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# Maintaining Surgical Treatment of Non-Small Cell Lung Cancer During the COVID-19 Pandemic in Paris

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**Background.** The coronavirus disease 2019 (COVID-19) outbreak was officially declared in France on March 14, 2020. The objective of this study is to report the incidence and outcome of COVID-19 after surgical resection of non-small cell lung cancer in Paris Public Hospitals during the pandemic.

**Methods.** We retrospectively analyzed a prospective database including all patients who underwent non-small cell lung cancer resection between March 14, 2020, and May 11, 2020, in the 5 thoracic surgery units of Paris Public Hospitals. The primary endpoint was the occurrence of SARS-CoV-2 infection during the first 30 days after surgery.

**Results.** Study group included 115 patients (male 57%, age  $64.6 \pm 10.7$  years, adenocarcinoma 66%, cT1 62%, cN0 82%). During the first month after surgery, 6 patients (5%) were diagnosed with COVID-19. As compared with COVID-negative patients, COVID-positive patients were more likely to be operated on during the first month of

the pandemic (100% vs 54%,  $P = .03$ ) and to be on corticosteroids preoperatively (33% vs 4%,  $P = .03$ ). Postoperative COVID-19 was associated with an increased rate of readmission (50% vs 5%,  $P = .004$ ), but no difference in 30-day morbidity (for the study group: grade 2, 24%; grade 3, 7%; grade 4, 1%) or mortality ( $n = 1$  COVID-negative patient, 0.9%). Immediate oncologic outcomes did not differ significantly between groups (R0 resection 99%, nodal upstaging 14%, adjuvant chemotherapy 29%).

**Conclusions.** During the COVID-19 pandemic, surgical treatment of non-small cell lung cancer was associated with a rate of postoperative COVID-19 of 5% with a significant impact on readmissions but not on other outcomes studied.

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After an early phase of slow virus spread, the coronavirus disease 2019 (COVID-19) outbreak was officially declared in France on March 14, 2020, and a national lockdown was established on March 16, 2020. By the end of March, there were 52,128 confirmed COVID-19 cases in France, including 22,757 patients requiring hospitalization, 5,565 requiring intensive care, and a death toll of 3,523.<sup>1</sup> After the eastern region, Paris and its vicinity quickly appeared to be the second epicenter of the disease in France, stretching the health care system with a huge number of patients, forcing Paris hospitals to double their intensive care unit capacity, to transfer intensive

care unit patients to distant regional hospitals, and to postpone non-urgent surgical procedures.<sup>1</sup>

Whether surgical resection of cancer can be considered an urgent or semiurgent procedure is questionable. Specifically, there is no consensus on the impact of delay in the surgical management of non-small cell lung cancer (NSCLC). Yang and associates<sup>2</sup> analyzed the US National Cancer Database and found that an interval longer than 6 to 12 weeks between diagnosis of early-stage NSCLC and surgery was associated with worse survival. General guidelines from the National Comprehensive Cancer Network state that treatment delays should be avoided,<sup>3</sup> and those from the European Society for Medical Oncology<sup>4</sup> and the American College of Chest Physicians<sup>5</sup> do not mention any time limit to initiate surgical intervention. Conversely, European Nordic countries have organized integrated cancer pathways to ensure a rapid and well-coordinated course of treatment, and low-

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risk patients with early-stage NSCLC are required to receive surgery within 14 calendar days after completion of diagnostic workup.<sup>6</sup>

At the beginning of the COVID-19 pandemic, there was no specific guideline to address the surgical management of NSCLC in this particular period. The ethical guidelines driving the care of COVID-19 patients were already widely discussed, and included maximizing benefits, treating equally, promoting and rewarding instrumental value, and giving priority to the worst off.<sup>7</sup> Even if the management of non-COVID-19 patients was not discussed by then, we considered that the value of maximizing benefits during a pandemic should be applied equally to all patients, whatever their underlying disease. Accordingly, the French High Counsel of Public Health (Haut Conseil de Santé Publique) published guidelines on the care of cancer patients during a pandemic, and advised prioritizing cancer care to patients with a high likelihood of cure.<sup>8</sup> In this context, we organized a specific COVID-free surgical path to preserve the surgical resections of NSCLC planned with curative intent in low-risk patients and patients whose tumor was to be operated rapidly. The objective of this study is to report the incidence and outcome of COVID-19 after surgical resection of NSCLC in Paris Public Hospitals during the COVID-19 pandemic.

## Patients and Methods

### Study Design

We set a retrospective study of a prospectively maintained multicentric administrative database, including all patients who underwent surgical treatment of NSCLC in Paris, France, from the official announcement of the COVID-19 outbreak until the end of the national lockdown. Inclusion criteria were patients with NSCLC undergoing surgery with curative intent from March 14, 2020, to May 11, 2020, in the thoracic surgery departments of Avicenne Hospital, Bichat Hospital, Cochin Hospital, Georges-Pompidou European Hospital, and Tenon Hospital, all part of Assistance Publique – Hôpitaux de Paris, a network of 39 public hospitals totaling 20,000 beds in Paris and its vicinity. We reviewed patient characteristics, surgical procedures, short-term outcomes, pathology results, and occurrence of postoperative COVID-19. The study was split in 2 time periods. The early time period was set from March 14 to April 14, and corresponded to an increase in the number of hospitalized COVID-19 cases in our institution, followed by a plateau of around 4,500 patients or 22% of Assistance Publique – Hôpitaux de Paris capacity. The late time period was set from April 15 to May 11, and corresponded to a progressive decline in the number of hospitalized COVID-19 patients.

### Endpoints

The primary endpoint was the incidence and prognosis of polymerase chain reaction (PCR)-proven postoperative COVID-19 during the first 30 days after surgery (30-day COVID-19). Secondary endpoints included the

occurrence of any complication according to the National Cancer Institute Common Terminology Criteria for Adverse Events version 5.0 during the first 30 days after surgery (30-day morbidity), the occurrence of death of any cause during the first 30 days after surgery (30-day mortality), the proportion of patients with complete resection on the surgical specimen (R0 resection), and the proportion of patients with suspected COVID-19 on the pathologic examination of the surgical specimen (day 0 COVID-19).

### Ethical Aspects

All patients signed an informed consent to authorize prospective data collection and retrospective data analysis. The database was declared to the National Board for Informatics and Freedom (Commission Nationale Informatique et Liberté authorization #2217817) and to the National Institute for Health Data (Institut National des Données de Santé authorization #MR1313290420). The study was approved by the ethics committee of the French Society of Thoracic and Cardiovascular Surgery (Société Française de Chirurgie Thoracique et Cardiovasculaire authorization #CERC-SFCTCV-2020-05-06-07-MOPI).

### Preoperative Management

All cases were discussed preoperatively and postoperatively during a multidisciplinary meeting including a pulmonologist, an oncologist, a thoracic surgeon, a radiation therapist, a radiologist, and a pathologist to confirm the surgical management of NSCLC and its timing in case of multimodal strategy. The risk of postoperative mortality was estimated using the Thoracscore.<sup>9</sup> Thoracic surgery units were organized as COVID-free units where every suspected COVID-19 case was immediately transferred to a medical unit dedicated to COVID-19 patients. For surgical candidates, screening of COVID-19 was performed the day before surgery. In the early time period, screening was based on a careful interview and a complete clinical examination. In the late time period, screening was based on careful interview, complete clinical examination, and systematic SARS-CoV-2 PCR on nasopharyngeal swab. Preoperative low-dose chest computed tomography (CT) was rarely performed. The surgery was postponed if the patient was determined to have symptoms, physical examination or CT findings consistent with COVID-19 infection, or a positive SARS-CoV-2 PCR.

### Surgery

When the surgery was confirmed, patients were equipped with a surgical mask and transferred to the operating room. The anesthesiology team wore FFP2 masks during intubation, bronchoscopy, and endotracheal tube manipulation to ensure selective ventilation. The surgical team wore surgical masks during the procedure. The surgical procedure was performed according to multidisciplinary meeting decision and surgeon's preference, with a closure of the bronchial stump using double-sided endostapler to avoid bronchial opening whenever

feasible. Patients wore a surgical mask during their transfer to the recovery room, in the recovery room, and during their transfer back to their room in the thoracic surgery unit. Postoperative chest CT and SARS-CoV-2 PCR were performed only if a postoperative COVID-19 infection was suspected, during initial hospitalization, after discharge, or upon readmission. In case of postoperative COVID-19, the severity of lung involvement was estimated on chest CT.<sup>10</sup>

### Statistical Analysis

Categorical variables were presented as numbers and proportions and compared with  $\chi^2$  or Fisher's exact test when appropriate. Continuous variables with normal distribution were reported as mean  $\pm$  SD and compared using Student's *t* test or Welch 2-sample *t* test when appropriate. Continuous variables with non-normal distribution were reported as median (interquartile range) and compared using the Mann-Whitney test. The 30-day follow-up was complete for all patients. All data analyses were conducted with 2-sided tests, without adjustment for multiple comparisons. A *P* value less than .05 was considered significant. Follow-up updates and final statistical analysis were performed on June 27, 2020. Statistical analyses were conducted using R (The R Statistical Software, R Foundation, Vienna, Austria).

## Results

### Patient Characteristics

From March 14, 2020, to May 11, 2020, 115 patients were admitted in the 5 thoracic surgery departments of Paris Public Hospitals for surgical treatment of NSCLC. Demographic and clinical features are developed in [Table 1](#).

### Preoperative Workup

Preoperative tumor assessment is presented in [Table 2](#). Average tumor size was  $28.4 \pm 15.7$  mm (range, 5-90 mm). Eight patients (7%) underwent induction chemotherapy. In 1 patient, a recent CT scan retrospectively showed additional alveolar opacities around a 4-cm tumor.

### Surgical Treatment

Details of surgical management are developed in [Table 3](#). One patient was operated in emergency conditions. Three patients (3%) underwent delayed surgery because of the pandemic context. One patient died 6 days after a right pneumonectomy due to bacterial pneumonia and pulmonary embolism with negative COVID-19 testing.

### Oncological Outcome

Immediate oncological outcomes are presented in [Table 4](#). One patient (1%) had R1 resection. Postoperative multidisciplinary meeting decision was available in 77

Table 1. Patient Characteristics

Variable	Study Group (N = 115)	No Postoperative COVID-19 (n = 109)	Postoperative COVID-19 (n = 6)	<i>P</i> Value
<b>Demographics</b>				
Age, y	64.6 $\pm$ 10.7	64.5 $\pm$ 10.9	66.0 $\pm$ 4.4	.43
Male sex	65 (57)	61 (56)	4 (67)	.70
BMI, kg/m <sup>2</sup>	24.4 $\pm$ 8.0	24.3 $\pm$ 8.1	27.6 $\pm$ 5.3	.20
Smoking history	99 (86)	94 (86)	5 (83)	.99
Active smoking	33 (29)	32 (30)	1 (17)	.67
<b>Extrapulmonary diseases</b>				
Diabetes	15 (13)	13 (12)	2 (33)	.17
Kidney failure	4 (3)	4 (4)	0	.99
Ischemic heart disease	18 (16)	16 (15)	2 (33)	.24
Hypertension	50 (43)	46 (42)	4 (67)	.40
ACE inhibitor	26 (23)	24 (22)	2 (33)	.62
History of organ transplantation	2 (2)	2 (3)	0	.99
Corticosteroid therapy	6 (5)	4 (4)	2 (33)	.03
Immunosuppressive therapy	7 (6)	6 (6)	1 (17)	.32
<b>Respiratory function</b>				
History of thoracic surgery	13 (11)	11 (10)	2 (33)	.14
COPD	32 (28)	30 (28)	2 (33)	.67
FEV1, %th	86.5 $\pm$ 18.6	87.1 $\pm$ 18.2	76.2 $\pm$ 24.9	.34
TLC, %th	104.0 $\pm$ 17.7	103.8 $\pm$ 17.7	107.3 $\pm$ 20.2	.76
DLCO, %th	66.5 $\pm$ 17.2	65.9 $\pm$ 17.0	74.4 $\pm$ 21.3	.43
Thoracoscore, %	2.0 $\pm$ 1.4	2.0 $\pm$ 1.4	2.77 $\pm$ 1.49	.26

Values are presented as mean  $\pm$  SD or n (%).

ACE, angiotensin-converting enzyme; BMI, body mass index; COPD, chronic obstructive pulmonary disease; DLCO, diffusing capacity of the lung for carbon monoxide; FEV1, forced expiration volume in 1 s; TLC, total lung capacity; %th, % of predicted values.

Table 2. Tumor Characteristics

Variable	Study Group (N = 115)	No Postoperative COVID-19 (n = 109)	Postoperative COVID-19 (n = 6)	P Value
<b>Tumor</b>				
Tumor size, mm	28.4 ± 15.7	28.3 ± 15.8	29.8 ± 15.7	.83
cT1	69 (62)	66 (62)	3 (50)	.37
cT2	27 (23)	26 (25)	1 (17)	
cT3	12 (11)	10 (9)	2 (33)	
cT4	4 (4)	4 (4)	0	
<b>Nodal status</b>				.69
cN0	94 (82)	89 (82)	5 (83)	
cN1	10 (9)	10 (9)	0	
cN2	10 (9)	9 (9)	1 (17)	
<b>Metastatic status</b>				.99
cM0	108 (94)	102 (94)	6 (100)	
cM1a	2 (2)	2 (2)	0	
cM1b	4 (3)	4 (4)	0	
cM1c	0	0	0	
<b>Histology</b>				
Preoperative histology	49 (43)	45 (41)	4 (67)	.54
Induction chemotherapy	8 (7)	7 (6)	1(17)	.34

Values are presented as mean ± SD or n (%).

patients, among which adjuvant chemotherapy was decided in 22 (29%), chemoradiotherapy in 4 (5%), and targeted therapy in 1 (1%).

### Postoperative COVID-19

No sign of SARS-CoV-2 infection in the lung parenchyma was noticed on surgical specimen (day 0 COVID-19). Six patients (5%) were diagnosed with COVID-19 during the first postoperative month (30-day COVID-19). All of them had surgery during the first month of the study (early time period). Their management is detailed in Tables 5 and 6. The occurrence of postoperative COVID-19 was associated with a higher rate of readmission (50% vs 5%,  $P = .004$ ), but not with longer initial hospital length of stay, increased 30-day morbidity, or increased 30-day mortality. At the time of analysis, all patients with postoperative COVID-19 returned home without oxygen support. In univariate analysis of preoperative risk factors, earlier vs late time-period ( $P = .03$ ) and preoperative corticosteroid therapy ( $P = .03$ ) were significantly associated with the occurrence of a postoperative COVID-19.

### Comment

While monitoring the occurrence of postoperative SARS-CoV-2 infection after surgical treatment of NSCLC during the COVID-19 pandemic in Paris, France, we found a frequency of 5% with an impact on readmissions but no impact on postoperative morbidity or mortality.

Table 3. Surgical Management

Variable	Study Group (N = 115)	No Postoperative COVID-19 (n = 109)	Postoperative COVID-19 (n = 6)	P Value
Time period	65 early/ 50 late	59 early/ 50 late	6 early/ 0 late	.03
<b>Approach</b>				.01
Open surgery	71 (62)	70 (64)	1 (17)	
VATS	30 (26)	28 (26)	2 (33)	
RATS	14 (12)	11 (10)	3 (50)	
<b>Procedure</b>				.20
Wedge resection	3 (3)	2 (2)	1 (17)	
Segmentectomy	19 (17)	19 (17)	0	
Lobectomy	86 (74)	81 (74)	5 (83)	
Pneumonectomy	7 (6)	7 (6)	0	
<b>Lymph node dissection</b>				.10
Sampling	2 (2)	1 (1)	1 (17)	
Radical	113 (98)	108 (99)	5 (83)	
<b>Type of complications</b>				
Prolonged air leak	18 (16)	17 (16)	1 (17)	.99
Bacteria pneumonia	11 (10)	11 (10)	0	.99
Atrial fibrillation	5 (4)	5 (5)	0	.99
DVT/PE	2 (2)	1 (1)	1 (17)	.10
Inferior laryngeal nerve palsy	1 (1)	0	1 (17)	.05
<b>NCI CTCAE 5.0 Classification</b>				
Grade 1	21 (18)	19 (17)	2 (33)	.30
Grade 2	28 (24)	27 (25)	1 (17)	.99
Grade 3	8 (7)	4 (4)	4 (67)	.001
Grade 4	1 (1)	1 (1)	0	.99
Grade 5	1 (1)	1 (1)	0	.99
<b>Outcomes</b>				
Chest tube duration, d	3 (2-5)	3 (2-5)	3 (3-5)	.53
Hospital length of stay, d	7 (5-11)	7 (5-10)	5 (4-9)	.73
Readmission	8 (7)	5 (5)	3 (50)	.004

Values are presented as median (interquartile range) or n (%).

DVT/PE, deep venous thrombosis/pulmonary embolism; NCI CTCAE, National Cancer Institute Common Terminology Criteria for Adverse Events; RATS, robot assisted thoracic surgery; VATS, video assisted thoracic surgery.

When the COVID-19 outbreak was declared in France, there were no specific guidelines dedicated to the surgical management of patients with NSCLC. Early French guidelines recommended discussion in a multidisciplinary setting and on a case-by-case basis, and suggested postponing non-urgent surgical management of NSCLC patients or considering alternative treatments.<sup>11</sup> Since then, different guidelines recommended to preemptively postpone surgery for stage I tumors up to 2 cm<sup>12</sup> or 3

Table 4. Oncologic Outcome

Variable	Study Group (N = 115)	No Postoperative COVID-19 (n = 109)	Postoperative COVID-19 (n = 6)	P Value
Histology				.85
Adenocarcinoma	75 (66)	71 (66)	4 (67)	
Squamous cell carcinoma	23 (20)	21 (19)	2 (33)	
Large cell carcinoma	2 (2)	2 (2)	0	
Carcinoid tumor	8 (7)	8 (7)	0	
Other	6 (5)	6 (6)	0	
Tumor				
Tumor size, mm	25.9 ± 14.3	25.6 ± 14.1	28.7 ± 18.5	.66
pT1	59 (52)	57 (52)	2 (33)	.45
pT2	36 (31)	34 (31)	2 (33)	
pT3	15 (13)	13 (12)	2 (33)	
pT4	5 (4)	5 (5)	0	
Nodal status				.41
pN0	89 (77)	85 (78)	4 (67)	
pN1	12 (11)	11 (10)	1 (17)	
pN2	14 (12)	13 (12)	1 (17)	
Resection margin				.99
R0	114 (99)	108 (99)	6 (100)	
R1	1 (1)	1 (1)	0	
Postoperative MDM decision	(n = 77)	(n = 71)	(n = 6)	
No adjuvant treatment	50/77 (65)	47/71 (66)	3/6 (50)	.58
Adjuvant chemotherapy	22/77 (29)	19/71 (27)	3/6 (50)	
Adjuvant chemoradiation	4/77 (5)	4/71 (6)	0	
Adjuvant targeted therapy	1/77 (1)	1/71 (1)	0	

Values are presented as mean ± SD, n (%), or n/N (%).

MDM, multidisciplinary meeting.

cm,<sup>13</sup> whereas an expert thoracic oncology multidisciplinary consensus opinion recommended considering non-surgical treatment for locally advanced NSCLC.<sup>14,15</sup> Conversely, the British Thoracic Society and the European Society of Medical Oncology advised following the standard of care until limitations of surgical resources actually arise.<sup>16,17</sup> We reached the same conclusion and decided to preserve the surgical resections of NSCLC until resources are effectively limited.

To minimize the risk of nosocomial COVID-19, all visits were prohibited and wearing surgical masks by all caregivers was mandatory after March 18, 2020 (ie, 4 days after the beginning of our study). No systematic screening of caregivers or asymptomatic patients was possible at this time. For suspected or confirmed cases of COVID-19, infection prevention and control strategies included contact, airborne, and droplet precautions for health care staff.<sup>18</sup> Personal protective equipment consisted of gowns, gloves, eye protection, and either medical masks for standard care or FFP2 masks during airway aerosol-generating procedures. Despite some tensions on the supply chain, no limitations on the use of personal protective equipment were reported in our institution, and no competition in the allocation of personal protective equipment were noticed between COVID-19 and non-COVID-19 units.

Given the natural history of the disease and the timing of postoperative diagnosis, half of the patients with postoperative COVID-19 reported here might have had the virus before surgery or have been infected in the hospital. Modeling analyses of the burden of COVID-19 in France estimated that by May 11, 2020, 4.4% of the population might have been infected, and possibly up to 9.9% in the Ile-de-France region, which includes Paris.<sup>19</sup> The frequency of postoperative COVID-19 reported in our study was therefore similar to the incidence of SARS-CoV-2 infection expected in the community setting of the surrounding area. Interestingly, our study encompasses the French lockdown, which was associated with a significant drop in the virus effective reproduction number (R) down to 0.6. It seems therefore unlikely that silently infected thoracic surgery patients could have spread the virus after discharge.

Cancer therapies can lead to prolonged immunosuppressive states that may affect the incidence of severe infection-related morbidities and mortality.<sup>14</sup> A recent study from New York identified 69 consecutive outpatients with lung cancer who were diagnosed with COVID-19, including 42 patients (62%) requiring hospitalization and 16 patients (24%) who died.<sup>20</sup> The role of treatments in this adverse prognosis is still to be established. Studying 28 cancer patients with COVID-19, Zhang and colleagues<sup>21</sup> found that a last antitumor treatment within 14 days

Table 5. Characteristics of Postoperative COVID-19 Patients (n = 6)

Patient	Sex, Age	Tobacco Use	Medical History	Preoperative FEV1	Subtype, cTNM	Surgery, Approach, Date (dd/mm)	pTNM, Resection	MDM Decision
1	F 58 y	Weaned	Arthritis/CS	81%	Adk cT3N0M0	LUL Lobectomy RATS 14/03	pT2bN0M0 R0	Adjuvant CTX postponed due to COVID
2	M 66 y	Weaned	IHD/ACE Arthritis/ CS + IS	77%	SCC cT1cN0M0	RLL Wedge VATS 16/03	pT1bN0M0 R0	No adjuvant treatment
3	M 66 y	Active	Diabetes/ACE	84%	Adk cT1bN0M0	LUL Lobectomy RATS 16/03	pT2N1M0 R0	Adjuvant CTX performed
4	F 69 y	No	No	114%	Adk cT1bN0M0	RUL Lobectomy VATS 23/03	pT1bN0M0 R0	No adjuvant treatment
5	M 70 y	Weaned	Diabetes IHD COPD	39%	Adk cT3N2M0 Induction CTX	RUL lobectomy+SVC Open 30/03	pT3N2M0 R0	No adjuvant treatment
6	M 68 y	Weaned	COPD	62%	SCC cT2bN0M0	LUL lobectomy RATS 02/04	pT3N0M0 R0	Adjuvant CTX cancelled due to COVID

ACE, angiotensin converting enzyme inhibitor; Adk, adenocarcinoma; COPD, chronic obstructive pulmonary disease; CS, corticosteroids; CTX, chemotherapy; F, female; IHD, ischemic heart disease; IS, immunosuppression; LUL, left upper lobe; M, male; MDM, multidisciplinary meeting; RATS, robot assisted thoracic surgery; RLL, right lower lobe; RUL, right upper lobe; SCC, squamous cell carcinoma; SVC, superior vena cava; VATS, video assisted thoracic surgery.

significantly increased the risk of developing severe events. Focusing on NSCLC surgery, a small retrospective series from China reported postoperative COVID-19 to be associated with mortality rate up to 42%.<sup>22</sup> In our study, the occurrence of postoperative COVID-19 was not associated with any increase in the overall morbidity or mortality after surgery for NSCLC, and most readmissions were indeed preemptive in the postoperative setting.

Study limitations include the absence of systematic screening of asymptomatic patients both preoperatively and postoperatively. We also regret the lack of control group from the pre-COVID-19 era, but the outcomes after surgical resection of NSCLC reported here are in line with the outcomes reported in pre-COVID-19

publications from the French national database Epi-thor.<sup>23</sup> Our study is also limited by its retrospective analysis, small groups, and absence of adjustment for multiple comparisons. These limitations can be counterbalanced by the prospective data collection, exhaustiveness of data on patients undergoing NSCLC surgery in Paris Public Hospitals during the first 2 months of the COVID-19 pandemic, and complete 30-day follow-up.

We can conclude that the surgical treatment of NSCLC during the first 2 months of the COVID-19 pandemic in Paris, France, was associated with a rate of postoperative COVID-19 of 5%, similar to that expected in the community setting. Postoperative COVID-19 was associated with higher rate of readmission, but with no adverse

Table 6. Postoperative Course of Postoperative COVID-19 Patients (n = 6)

Patient	Surgery to Spt (d)	Surgery to PCR (d)	Surgery to Chest CT (d)	Chest CT Severity (%)	Patient Management	Respiratory Support	COVID-19 Treatment	Follow-up
1	2	3	6	<10%	Same hospitalization, total 11 days	No	None	92 d alive at home early recurrence
2	17	17	18	<10%	Readmission, total 13 days	No	Amoxicillin clavulanate	94 d alive at home
3	3	3	Not performed	Not performed	Outpatient	No	Amoxicillin clavulanate	94 d alive at home
4	8	16	16	25%	Readmission, total 8 days	No	H+A+C	86 d alive at home
5	No symptom	30	Not performed	Not performed	Readmission, total 7 days	No	None	45 d alive at home
6	4	4	6	<10%	Same hospitalization, total 24 days	No	Amoxicillin clavulanate	77 d alive at home

CT, computed tomography; H+A+C, hydroxychloroquine + azithromycin + corticosteroids; PCR, polymerase chain reaction test; Spt, symptoms.

impact on postoperative morbidity, mortality, or immediate oncologic outcomes. Further studies are needed to clarify the risk factors, patients-reported outcomes, and long-term consequences of postoperative COVID-19.

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