Journal of Clinical and Medical Images

Case Report ISSN: 2640-9615 | Volume 5

Multiple-Giant Pulmonary Bullae as Sequel of COVID 19 – Case Report

Lopez-Rojas S[1,*] and Rosas-Nunez O[1,*]

Department of Familiar Medicine Unit 20, Mexican Institute of Social Security, Mexico City, Mexico

***Corresponding author:**
Susana Lopez-Rojas,
Familiar Medicine Unit 20, Mexican Institute of Social Security, Ext.15300,
Tel: +52 55331100,
E-mail: sussie.lopezr@gmail.com

Oscar Rosas-Nunez,
Familiar Medicine Unit 20, Mexican Institute of Social Security, Ext. 15300,
Tel: +52 55331100
E-mail: oscar.rosasn@imss.gob.mx

Received: 12 July 2021
Accepted: 02 Aug 2021
Published: 10 Aug 2021

Citation:

Rosas-Nunez O and Looez-Rojas S. Multiple-Giant Pulmonary Bullae as Sequel of COVID 19 – Case Report. J Clin Med Img. 2021; V5(14): 1-5

Keywords:

Giant pulmonary bullae; COVID 19 complications; Pulmonary bullous disease

1. Abstract

Pulmonary giant bullae are an uncommon sequel in people who have moderate/severe COVID 19, very few cases have been reported in medical literature and we present a case in Mexico City. Case presentation: 47-year-old woman who works as a nurse with no pathological background developed moderate COVID 19 in September 2020 requiring supplementary oxygen being discharged 12 days later without supplementary oxygen, a chest tomography revealed frost glass pattern in both inferior lung lobes without consolidations. In October 2020 in a chest radiography, pulmonary bullae were found in both lungs, but no importance was given. In April 2021 a chest tomography revealed the real size and sites affected by bullae and was sent to evaluation of occupational medicine for work-sickness pension. In May 2021 a first resolution of Occupational Medicine Evaluation Center denied work-sickness pension due to an incomplete evaluation, in a second resolution with an integral evaluation, work-sickness pension was given for the patient recognizing pulmonary bullous disease as a complication of COVID 19 in mexican population.

2. Introduction

The apparition of giant pulmonary bullae is an uncommon sequel in people who have moderate/severe, their presence compromises not only lung function as a restrictive disease, but they also affect life quality of the patients. This is an uncommon sequel which develops after 30 days of the symptom onset, this is not considered when the patients finish the acute phase of the disease and reincorporate to their labors with symptom persistence as cough, because they are susceptible to develop complications like this. We will show the case of a 47-year-old woman who was working as nurse in a general hospital in Mexico City when she developed COVID 19.

3. Case Presentation

47-year-old woman who comes from Guanajuato and lives in Mexico City, occupation – nurse, personal non-pathologic background – smoking and drinking denied, feeding with dry diet, water consumption 2000 milliliters per day, daily bath with clothes change, lives in own house with all the urbanization services, pets denied, personal pathologic background asked and denied. Symptom onset on 07/09/2021 with asthenia, adynamia, general discomfort, arthralgia, she realizes pulse oximetry with partial saturation of 80% and RT-PCR for SARS CoV-2 was taken, while she was send to her house with supplementary oxygen, beginning medical treatment with acetaminophen and chlorpheniramine, without clinical improvement and presenting fever up to 39 Celsius degrees, anosmia, myalgia, ageusia, headache with intensity 5/10, being hospitalized in 11/09/2020 in General Zone Hospital 24 with supplementary oxygen by nasal cannula, ceftriaxone, dexamethasone, enoxaparin, in 12/09/2020 a Simple Chest Computed Tomography is done with frosted glass pattern in peripheral areas of both inferior lung lobes, in 15/09/2020 RT-PCR result is received being positive to SARS CoV-2, the patient was discharged in 21/09/2020 without supplementary oxygen because her partial oxygen satura-

tion was 91% in rest, persisting with dry cough and dyspnea MRC 3 when she leaved the hospital.

In 01/10/2020 persisting with dry cough a Chest Radiography was done, and a radiolucent circular structure was found in the right lung with radiopaque thick walls as the displacement of trachea and bronchi to right hemithorax, also a radiolucent circular structure in left lung (Figure 1).

Figure 1: Chest radiography. There are radiolucent structures with thick walls in mid-lobe of right lung and apical segment of left lung compatible with pulmonary bullae. October 2020.

In 09/10/2020 she's evaluated in North Physical and Rehabilitation Medicine Unit where in concluded that the patient does not present peripheral neuropathy, but with neuropathy of phrenic nerve as sequel of COVID 19, autonomic cardiovascular testing without alteration.

In 19/11/2020 occupational medicine values the patient of probably occupational disease, persisting with dyspnea MRC 3 and dry cough when she realizes physical effort, with conclusion that this is a infect-contagious disease that keeps relation with the activities she makes in her workplace existing cause-effect-work-injury relation, disease present in Article 513, fraction 136 of Federal Labor Law as "Another virosis" being accepted as occupational disease sustained in articles 473 and 475 of Federal Labor Law, articles 41 and 43 of Social Security Law, emitting opinion agree to articles 19, 22, 23, 25 and 30 of Medical Benefits Regulation of Mexican Institute of Social Security, making use of article 18 of Federal Labor Law.

In 18/01/2021 Cardiothoracic Surgery of National Medical Center "La Raza" examined the patient with diagnosis of multiple-giant pulmonary bullae and restrictive disease in spirometry, with 30% of functional lung parenchyma, not being candidate for bullectomy because the functional parenchyma is very low with spontaneous pneumothorax high-risk.

In 29/04/2021 her last evaluation by pneumology al General Zone Hospital was done with diagnosis of Multiple Subpleural Bullous Disease of right predominance, they proposed to continue the prescription on inability and recategorization as high-risk personal with Chest Computed Tomography of 28/04/2021 with affection of both lungs, volume decrease, interstitial disease with multiple rounded hypodense images with thick walls of subpleural localization with right predominance, the biggest of 145x86mm displacing mediastinal structures and contralateral lung, another left apical hypodense rounded image of 155x94mm of subpleural localization (Figures 2, 3 and 4), study without changes with October 2020 Chest Tomography, suggesting to value pension for work sickness.

Being sent to occupational medicine by familiar medicine in 03/05/2021 with diagnosis of Bullous disease with giant-bilateral bullae after viral atypical pneumonia by SARS CoV-2.

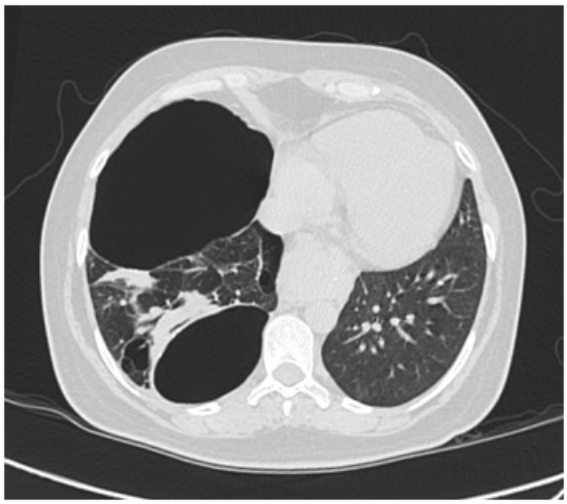

Figure 2: Transversal section of thorax computed tomography. There are two hypodense structures in right lung (anterior and posterior) with atelectasis zones, with peripheral distribution. April 2021

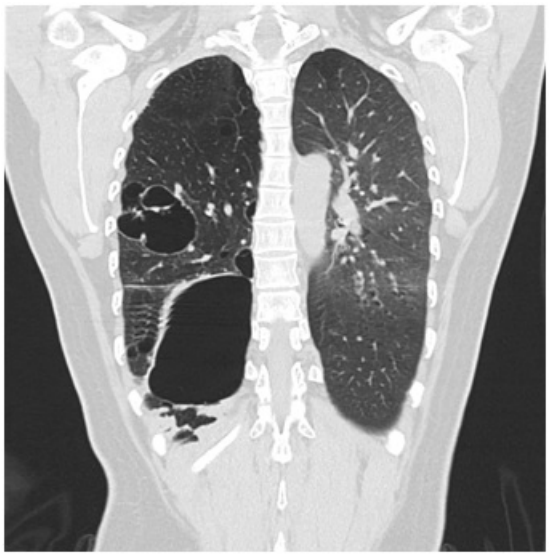

Figure 3: Coronal section of posterior thorax. There are at least 3 hypodense structures in the right lung with thick walls compatible with pulmonary bullae. April 2021.

Figure 4: Coronal section of anterior thorax. There are many hypodense structures (bullae) with thick walls in right (3) and left (1) lung. April 2021

At physical examination we found the patient with heigh of 158 centimeters, wight of 60 kilograms, blood pressure 90/60, heart rate 77, breath rate 19, temperature 36.5 Celsius degrees, neurologically full with nice coloration of skin and mucous, nice hydration status, auscultating precordial region with good-pitched, good-frequency, good-intensity noises, sustained unfolding of second noise in pulmonary focus, without murmurs, chest with respiratory mechanics limited, vesicular murmur abolished, less transmission of voice, increased lung clearance, the remaining physical exam was deferred because it does not have relation with the current condition.

In 07/05/2021 we made the proposal to make the case report and had her written informed consent.

In June 2021 the Occupational Medicine Evaluation Center made the patient evaluation with a previous chest radiography (Figure 5), which was asked to make the complete evaluation of the patient, obtaining a qualification of 70% lung function loss with a global loss of working capacity of 55% in the class 4 of the Work-Disability Percentage Assignation due to Respiratory System Deficiencies, also the Valuation Criteria of Occupational Disease Sequels give an 86% of capacity loss for work, being authorized her work-sickness pension in 21/06/20214.

4. Review

In January 2020 a 38 year old man from Wuhan, China, without importance diseases has spontaneous hear-loss and tinnitus, a tympanotomy was realized and in the second day after procedure he begins with 38.1 Celsius degree fever, RT-PCR for SARS CoV-2 positive, 10 days after he begins with increasing fever and cough, a Chest Tomography was realized with frosted glass pattern in both lung inferior lobes, at day 15 he has palpitations and was admitted to intensive care unit, at 25 days a Chest Tomography was done finding a giant bulla in right lung, at day 30 he has spontaneous pneumothorax and pleural effusion. This began to suggest these patients should be monitored closely with imagen studies.

Figure 5: First radiography. There are not any radiolucent areas. June 2020

This was sent to Occupational Medicine Evaluation Center for the second evaluation of this case when we achieved the work-sickness pension for the patient.

In the same month the case of a 32-year-old man health-worker was reported, his job center was a third level hospital, without important background, begins with asthenia, and at day 6 of symptom onset need hospitalization, a chest tomography was done finding frosted glass pattern in both inferior lobes, RT-PCR positive for SARS CoV-2, at day 17 he has clinical improvement being discharged to his home. At day 21 he restarts with dry cough and another chest tomography was done finding a giant bulla of subpleural localization in left lung and pneumothorax. This patient was monitored for 92 days where the giant bulla and pneumothorax presents regression. This began to suggest that subpleural consolidations due to COVID 19 can destroy lung alveoli and erode distal bronchi, increasing intraalveolar pressure with cough for the development of pneumothorax and bullae.

In April 2020 in Wuhan, China were two more cases of this. The first one was a 38-year-old man with dyspnea, chest pain and polypnea diagnosed with pneumonia due to severe COVID 19 who was admitted to intensive care unit, a Chest Tomography was performed finding frosted glass pattern in both inferior lung lobes being treated with supplementary oxygen, at day 26 a new chest tomography was performed finding multiple bilateral pulmonary bullae where the frosted glass pattern was present in the first tomography, developing a pneumothorax of approximately 20%, the bullae diameter in this patient was 5 cm. The second case was a 35-year-old woman diagnosed with severe COVID19, at her arrival a chest tomography was done finding bilateral frosted glass

pattern, also consolidations and another opacity, she developed type 1 severe respiratory failure requiring orotracheal intubation where her PEEP was between 20-26 H_2O cm, at day 40 a new chest tomography was performed finding multiple hypodense areas where the frosted glass pattern was previously, with peripheral distribution.

In July 2020 was documented the case of a 37-year-old man without any importance background who arrived at hospital after a history of 4 days with dry cough, positive RT-PCR for SARS CoV-2 with clinical improvement being discharged at day 12, when day 14 arrived, he begins with pleuritic pain and dyspnea, finding pneumothorax with displacement of mediastinal structures. Here was proposed barotrauma that conditionate alveolar rupture can be present in patients who require mechanical ventilation, but it has been reported in patients without mechanical ventilatory support. Pulmonary bullae formation was proposed in patients with spontaneous pneumothorax as a possible complication of COVID 19.

In 1967 Reid proposed a classification for pulmonary bullae where 3 types are found: I – Small quantity of pediculated hyperinflated lung tissue, II – Minor quantity of sessile lung tissue, III – Great quantity of hyperinflated tissue that extends to hilum with defined margins and vanishing parenchyma in each bulla.

Giant bullae are the most uncommon presentation of pulmonary bullous disease, it's defined as a bulla with more than 30% of hemithorax and results in lung tissue compression. The most common symptoms are dry cough, chest pain, progressive dyspnea, with variable intensity due to distention during hyperventilation. In the complications of pulmonary bullous disease, we find spontaneous pneumothorax, infectious hemoptysis and cavitary pneumonitis, the gold standard for their study is chest computed tomography because we can have information about anatomical place, dimensions and characteristics and integrity of adjacent lung tissue.

Sequels of moderate/severe COVID 19 are diverse and development of pulmonary bullae is uncommonly proposed in these patients, compromising a great number of pulmonary segments, approximately 10-15, with peripheral distribution with early findings as frosted glass pattern, reticular pattern, and consolidations without bullae identification in early studies. They are associated to mechanical ventilation due to barotrauma in 6.5% of the patients, generally they have a diameter of less than 1cm. In the proposed mechanisms we find the development of parenchyma ischemia, lung fibrosis and inflammatory exudates in airway. Development of lung bullae is approximately at day 30 after symptom onset, it has been proposed to consider bullae development in patients with COVID 19. Distention of bullae lead to wall thickness due to decrease of surface tension of their walls, although pathophysiology is unclear.

5. Discussion

Development of bullae after COVID19 infection is a problem which is present in almost 10% of the patients who have moderate/severe cases of the disease, although mechanisms that generate these bullae are unclear, the proposed hypothesis is the increase of intraalveolar pressure due to symptoms as cough of physical effort. Pulmonary bullae symptoms are unspecific being able to have dry cough, chest pain and dyspnea which is variable in every patient. Giant bullae are the most uncommon presentation of pulmonary bullous disease, and the most associated illness is Chronic Obstructive Lung Disease, this condition is not present in our patient and neither in the reported cases in worldwide reported cases.

In the case we report our patient was a nurse in a General Zone Hospital, which was assigned as COVID Center in the north zone of Mexico City, in her workplace she had close contact with this kind of patients from the beginning of COVID 19 pandemic in Mexico from March 2020, her symptom onset was in 06/09/2020 and bullae were found in October 2020 being consistent with the reported cases about pulmonary bullous disease in COVID 19 patients. Although election treatment is bullectomy, our patients was not eligible for the surgery because she has only a 30% remaining lung functional parenchyma, conditioning potential postsurgical complications.

In every patient with moderate/severe COVID 19 disease who persist with dry cough after acute phase finished, we must consider pulmonary bullous disease as a possible differential diagnosis to make a correct evaluation and management of this patients because being untreated can lead them to develop infectious hemoptysis, spontaneous pneumothorax and cavitary pneumonitis. These complications can be a real menace for patients' life because they can be making physical effort in their workplaces.

The first evaluation of Occupational Medicine Evaluation Center denied the work-sickness pension because they did not consider pulmonary bullous disease as a complication of COVID 19, after showing the current evidence and case reports of this complication in the second evaluation of the Occupational Medicine Evaluation Center we achieved the work-sickness pension for this patient. Finally pulmonary bullous disease was recognized as a complication of moderate/severe COVID 19 in mexican population.

6. Acknowledgment

The authors would like to express their appreciation to all the medical staff of the General Zone Hospital 24, Familiar Medicine 20 and the Temporal Attention Center "Autodromo Hermanos Rodríguez" of the Mexican Institute of Social Security for their labor during the COVID19 pandemic in Mexico City.

We are also grateful to the many front-line medical staff for their dedication in the COVID 19 pandemic in Mexico, specially Grecia Atenea Abad Ávila, Brenda Karina Mata Samperio, Citlali Monroy Franco, Gabriela Larios Arista, Jose Luis Santiago Garduño, Itzel Rosas Morales, and our teachers Santa Vega Mendoza, Maria del Carmen Aguirre García and Danae Pérez López.

Reference

1. Fan Q, Pan F, Yang L. Spontaneous pneumothorax and sub pleural bullae in a patient with COVID19: a 92-day observation. European Journal of Cardio-Thoracic Surgery, 2020; 58: 858-60.
2. Liu K, Zeng Y, Xie P, Ye X, Xu G, Liu J, Wang H, Quian J. COVID-19 with cystic features on computed tomography: A case report. Medicine 2020; 99: 18(e20175).
3. Yasukawa K, Vamadevan A, Rollins R. Bulla formation in tension pneumothorax in a patient with COVID19. Am J Trop Med Hyg, 2020; 103(3): 943-4.
4. De-Menezes-Lyra R. Etiology of primary spontaneous pneumothorax. J Bras Pneumol. 2016; 42(3): 222-6.
5. Shi H, Han X, Jiang N, Cao Y, Alwalid O, Gu J, Fant Y, Zheng C. Radiological findings from 81 patients with COVID19 pneumonia in Wuhan, China: A descriptive study. Lancet 2020; 20(4): 425-434.