 pneumonia was 94.3% for non-elderly patients and 33.3% for elderly patients.

When COVID-19 pneumonia is classified as atypical pneumonia using the JRS scoring system, physicians need to distinguish COVID-19 pneumonia from *M. pneumoniae*

pneumonia. Previous studies indicate that the diagnosis of *M. pneumoniae* pneumonia will appear reliable when a combination of bronchial wall thickening and tree-in-bud and centrilobular nodules and/or ground-glass opacity (GGO) with lobular distribution are found on computed tomography (CT) findings [10,11]. The typical findings on chest CT among patients with COVID-19 pneumonia are peripheral GGOs with or without consolidation or a crazy-paving pattern and multifocal GGO with rounded morphology [12–17]. Bronchial wall thickening and tree-in-bud and centrilobular nodules are rarely observed in COVID-19 pneumonia [9,18]. Although physicians may differentiate typical COVID-19 pneumonia from typical *M. pneumoniae* pneumonia using chest CT findings, CT findings change over time [19,20].

The basic policy and main purposes of the JRS pneumonia guidelines include; 1) prevention of bacterial resistance, and 2) effective and long-term use of medical resources [4]. Thus, the JRS guidelines have been recommended for the prediction of causative microorganisms for the selection of appropriate antibiotics. However, the JRS scoring system is an auxiliary diagnosis, not a definitive diagnostic method. Finally, a definitive diagnosis of COVID-19 involves the detection of SARS-CoV-2 using reverse transcription polymerase chain reaction or antigen detection assay.

Atypical pneumonia due to SARS-CoV-2 in patients under 60 years old is clinically and radiologically distinct from bacterial pneumonia. If limited to patients under 60 years, the JRS scoring system is a useful tool for distinguishing between COVID-19 pneumonia and bacterial pneumonia. When COVID-19 pneumonia is classified as atypical pneumonia using the JRS scoring system, physicians can clinically diagnose COVID-19 pneumonia using chest CT scans.

Conflict of Interest

The author has no conflict of interest.

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Naoyuki Miyashita[*]

*First Department of Internal Medicine, Division of Respiratory Medicine, Infectious Disease and Allergology, Kansai Medical University, 2-3-1 Shin-machi, Hirakata, Osaka 573-1191, Japan
E-mail address: miyashin@hirakata.kmu.ac.jp

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