Letter to the Editor

COVID-19 or Pulmonary Contusion? A Diagnostic Dilemma

From:

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Dear Editor,

Accurate diagnosis of the pulmonary manifestations of severe acute respiratory syndrome of novel coronavirus may be challenging, especially in patients with concomitant chest trauma. Several studies have evaluated the accuracy of imaging modalities in coronavirus disease of 2019 (COVID-19) and suggest a high sensitivity of computed tomography (CT) scan (97%−98%) (1,2). However, imaging manifestations of COVID-19 reported in the literature are nonspecific (3). In particular, pulmonary contusion, which is a common complication of blunt chest trauma, has a lot of similarities on CT with COVID-19, including peripheral subpleural consolidation and ground glass opacity. Therefore, the current diagnostic protocols are insufficient for differentiation of COVID-19 and pulmonary contusion.

Moreover, it is increasingly recognized that individuals with COVID-19 may be asymptomatic or presymptomatic (4). Therefore, in is not an unlikely clinical scenario to encounter asymptomatic patients with undiagnosed COVID-19 who attend the emergency room with non-COVID-19 related complaints such as trauma. Unfortunately, clinical diagnostic test for COVID-19, namely polymerase chain reaction assay performed on nasopharyngeal swabs, is time-consuming and yields about 25% to 41% false negative results (2,5). Consequently, a detailed evaluation of CT scan is necessary to differentiate pulmonary contusion from pulmonary involvement with COVID-19.

The location of ground glass opacity and consolidation cannot be used to conclusively differentiate COVID-19 (6) from pulmonary contusion. Bilateral, multifocal distribution of the lesions in the posterior subpleural and prebronchial areas is a typical pattern in COVID-19 (3,6,7). with uni-focal and unilateral lesions also seen in a minority of patients (2%). The typical location of pulmonary contusion is at the site of the impact in the subpleural region. Nonetheless, multifocal ground glass opacity and consolidation in other lobes as well as in central and prebronchial areas, and even bilateral lesions including in the contralateral intact side have been described and attributed to countercoup mechanism and inflammatory basis of pulmonary contusion (8).

Specific parenchymal signs may be useful in differentiating COVID-19 manifestations and pulmonary contusion. Subpleural sparing, which is a thin nonopacified subpleural parenchymal layer separating the pulmonary contusion and chest wall, was first described by Donnelly as a specific sign to differentiate between contusion and viral pneumonitis, especially in pediatric patients (9). Moreover, while cavitation is not seen with COVID-19 (10), pulmonary contusion is associated with laceration and gas accumulation in the lung parenchyma (11). such as reverse halo sign, a central ground glass density with peripheral consolidation (6,12) and thin (1−3 mm) subpleural curvilinear line, lying within 1cm and parallel to the chest wall are described in COVID-19 (13) but not in pulmonary contusion. Although air-bronchograms are found in both COVID-19 and pulmonary contusion, accumulation of gelatinous mucous in COVID-19 may result in slight bronchiolar dilation and bronchiectasis (6). Lastly, bronchial wall thickening is described in 10% to 20% of patients with COVID-19 (14).

Furthermore, interstitial involvement manifesting as interlobular septal thickening and crazy paving appearance, due to the superimposition of thick interlobular septa on ground glass opacities (15), are detected in 36% of patients with COVID-19 (16). These findings are not expected in pulmonary contusion. Similarly, vascular enlargement, attributed to inflammatory capillary wall edema is found in most cases of COVID-19 (6).

Moreover, chest wall and pleural manifestations can also aid in the differentiation. Pleural thickening is a manifestation of COVID-19 in 32% of cases (17), whereas pneumothorax is found in half of patients with traumatic pulmonary contusion and is highly suggestive of lung contusion (18). Mild pleural effusion is uncommon in COVID-19 (5% of cases) (16,17); however, large pleural effusions and hemothorax are highly suggestive of pulmonary contusion. Rib (55.8%) and sternal (9.7%) fracture are common associated findings in pulmonary contusion (18) and will help in establishing the diagnosis.

Lastly, the clinical context and temporal evolution of findings will be useful in differentiating COVID-19 and pulmonary contusion. Pulmonary contusion does not usually occur in mild trauma and the patients with contusion have higher injury severity scores (18). Typically, findings of pulmonary contusion stabilize after 24 hours and progression after 48 hours raises the possibility of another diagnosis. In contrast, the COVID-19 lesions progress rapidly and correspond to the clinical course of disease. In fact, the number, extent and density of lesions increases concurrently in follow up CT scan (7,10,19).

In conclusion, the interstitial, pleural and chest wall manifestations may differentiate COVID-19 and pulmonary contusion; however, the typical lesions are inconclusive. Similarly, the temporal progression and clinical context are promising findings for accurate diagnosis.

AUTHORS' CONTRIBUTION

SP has provided the case and images and M.R.R and S.H. have written the article.

CONFLICT OF INTEREST

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