The Negative Impact of COVID-19 Pandemics on the Diagnosis of Lung Diseases in Brazil.

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Surgical and Experimental Pathology

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Abstract:	<p>Background</p> <p>COVID-19 pandemics affects the Health system all around the World. Brazil, since the first case in March, reported more than 4.0 million people infected. The pandemic's magnitude made that Hospitals prioritize the care of the secondary respiratory distress syndrome, and all elective diagnosis and treatment have been postponed. This study aimed to assess changes in patient's profiles submitted to lung or pleural biopsies comparing before and during COVID-19 pandemics.</p> <p>Methods</p> <p>We retrospectively review the data of patients who underwent lung disease diagnostic approaches across April/May 2019 versus April/May 2020. We collect the data about the total cases, demographics, type of procedure, and disease diagnosis. Histological type, stage of the tumors, and molecular profile were also analyzed in cancer cases.</p> <p>Results</p> <p>The number of total cases and lung biopsies dropped by more than 90% when the 2019/2020 samples were compared. Benign disease faced a more substantial reduction than cancer cases, with emphasis in granulomatous diseases. We had more advanced cases and more squamous cell carcinomas and small cell neuroendocrine carcinomas in the cancer scenario. Low-grade tumors, as carcinoids, suffered a significant reduction. Also, the molecular profile of the tumors drops in absolute numbers. Still, there was an increase of PD-L1 expression, probably because the sample comprises more squamous cell carcinomas and advanced cases.</p>
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<p>Is this study a clinical trial?</p> <p>A clinical trial is defined by the World Health Organisation as 'any research study that prospectively assigns human participants or groups of humans to one or more health-related interventions to evaluate the effects on health outcomes'.</p>	No

The Negative Impact of COVID-19 Pandemics on the Diagnosis of Lung Diseases in Brazil.

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Abstract

Background: COVID-19 pandemics affects the Health system all around the World.
Brazil, since the first case in March, reported more than 4.0 million people infected.
The pandemic's magnitude made that Hospitals prioritize the care of the secondary
respiratory distress syndrome, and all elective diagnosis and treatment have been
postponed. This study aimed to assess changes in patient's profiles submitted to lung
or pleural biopsies comparing before and during COVID-19 pandemics.

Methods: We retrospectively review the data of patients who underwent lung disease
diagnostic approaches across April/May 2019 versus April/May 2020. We collect the
data about the total cases, demographics, type of procedure, and disease diagnosis.
Histological type, stage of the tumors, and molecular profile were also analyzed in
cancer cases.

Results: The number of total cases and lung biopsies dropped by more than 90% when the 2019/2020 samples were compared. Benign disease faced a more substantial reduction than cancer cases, with emphasis in granulomatous diseases. We had more advanced cases and more squamous cell carcinomas and small cell neuroendocrine carcinomas in the cancer scenario. Low-grade tumors, as carcinoids, suffered a significant reduction. Also, the molecular profile of the tumors drops in absolute numbers. Still, there was an increase of PD-L1 expression, probably because the sample comprises more squamous cell carcinomas and advanced cases.

Conclusions: COVID-19 pandemics have a considerable negative impact on the management and diagnosis of lung diseases in Brazil. The consequences can be significant, and implementing a new policy to patients with lung diseases must be managed.

Key Words: COVID-19; Lung Cancer; Tuberculosis; Diagnosis; Epidemiology

Background

The coronavirus disease (COVID-19) pandemic has a significant impact on the healthcare system in all world. Brazil is the third country in the absolute number of infected patients with more than 4.9 million cases (Brazilian Ministry of Health, 2020). The pandemic started in São Paulo at the end of February, and since then, it spreads rapidly across the country. The two main affected cities are Sao Paulo and Rio de Janeiro. Both cities decided to impose a quarantine in late March, and both had partially lifted it at the begging of June. Since them, all pathology services faced a significant reduction in biopsies and surgical specimens, with partial recovery in July.

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44 The collapse in the health system due to COVID-19 caused a vital impact on cancer
45 diagnosis worldwide. Almost all cancer diagnosis has dropped, and there is uncertainty
46 about the impact on cancer patients' prognosis. The fall in the number of cases is much
47 more worrisome when a delay of diagnosis and treatment can increase morbidity and
48 mortality, particularly in aggressive tumors, such as lung cancer. There is a general
49 concern about the delay in cancer diagnosis, which has been called "cancer amnesia"
50 (Bertolaccini and Spaggiari 2020).

51 There are two main difficulties to be considered in the cases of lung diseases. COVID-
52 19 causes severe respiratory distress syndrome, and it is the leading cause of the need
53 for intensive care and the most important cause of death; all diseases that need an
54 invasive procedure to diagnose, including cancer diagnosis, where displaced by the
55 urgent and emergency pandemic needs. Furthermore, there is overlap concerning age
56 range related to COVID-19 severity and lung cancer, affecting mostly the 7th decade
57 and elder. Moreover, patients with concomitant lung cancer and COVID-19 infection
58 have more severe disease and higher mortality (Luo et al. 2020; Venkatesulu et al.,
59 2020).

60 In Brazil, lung cancer is the third more common among men and fourth in estimating
61 almost 31,000 new cases in 2020, as the National Institute of Cancer of Brazil (Instituto
62 Nacional do Cancer 2019). According to GLOBOCAN project, in 2018, this number was
63 34,100 new cases and 31,856 deaths (Bray et al. 2018). Brazil reproduces the same
64 scenario observed in the world in terms of mortality. Lung cancer is the leading cancer
65 mortality cause among men and the second cause in women. (Instituto Nacional do

66 Cancer 2020) Early diagnosis and initial treatment are critical to the prognosis of these
67 patients.

68 The present study evaluates the negative impact of the COVID-19 pandemic on
69 morphological diagnosis in lung diseases, including lung cancer.

70 **METHODS**

71 The Institucional Ethics Committee approved the study under protocol number
72 #4.156.067. In order to select the lung biopsies and surgical specimens, we search for
73 all lung cases from the Institute of Anatomic Pathology archives of the D'Or Hospitals
74 Network in Rio de Janeiro and São Paulo. To evaluate the COVID-19 pandemic impact,
75 we compare April/May 2019 and April/May 2020. Patient data were retrieved by the
76 report system and anonymized by the senior author.

77 The following parameters were collected:

- 78 1. The total of lung diagnostic cases;
- 79 2. Age and gender;
- 80 3. Kind of procedure: diagnostic biopsy, a biopsy to rule out metastasis, surgical
81 specimen;
- 82 4. Disease diagnosis.

83 We also collected the additional parameters in cancer cases:

- 84 1. Histological type;
- 85 2. Stage by the primary tumor (T), regional lymph nodes (N), and clinical stage (in
86 cancer cases) according to AJCC 8th edition (referencia);

3. Molecular biomarkers.

The data were collected in an Excel spreadsheet and analyzed in a statistics software (Prism V5.01, GraphPad Software, San Diego, California, USA) using descriptive statistics and contingency tables by chi-Square or Fisher exact test.

RESULTS

The number of patients seen by the Institute of Anatomic Pathology at Rede D'Or Network was 19,520 in April/May 2019 and 5,575 in April/May 2020, a fall of 3.66 times. From those, lung cases were 245 (1.26%) in 2019 and 128 (2.3%) in 2020.

Although there is a proportional increase in cases concerning the total, the absolute number falls by 91%.

There were no differences in gender and age of the patients, as shown in Table 1.

There is a corresponding increase in cancer cases than benign diseases in terms of

lesion's biological behavior. The number of diagnostic biopsies dropped to

approximately one third, and the number of pneumectomies/lobectomies dropped to

half. A minor difference was seen in biopsies to rule out metastasis, probably because

of its severity.

The cases' distribution in terms of the pT stage and clinical stage showed a trend to

cases in more advanced stages in 2020.

Table 2 shows benign disease diagnoses. The number of cases drops in almost 2,6

times during COVID-19 pandemics. Although most cases are related to chronic

diseases, the number of cases secondary to granulomatous disease draws attention. In

a country with a low Human Development Index like Brazil, this is very important.

Tuberculosis is an endemic infection, and the delay of the diagnosis can cause several

problems like pleural effusion, hemoptysis, empyema, and pleurisy. Other diseases group includes cases of amyloidosis, primary bronchiectasis, squamous metaplasia of the bronchial epithelium, suspicious to neoplasms, alveolar hemorrhage, vasculitis, diffuse alveolar damage, and necrosis without apparent cause.

Table 3 shows the distribution of malignant neoplasms. The fall in number in cases of the malignant neoplasms was less expressive than the benign cases. Even those there is a significant reduction in terms of the absolute number of cases. The diagnosis distribution is not statistically significant, although there are more cases of squamous cell carcinoma in 2020 than adenocarcinomas. Also, it draws the attention of the number of neuroendocrine carcinomas. The number of small cell carcinomas was higher in 2020 than in 2019, and there was just one case of carcinoid tumor in 2020 against six cases in the same period in 2019.

Finally, the number of molecular predictive tests faced a sharp drop in 2020. There were fewer cases *EGFR* mutated, probably secondary to fewer cases of adenocarcinoma. The results of PD-L1 are secondary to relatively more cases of squamous cell carcinoma, usually more frequently show high PD-L1 expression.

DISCUSSION

COVID-19 pandemics have a considerable impact on the health system all around the world. Hospitals have to focus on the massive number of patients with severe acute respiratory syndrome and had to increase the disponibility of intensive care unit beds. Consequently, elective procedures and cancer surgeries have been postponed to maintain the capacity to give adequate care of COVID-19 patients.

Our results show the direct consequence of COVID-19 pandemics in lung disease diagnosis. The lungs are the main target of SARS-CoV-2, affecting with more severity old patients. Therefore, this overlap had a significant impact, and all diagnostic procedures such as transthoracic biopsies, bronchoscopies, and mediastinoscopies create an additional hazard to the patients. An additional problem is represented by incidental findings in CT Scan/MRI performed to diagnose COVID-19 in an emergency room (Deen et al. 2020). The consequences of this diagnosis delay on diseases like tuberculosis, interstitial inflammatory diseases, and lung cancer will be disastrous, especially in developing countries where the public health system struggles to perform such diagnoses.

COVID-19 patients with lung cancer have higher mortality and less admission in intensive care units. (Garassino et al., 2020; Luo et al., 2020) Among the cancer subtypes, lung cancer showed the second-highest mortality index, only behind hematological cancers (Venkatesulu et al. 2020). Presumably, patients with lung and colorectal cancer are more susceptible to SARS-CoV-2 infection (Wang and Huang 2020). Also, there are more cases in advanced stage showing that patients with localized disease have been less approached. Therefore, we are facing a complicated situation with less diagnosis, more susceptibility, and higher mortality, although the cohort is too small to reach statistical significance. Moreover, the consequences may remain for many months or even years.

Several societies provide recommendations on managing lung cancer during COVID-19 pandemics (Baldoto et al. 2020; Corona-Cruz et al. 2020; Jheon et al. 2020; Passaro et al. 2020). The European Society for Medical Oncology divide the patients into three

155 different levels of priority. For the outpatients, high priority is defined by the presence
 156 of disease-related symptoms and suspicious clinical stage III or metastatic disease, and
 157 medium priority is those with new diagnosis or suspicion of localized lung cancer
 158 (Passaro et al. 2020). There are recommendations to biopsy both situations. The
 159 Brazilian Thoracic Group also recommends that surgical approaches be postponed in
 160 cases of a predominantly solid lesion, suspected lesions larger than 2cm and surgical
 161 procedures for staging (Baldoto et al. 2020). However, in practice, we see that these
 162 recommendations have been not followed thoroughly, as our results demonstrate.
 163 Furthermore, in Brazil, most of the patients with lung cancer still present in a higher
 164 disease stage. Most of the time, the treatment window is very narrow, and a delay of
 165 two or three months can determine a worse prognosis (Bertolaccini and Spaggiari
 166 2020). A delay in diagnosis represents losing opportunities to establish a surgical or
 167 systemic treatment that can be loose. Since the pandemic in Brazil still affects many
 168 individuals and the curve of new cases shows no decline, the situation is very
 169 worrisome, and a massive impact on lung cancer survival can be expected.
 170 Not only the lung cancer scenario is dramatic. In developing countries, tuberculosis is a
 171 significant problem. In Brazil, we expect around 72,000 new cases with more than
 172 4,000 deaths (Brazilian Ministry of Health 2017) We show that the number of
 173 tuberculosis diagnosis drops more than three times. When considering that the public
 174 health system is the primary source for diagnosing and treating these patients, and
 175 COVID-19 have exhausted the system, the situation can be hazardous and cause a
 176 recrudescence. Deaths in patients with tuberculosis and COVID are more than the
 177 double, especially when you put together in the context of co-infection with Human

178 Deficiency Virus (Keene et al, 2020) The governments should organize services to
 179 provide the best medical support for these vulnerable population.

180 In conclusion, COVID-19 pandemics impact the management and diagnosis of lung
 181 diseases in Brazil. It is mandatory for all players implicated in the management of
 182 thoracic disease to establish a strategy to minimize the damages after the pandemic's
 183 peak. The public health system, responsible for treating the vulnerable population,
 184 must introduce a new policy to benefit the diagnosis of lung infectious diseases and
 185 cancer.

186 **Declarations**

187 **Ethics approval:** The Institucional Ethics Committee approved the study under protocol number
 188 #4.156.067

189 **Consent for publication:** not applicable

190 **Availability of data and material:** De-identified data can be made available under request

191 **Conflicts of interest/Competing interests:** nothing to declare

192 **Funding:** There is no specific funding to this manuscript

193 **Author contributions:** F.A.S. had full access to all the data in the study and take responsibility for the
 194 integrity of the data and accuracy of the data analysis. C.C.O., M.C., C.K., and N.C.G. contributed
 195 substantially to the study design, data analysis and interpretation, and the writing of the manuscript.

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199 **REFERENCES**

- 200 Baldotto C, Gelatti A, Accioly A, Mathias C, Mascarenhas E, Carvalho H, Faroni L,
 201 Araújo LH, Zukin M, Gadia R, Terra RM, Haddad R, Lima VC, Castro-Junior G
 202 (2020) Lung cancer and COVID-19 pandemic: recommendations from the Brazilian
 203 Thoracic Oncology Group. Clinics (Sao Paulo) 2020; 75:e2060.
 204 <https://doi.org/10.6061/clinics/2020/e2060>.
- 205 Bertolaccini L, Spaggiari L (2020) Reorganization of thoracic surgery activity in a
 206 national high-volume cancer centre in the Italian epicenter of coronavirus disease
 207 2019. Eur J Cardio-Thorac Surg. 58(2):210-212.
 208 <https://doi.org/10.1093/ejcts/ezaa234>
- 209 Bray F, Ferlay J, Soerjomataram I, Sirgel S, Torre LA, Jemal A (2018) Global
 210 cancer statistics 2018; GLOBOCAN estimates of incidence and mortality
 211 worldwide for 36 cancers in 185 countries. CA Cancer J 68(6):394-424.
 212 <https://doi.org/10.3322/caac.21492>.
- 213 Brazilian Ministry of Health. Brasil Livre de Tuberculose: Plano Nacional pelo fim
 214 da tuberculose como problema de saúde pública (2017)
 215 [https://www.saude.gov.br/images/pdf/2017/julho/05/af-miolo-plano-nac-](https://www.saude.gov.br/images/pdf/2017/julho/05/af-miolo-plano-nac-tuberculose-29jun17-grafica.pdf)
 216 [tuberculose-29jun17-grafica.pdf](https://www.saude.gov.br/images/pdf/2017/julho/05/af-miolo-plano-nac-tuberculose-29jun17-grafica.pdf). Accessed October 5th 2020.
- 217 Brazilian Ministry of Health, Coronavirus//Brasil (2020).
 218 <https://covid.saude.gov.br/>. Accessed October 5th 2020.
- 219 Corona-Cruz J, Guzmán-de Alba E, Iñiguez-Garcia M, López-Saucedo R, Olivares-
 220 Torres C, Rodriguez-Cid J, et al (2020) Surgical care of thoracic malignancies during
 221 the COVID-19 pandemic in Mexico: an expert consensus guideline from the
 222 Sociedad Mexicana de Oncología (SmeO) and The Sociedad Mexicana de

- 223 Cirurjianos Torácicos Generales (SMCTG). Thorac Cancer 11(8):2370-2375.
 224 <https://doi.org/10.1111/1759-7714.13546>.
- 225 Deen SS, Wetscherek M, Karia S, Godfrey EM (2020) Diagnostic challenges of
 226 incidental lung lesions on liver MRI during the COVID-19 pandemic. BMJ Case
 227 Rep. 13(7):e237430. <https://doi.org/10.1136/bcr-2020-237430>
- 228 Garassino MC, Ehisenant JG, Huang L-C, et al (2020) COVID-19 in patients with
 229 thoracic malignancies (TERAVOLT): first results of an international, registry-
 230 based, cohort study. Lancet Oncol 2020; 21(7):914-922.
 231 [https://doi.org/10.1016/S1470-2045\(20\)30314-4](https://doi.org/10.1016/S1470-2045(20)30314-4).
- 232 Instituto Nacional do Cancer. Estimativa 2020. Incidência do Cancer no Brasil.
 233 INCA 2019:34-35. (<http://controlecancer.bvs.br/>). October 5th 2020.
- 234 Instituto Nacional de Câncer, Ministério da Saúde. Atlas de mortalidade por cancer.
 235 <https://www.inca.gov.br/aplicativos/atlas-de-mortalidade-por-cancer>. Accessed
 236 October 5th 2020.
- 237 Jheon S, Ahmed ADB, Fang VWT, Jung W, Khan AZ, Lee J-M, Sihoe ADI,
 238 Thoncharoen P, Tsuboi M, Turna A, Nakajima J (2020) Thoracic cancer surgery
 239 during the COVID-19 pandemic: a consensus statement from the thoracic domain of
 240 the Asian Society for Cardiovascular and Thoracic Surgery. Asian Cardiovasc
 241 Thorac Ann 28(6):322-329. <https://doi.org/10.1177/0218492320940162>.
- 242 Keene C, Mohr-Holland E, Cassidy T, Scott V, Nelson A, Furin J, Triviño-Duran L
 243 (2020) How COVID-19 could benefit tuberculosis and HIV services in South
 244 Africa. Lancet Respir Med Aus. 2020; 3:S2213-2600(20)30311-8. [https://doi.org/10.1916/S2213-2600\(20\)30311-8](https://doi.org/10.1916/S2213-2600(20)30311-8).

- 246 Luo J, Rizvi H, Preeshagul IR, Egger JV, Hoyos D, Bandlamuni C, McCarthy CG,
247 et al (2020) COVID-19 in patients with lung cancer. *Ann Oncol* 31(10):1386-1396.
248 [https:// doi: 10.1016/j.annonc.2020.06.007](https://doi.org/10.1016/j.annonc.2020.06.007).
- 249 Passaro A, Addeo A, Van Garnier C, Von Garnier C, Blackhall F, Planchard D, et al
250 (2020) ESMO management and treatment adapted recommendations in the
251 COVID-19 era: lung cancer. *ESMO Open* 2020; 5:e000820.
252 <https://doi.org/10.1136/esmoopen-2020-000820>.
- 253 Venkatesulu BP, Chandrasekar VT, Girdhar P, Advani P, Sharma A, Elumalai T et
254 al (2020) A systemic review and meta-analysis of cancer patients affected a novel
255 coronavirus. *medRxiv* May 2020; 29:2020.05.27.20115303.
256 [\(Preprint\)](https://doi.org/10.1101/2020.05.27.20115303).
- 257 Wang B, Huang Y (2020) Which type of cancer patients are more susceptible to the
258 SARS-COV-2: evidence from a meta-analysis and bioinformatics analysis. *Crit Rev*
259 *Oncol Hematol* 153:103032. <https://doi.org/10.1016/j.critevonc.2020.133032>

Table 1: Demographics of lung cases comparing April/May- 2019 and April/May-2020

	2019	2020	TOTAL
Number of Cases	245 (65.9%)	127 (34.1%)	372
Biological Behaviour			p=0.022
Benign disease	135 (71.4%)	54 (28.6%)	189
Malignant disease	110 (60.1%)	76 (40.9%)	186
Gender			n.s.
Female	121 (68.8%)	55 (31.35)	176
Male	124 (63.3%)	72 (36.7%)	196
Age (median)	62	63	n.s.
Kind of procedure			p=0.0967
Diagnostic Biopsy	157 (75.8%)	50 (24.2%)	207
To rule out metastasis	38 (55.1%)	31 (44.9%)	69
Surgical Specimens	50 (65,8%)	26 (34.2%)	76
Stage pT			p=0.0522
pT1	16 (84.2)	3 (15.8%)	19
pT2	2 (33.3%)	4 (66.7%)	6
pT3	2 (66.7%)	1 (33.3%)	3
Prognostic Stage Groups			p=0.1362
ECI + EC II	19 (70.4%)	8 (29.6%)	27
ECIII + ECIV	18 (48.6%)	19 (51.4%)	37

Table 2: Benign lung diseases diagnosed comparing April/May-2019 versus April/May 2020

DISEASES*	2019 (N=132)	2020 (N=51)	TOTAL
Granulomatous disease	31 (23.5%)	9 (17.6%)	40
Acute Inflammatory Disease	10 (7.6%)	8 (15.7%)	18
Interstitial Diseases	7 (5.3%)	1 (2%)	8
Unspecific inflammatory reaction	58 (43.9%)	27 (52.9%)	85
Emphysema	8 (6.1%)	1 (2%)	7
Others	18 (13.6%)	5 (9.8%)	23

*There is no statistical significance ($p=0.286$) on the diagnosis distribution

Table 3: Neoplastic lung diseases diagnosed comparing April/May-2019 versus April/May 2020

NEOPLASTIC DISEASES*	2019 (N=110)	2020 (N=76)	TOTAL
Non-Small cell lung carcinoma	72 (60.5%)	47 (39.5%)	119
Adenocarcinoma	57 (67.1%)	28 (32.9%)	85
Squamous Cell Carcinoma	12 (44.4%)	15 (55.6%)	27
Others	3 (60%)	2 (40%)	5
Neuroendocrine tumors	11 (61.1%)	7 (38.9%)	18
Carconoid tumor	6 (85.7%)	1 (14.3%)	7
Small cell carcinoma	5 (45.5%)	6 (55.5%)	11
Sarcomas	1	2	3
Mesoteliomas	2	1	3
Metastatic tumors	24 (55.8%)	19 (44.2%)	43

*There is no statistical significance ($p=0.5249$) on the diagnosis distribution. There is a significant difference when compared adenocarcinoma versus squamous cell carcinoma ($p=0.0428$).

Table 4: Molecular Biomarkers distribution comparing April/May-2019 versus April/May 2020

BIOMARKER*	2019	2020	TOTAL
EGFR sequencing	34	7	41
Positive	9 (26,5%)	1 (14.3%)	10 (24.4%)
Negative	25 (73.5%)	6 (85.7%)	31 (75.6%)
ALK-1 immunohistochemistry	33	7	40
Positive	0 (%)	1 (14.3%)	1 (2.5%)
Negative	33 (%)	6 (85.7%)	39 (97.5%)
PD-L1 immunohistochemistry	32	12	44
High expressor (more than 50%)	5 (15.6%)	2 (16.7%)	15 (34.1%)
Low Expressor (>1% <50%)	4 (12.5%)	4 (33.3%)	29 (65.9%)
Negative	23 (71.9%)	6 (50%)	29 (65.9%)