

## Surgery and COVID-19: Balancing the nosocomial risk a french academic center experience during the epidemic peak

### Editor

The COVID-19 outbreak greatly impacted surgical activities. Restrictions were imposed globally based on precautionary principle.

Little is known of the nosocomial risk for COVID-negative patients undergoing surgery, nor the risk of operating on COVID patients during the epidemic<sup>1</sup>.

We reviewed patients who underwent surgery in an academic hospital in the particularly affected Paris area during the 4 initial weeks of surgical restrictions, encompassing the epidemic peak.

This study was approved by the Institutional Review Board. All patients who received a surgical procedure during the study period were included. The clinical situation was updated at least 3 weeks after the procedure.

Patients were considered positive when the reverse transcription Polymerase Chain reaction was positive or the pathognomonic computed tomography scanner signs<sup>2</sup> were found. The data collected included patients demographic information, dates of admission/discharge, post-hospitalization orientation, comorbidities, date of surgery, department, type of intervention, emergency and oncological indications, type of anesthesia, pre/post operative COVID-19 tests, post-operative

symptoms, COVID-19 specific intensive care unit (ICU) admission/death, symptoms among patients surroundings.

### Population

472 patients received 524 procedures between 13<sup>th</sup> March and 9<sup>th</sup> April 2020. Twenty-four (5 per cent) patients were lost of follow-up. Median time from surgery to status update was 35 days (range: 21-55). Patients' characteristics are presented in Table 1.

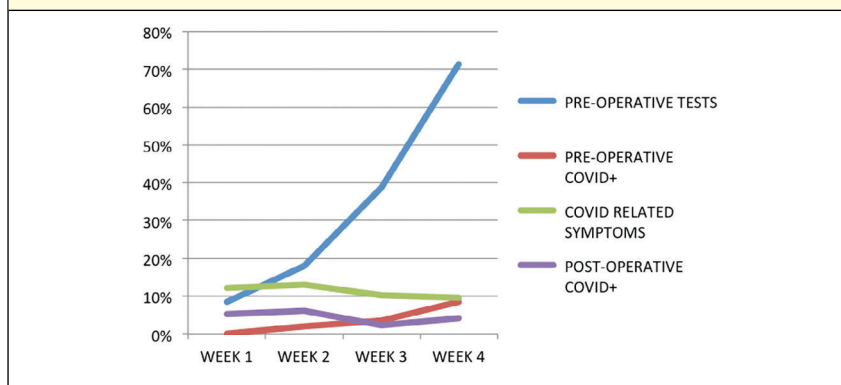
### COVID-19 before surgery

135/472 (29 per cent) patients had a pre-operative COVID-19. This rate increased along the 4-week period

**Table 1** Patients characteristics: entire cohort, preoperative COVID, non-COVID patients, postoperative COVID patients and comparison between non-COVID vs. postoperative COVID patients

Population	Total 472 (24 lost follow-up)	Preoperative COVID 13	Non COVID 439	Postoperative COVID 20	Non COVID vs Postoperative COVID p-value
<b>Gender ratio F/M</b>	189/283 (0.67)	2/11 (0.18)	177/262 (0.67)	10/10 (1)	0.529
<b>Age in years median (IQL)</b>	64 (50-74)	71 (58-77)	63 (49-74)	78 (66-87)	<0.001
<b>BMI in kg/m<sup>2</sup> median</b>	25 (22-18)	26 (26-28)	25 (22-28)	26(24-28)	0.527
<b>Comorbidities</b>					
Obesity	71 (16.9)	0 (0.0)	68 (17.3)	3 (21.4)	0.967
High Blood Pressure	199 (42.9)	7 (53.8)	180 (41.8)	12 (60.0)	0.269
Diabetes	96 (20.8)	4 (30.8)	86 (20.0)	6 (30.0)	0.427
Chronic Respiratory Failure	21 (4.6)	0 (0.0)	21 (4.9)	0 (0.0)	0.581
Chronic Cardiac Failure	41 (8.9)	0 (0.0)	36 (8.4)	5 (25.0)	<b>0.04</b>
Chronic Kidney Failure	66 (14.2)	3 (23.1)	56 (13.0)	7 (35.0)	<b>0.02</b>
Immunodeficiency	61 (13.2)	0 (0.0)	60 (14.0)	1 (5.0)	0.492
<b>Length of Hospital Stay in days Median (IQL)</b>	5 (2-12)	8 (4-18)	5 (2-11)	15 (6-28)	0.365
<b>Emergency Indications</b>	195 (41.3)	8 (61.5)	177 (40.3)	10 (50.0)	0.529
<b>Oncologic Indications</b>	149 (31.6)	3 (23.1)	141 (32.1)	5 (25.0)	0.672
<b>Department</b>					0.591
Cardiac	1 (0.2)	0 (0.0)	1 (0.2)	0 (0.0)	
Gastroenterology	120 (25.4)	3 (23.1)	111 (25.3)	6 (30.0)	
Neurosurgery	36 (7.6)	1 (7.7)	32 (7.3)	3 (15.0)	
Orthopedic	74 (15.7)	1 (7.7)	70 (15.9)	3 (15.0)	
Urology	63 (13.3)	4 (30.8)	57 (13.0)	2 (10.0)	
Visceral	49 (10.4)	0 (0.0)	49 (11.2)	0 (0.0)	
Vascular	49 (10.4)	1 (7.7)	44 (10.0)	4 (20.0)	
Plastic surgery	77 (16.3)	2 (15.4)	73 (16.6)	2 (10.0)	
Other	3 (0.6)	1 (7.7)	2 (0.5)	0 (0.0)	
<b>Type of Anesthesia</b>					0.283
General	341 (72.2)	12 (92.3)	318 (72.4)	11 (55.0)	
Spinal	11 (2.3)	0 (0.0)	10 (2.3)	1 (5.0)	
Local	113 (23.9)	1 (7.7)	104 (23.7)	8 (40.0)	
<b>COVID specific Intensive Care Unit Admission</b>	5 (2.1)	4 (57.1)	0 (0.0)	1 (5.0)	
<b>COVID specific Death</b>	3 (1.3)	0 (0.0)	0 (0.0)	3 (15.0)	

**Figure 1 Weekly description of the surgical population: pre-operative test rates (blue), pre-operative COVID-confirmed rates (red), post-operative COVID-related symptoms rates (green), postoperative COVID-confirmed rates (purple)**



(figure 1). Thirteen (10 per cent) were positive: 3 were pre-diagnosed ICU patients requiring surgery: 2 remained 31 and 36 days after surgery, 1 was discharged; 10 (7 per cent) were detected with a pre-operative test. One patient was admitted to ICU the day after surgery and discharged from hospital after 9 days. All of the 10 patients diagnosed from systematic tests were discharged, 4 developed symptoms but did not require ICU. No patient died.

### COVID-19 after surgery

54/448 (12 per cent) of patients developed COVID-19-related symptoms at a median time of 8 days post-surgery. Thirty-three were tested: 16 were positive. Sixty-nine asymptomatic patients received a post-operative test, 4 were positive. Overall, 20 patients from 101 tested had a confirmed COVID-19 after surgery. Positive postoperative test rate was 20 per cent, shifting from 6 per cent for asymptomatic patients to 48 per cent in case of symptoms. Within these 20 patients, 1 (0.5 per cent) was admitted in ICU 5 days after surgery. Three (15 per cent) patients died of COVID-19 (7, 15, 15 days after surgery). The overall post-operative COVID-19 specific ICU admission/death were respectively 0.2 per cent/0.7 per cent. COVID patients were significantly older (78 vs. 64 years old;  $p < 0.001$ ), had more chronic kidney

(35 per cent vs. 13 per cent;  $p = 0.02$ ) and chronic cardiac failure (25 per cent vs. 8 per cent;  $p = 0.04$ ) compared to COVID negative patients. There was no significant difference regarding other variables (Table 1).

### Evolution of preoperative COVID-19 negative population

122 patients were negative on systematic preoperative tests. Four (3 per cent) were lost of follow-up; 17/118 (14 per cent) developed COVID related symptoms at a median time of 11 days post-surgery. Fourteen were tested: 4 positive cases. Overall, 39 were tested post-operatively after a negative preoperative test, 5/39 (13 per cent) were positive (1 asymptomatic patient). None died or required ICU.

This study is the first to report on COVID-19 epidemic peak specific risk in a comprehensive surgical population.

Firstly, the COVID-19 specific death rate is limited but real (0.7 per cent). Surgeries during the epidemic should be maintained for emergencies and cancer-related surgeries. Secondly, the COVID-19 specific ICU admission rate was low (0.2 per cent). This point should reassure fears of adding stress to overwhelmed ICU. Thirdly, the contaminated population was significantly older, with more chronic kidney and cardiac failures. Alternatives to surgery

should be particularly considered when possible for these specific populations. Our results are consistent with recent reports (3-5).

The burden of surgery for COVID patients, with no death, looks better than the recent Lei et al study reporting a mortality rate of 20.5 per cent<sup>1</sup>.

Among the patients who received both pre/post surgery tests, 13 per cent turned positive. The concomitant national lockdown made extra-hospital contamination unlikely in this subgroup.

A. Ingels<sup>1</sup>, S. Bibas<sup>1</sup>, J. B. Da Costa<sup>1</sup>, A. Attias<sup>2</sup>, F. Brunetti<sup>3</sup>, N. De Angelis<sup>3</sup>, P. Desgranges<sup>4</sup>, C.-H. Flouzat-Lachaniette<sup>5</sup>, T. Folliguet<sup>6</sup>, T. Ivanov<sup>3</sup>, O. Langeron<sup>2</sup>, L. Lelde<sup>3</sup>, E. Levesque<sup>2</sup>, P. L. Corvoisier<sup>7</sup>, C. Marmorat<sup>1</sup>, F. Melendugno<sup>1</sup>, J.-P. Meningaud<sup>8</sup>, F. Mesli<sup>9</sup>, W. Paillusson<sup>1</sup>, S. Palfi<sup>10</sup>, L. Pedre<sup>1</sup>, D. Somacale<sup>3</sup>, C. M Champy<sup>1</sup> and A. de la Taille<sup>1</sup>

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<sup>1</sup>Department of Urology, Hôpital Henri Mondor – APHP, UPEC, Créteil, France,

<sup>2</sup>Department of Anesthesiology and Intensive Care, Hôpital Henri Mondor – APHP, UPEC, Créteil, France,

<sup>3</sup>Department of Visceral surgery, Hôpital Henri Mondor – APHP, UPEC, Créteil, France, <sup>4</sup>Department of Vascular surgery, Hôpital Henri Mondor – APHP, UPEC, Créteil, France, <sup>5</sup>Department of Orthopedic surgery, Hôpital Henri Mondor – APHP, UPEC, Créteil, France, <sup>6</sup>Department of Cardiac surgery, Hôpital Henri Mondor – APHP, UPEC, Créteil, France,

<sup>7</sup>INSERM, CIC 1430 - Hôpital Henri Mondor – APHP, UPEC, Créteil, France, <sup>8</sup>Department of Reconstructive surgery, Hôpital Henri Mondor – APHP, UPEC, Créteil, France, <sup>9</sup>Department of Gastroenterology, Hôpital Henri Mondor – APHP, UPEC, Créteil, France, and <sup>10</sup>Department of Neurosurgery, Hôpital Henri Mondor – APHP, UPEC, Créteil, France

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