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COVID-19: Thoracic Diagnostic Interventional Procedures in Troubled Times☆

COVID-19: intervencionismo diagnóstico torácico en tiempos difíciles

To the Editor:

SARS-CoV-2 disease (Covid-19) is an infection caused by a new emerging coronavirus first detected in Wuhan, China, in December 2019. It has now become a pandemic and is posing a serious public health problem for almost all countries.[1] In particular, the incidental diagnosis of thoracic tumors in patients with SARS-CoV-2 infection represents an additional challenge, both from a diagnostic and therapeutic point of view. Some publications have addressed the clinical management of cancer patients in the current SARS-CoV-2 pandemic, but there are no specific guidelines for performing thoracic diagnostic interventional procedures in patients with tumors who are also infected with SARS-CoV-2.[2–12] We report two cases in which thoracic tumors were detected that required biopsy with radiological control at the peak of the Covid-19 pandemic that hit Madrid in the second half of March 2020.

These were 2 patients (a 19-year-old woman with no history of interest, and a 73-year-old man, former smoker) who came to our hospital with chest symptoms (fever, cough, and dyspnea) in the second half of March 2020, coinciding with the peak of the Covid-19 pandemic that struck Spain and, in particular, the Madrid region. Both patients underwent polymerase chain reaction (PCR) testing for SARS-CoV-2 and a chest X-ray in the emergency department. In both cases PCR was positive and chest X-ray showed opacities of infectious appearance and a tumor mass. Treatment for SARS-CoV-2 infection was started in both patients (with good clinical progress) and a CT scan of the chest was performed, confirming the tumor lesions. The 19-year-old patient had a voluminous mass in the right hemitorax with destruction of the third costal arch and invasion of the chest wall and spinal canal. Ipsilateral pleural implants of metastatic appearance and some ground glass opacities of an infectious nature were also observed in the right lung base (Fig. 1A–D). The 73-year-old patient had a 6 cm mass in the upper right lobe, adenopathies in the ipsilateral pulmonary hilum, and bilateral opacities of pneumonic appearance (Fig. 1E–G). In this second case, no signs of distant metastases were observed. During the fortnight in which the two patients were admitted (March 16–31, 2020), the region of Madrid endured the highest number of cases and deaths from this pandemic in the whole country, and our center, a university hospital in Madrid with about 850 beds, had virtually become a "Covid-19 dedicated" center, with more than 950 patients admitted with SARS-CoV-2 infection. Because of this situation, most of the hospital's clinical activity (like many other centers throughout the country) was focused on the treatment of Covid-19 patients, and large numbers of medical personnel (including pulmonologists, medical oncologists and radiation therapists, thoracic surgeons, pathologists, and radiologists) had been recruited from different departments of the center for the care and management of these patients. As a result of this unusual situation, most of the hospital's "ordinary" clinical activity was suspended, including the routine care of cancer patients (consultations, day hospital, radiotherapy sessions, follow-up radiological studies). However, in the case of our 2 patients, we decided to perform a CT-guided biopsy of the lesions in the hope of obtaining an early histological diagnosis and being able to start specific treatment as soon as possible. Because both patients had Covid-19, the biopsy procedure was performed on the CT equipment of our hospital reserved for patients with this infection. During the procedure, the infection control protocol of the radiodiagnostics department was followed and personal protective equipment (PPE) was used. Both patients wore masks, while radiology staff who participated in the biopsy procedure followed our hospital's Covid-19 control protocol and used PPE, since core needle biopsy is considered a potentially aerosol-generating procedure.[13] PPE included

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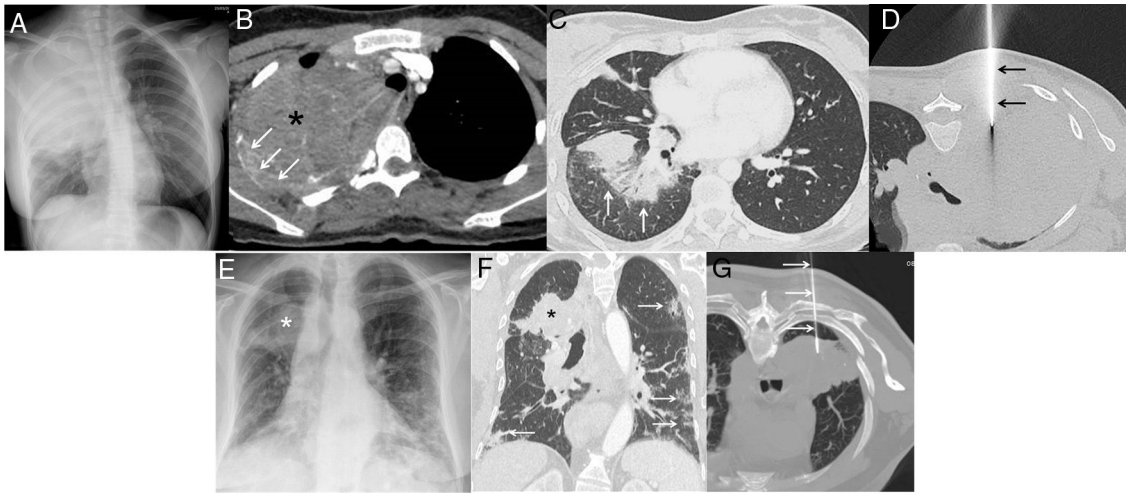

Fig. 1. A–D) A 19-year-old patient with dyspnea, chest pain, cough, and fever. A) Posteroanterior chest X-ray showing a large mass in the right hemitorax and partial destruction of the right third costal arch. B) Axial CT image of the chest (mediastinum window) confirming a large heterogeneous mass in the right hemitorax (asterisk) with destruction of the right third costal arch (arrows). C) Axial CT image of chest (lung window) showing peri-bronchial ground glass opacities of infectious appearance (arrows). D) Axial CT image of chest (patient in prone position) during biopsy procedure (arrows mark biopsy needle). E–G) A 73-year-old patient with fever, cough, and dyspnea. E) A posteroanterior chest X-ray showing a mass in left upper hemitorax (asterisk) and bilateral opacities of an infectious appearance. F) Chest CT coronal image (lung window) showing lung mass (asterisk) and bilateral pneumonic opacities (arrows). D) Axial CT image of chest (patient in prone position) during biopsy procedure (arrows mark biopsy needle).

gloves, FFP2 filter mask, goggles, face shields, robe, aprons, cap and shoe coverings. At the end of the biopsy procedures we followed our hospital's protocol for decontaminating the CT scanner. Histologic diagnosis confirmed Ewing's sarcoma of the chest wall in the 19-year-old patient and pulmonary adenocarcinoma in the 73-year-old patient, and treatment was started after discussion of both cases by the thoracic tumor multidisciplinary committee (virtually via teleconference).

As cases of Covid-19 escalate exponentially throughout the world, saturating hospitals and accounting for more than 200,000 deaths worldwide (as of April 25, 2020), many institutions have had to prepare themselves to deal with the avalanche of patients with SARS-CoV-2 infection. At our center, this preparation included the secondment of the majority of hospital staff to care for the more than 950 patients in newly created "Covid-19 units". In this scenario, only oncological emergencies and critically ill cancer patients were being treated in the hospital, while the vast majority of outpatient visits and diagnostic procedures were postponed. The proper clinical management and safety of cancer patients (both patients in follow-up and newly diagnosed cases) in the current Covid-19 pandemic should be a priority and each institution should establish contingency plans.[2–12] Some authors have suggested postponing adjuvant chemotherapy or elective surgery in patients with less aggressive tumors, reducing the frequency of hospital visits for cancer patients, and developing appropriate isolation protocols to mitigate the risk of SARS-CoV-2 infection in these patients.[14] Other authors have proposed that more intensive surveillance or treatment should be considered for cancer patients who also have COVID-19.[15] Recent articles have reminded us how important it is for radiology departments to be prepared for COVID-19 (from the indication of chest X-rays or CT to the protection of their staff),[16] but there are no specific guidelines for performing diagnostic thoracic interventional procedures in patients with tumor lesions who are also infected with SARS-CoV-2.

The purpose of this report is to send a clear and positive key message that image-guided chest biopsies in cancer patients who are also infected with SARS-CoV-2 are feasible and safe (even at the height of the pandemic), provided that appropriate safety measures are taken by the health personnel involved in the procedure. We believe that cancer patients, regardless of whether they are infected with SARS-CoV-2 (and regardless of the phase of the pandemic), continue to deserve our dedication and care.

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Factors Associated to Hospital Admission in a Care Protocol in COVID-19☆

Factores asociados al ingreso hospitalario en un protocolo asistencial en COVID-19

To the Editor:

The spectrum of presentation of SARS-CoV-2 disease (Covid-19) severity is very broad, ranging from asymptomatic infection to pneumonia that can progress to acute respiratory distress syndrome.[1] To date, numerous series of patients admitted to hospitals have been described and certain factors are known to be associated with higher severity.[2,3] However, there is still little information in Spain on the course of consecutive patients and factors related to hospital admission versus outpatient management.

In order to explore this area in greater depth, we retrospectively reviewed the first consecutive patients diagnosed with Covid-19 in our province (population: 329,587 inhabitants), selected from the complete list of subjects with confirmed SARS-CoV-2 infection. According to the protocol, patients with no initial symptoms of alarm (confusion, dyspnea, chest tightness) but older than 60 years, pregnant, or with comorbidities were included in a telehealth program (including daily O_2 saturation monitoring) managed by a hospital team, and the rest were followed by telephone by their primary care physicians. Patients were referred to the hospital if they showed clinical deterioration during follow-up. The general criteria for admission were pulmonary infiltrates, O_2 saturation < 95%, respiratory rate > 25 bpm, confusion, hemodynamic instability, or clinical severity at the discretion of the attending physician. The existence of stable comorbidities was not a criterion for admission *per se*.

Patients were included in the study if they were followed up for at least 15 days after diagnosis.

Results are expressed as mean ± standard deviation or number of observations (%). Groups were compared using the Mann-Whitney test for quantitative variables, and X^2 for qualitative variables. Cox univariate and multivariate analyses were performed (dependent variable: hospital admission).

A total of 506 subjects were included from March 9th to 31st, 2020. Fewer men presented infection (187; 36.9%) than women (319; 63.0%) ($P < .0001$). Mean age: 56.0 ± 17.6 years (range: 12–93). Follow-up time: 18.7 ± 5.4 days. After the first evaluation, 94 patients (18.5%) were admitted. Initial mean SpO2 was 90.9 ± 0.7%. The remaining 412 subjects were followed as outpatients. SpO2 was available in 53.4% of these cases (96.1 ± 0.14%). Of those followed on an outpatient basis, 20 individuals were subsequently admitted (4.8% of this group). Four others died at home after admission was ruled out: 3 were ≥88 years old and had cancer or dementia; the fourth was receiving palliative treatment for incurable cancer. The subjects admitted were older than those treated as outpatients (70.0 ± 12.8 vs. 51.7 ± 16.5 years, $P < .0001$), were more often men (51.7% of those admitted vs. 32.3% of outpatients, $P < .0001$) and more frequently had comorbidities (85.0% vs. 40.8%, $P < .0001$). Comorbidities with different prevalences in inpatients vs. outpatients were arterial hypertension (58.7 vs. 20.6%, $P < .0001$), diabetes (36.8 vs. 8.4%, $P < .0001$), heart disease (23.6 vs. 4.0%, $P < .0001$), dyslipidemia (50% vs. 17.3%, $P < .0001$), cancer (7.0 vs. 2.2%, $P = .02$), and renal failure (4.3 vs. 0.7%, $P = .02$). Other comorbidities recorded with low prevalence (< 5%) and no differences between groups were: sleep apnea syndrome, rheumatoid arthritis, dementia or psychomotor retardation, peripheral arterial disease, multiple sclerosis, Crohn disease, and bronchiectasis. Asthma was reported in 7.8% of admitted patients and 4.5% of outpatients ($P = .25$) and COPD was reported in 3.5% and 1.5%, respectively ($P = .34$).

Table 1 shows the results of the Cox analysis. Variables that were significantly different in both groups were included. Age was coded in 1-year increments, and the remaining variables were dichotomized. In the multivariate analysis, age and diabetes were independently associated with admission.

Patients admitted for Covid-19, older age, male sex, and comorbid conditions have been associated with more severe disease.[4] In our series of consecutive patients, 80% of the cases were followed up as outpatients, and less than 5% needed admission. The variables associated with admission were also higher age, male sex, and comorbidities. These data suggest that profiles of patients who do not present with immediately severe disease may be established. Thus, candidates may be selected for outpatient follow-up, and the intensity of the follow-up required may be graded, with a less specialized level of care being implemented in younger subjects without comorbidities. The results of the multivariate analysis suggest that diabetes may be particularly relevant for closer follow-up, but this analysis must be interpreted prudently because the study might not have sufficient statistical power.

Our study has some strengths, such as the inclusion of consecutive patients, and the availability of a unified electronic history that allows access to reliable data on the study variables. Several limitations must be highlighted. The retrospective design implies a risk of

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