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## **Impact of the first month of Covid 19 lockdown on oncologic surgical activity in the Ile de France region university hospital otorhinolaryngology departments.**

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**Abstract. Objective:** To evaluate the impact of the first month of lockdown related to the Covid 19 epidemic on the oncologic surgical activity in the Ile de France region university hospital otorhinolaryngology departments. **Material and Methods:** A multicenter prospective observational assessment was conducted in 6 university hospital otorhinolaryngology departments (Paris Centre, Nord, Est and Sorbonne) during the 1-month periods before (Month A) and after (Month B) lockdown on March 17, 2020. The main goal was to evaluate lockdown impact on oncologic surgical activity in the departments. Secondary goals were to report population characteristics, surgery conditions, postoperative course, progression of Covid status in patients and surgeons, and adverse events. **Results:** 224 procedures were performed. There was 10.9 % reduction in overall activity, without significant difference between departments. Squamous cell carcinoma and larynx, hypopharynx, oropharynx, oral cavity and nasal cavity and sinus locations were predominant, at 79% and 75.8 % of cases respectively, with no significant differences between months. T3/4 and N2/3 tumors were more frequent in Month B ( $p = .002$  and  $.0004$ ). There was no significant difference between months regarding surgical approach, type of reconstruction, postoperative course, tracheotomy and nasogastric feeding-tube time, intensive care stay or hospital stay. None of the Month A patients were Covid-19-positive, versus 3 in Month B, without adverse events. None of the otorhinolaryngologists involved in the procedures developed symptoms suggesting Covid-19 infestation. **Conclusion:** The present study underscored the limited impact of the Covid-19 epidemic and lockdown on surgical diagnosis and cancer surgery in the Ile de France university otorhinolaryngology departments, maintaining chances for optimal survival without spreading the virus. **Key-words:** Covid-19, cancer, otorhinolaryngology.

## **Introduction.**

In France, the first three cases of the Covid-19 epidemic, in patients of Chinese origin who had been staying in Wuhan, were diagnosed on January 24, 2020 (<https://fr.m.wikipedia.org>). On March 17, lockdown was implemented to combat the epidemic, and on March 25 the French Society of ENT (SFORL) published guidelines for head and neck cancer surgery [1].

The main aim of the present study was to assess the impact of this month of lockdown and of the SFORL guidelines in university hospital otorhinolaryngology (ORL) departments in the Ile de France region, where the epidemic was at its most severe. Secondary objectives were to report population characteristics, surgery conditions, postoperative course, progression of Covid status in patients and surgeons, and adverse events.

## **Material and Method.**

Six university hospital ORL departments in the Ile de France region (Paris Centre, Paris Nord, Paris Est and Paris Sorbonne) practicing oncologic surgery took part in a multicenter prospective observational study.

The main aim of the present study was to assess the impact of this month of lockdown and of the SFORL guidelines in university hospital otorhinolaryngology (ORL) departments in the Ile de France region, where the epidemic was at its most severe. Secondary objectives were to report population characteristics, surgery conditions, postoperative course, progression of Covid status in patients and surgeons, and adverse events. Review board approval was not sought, as the study did not come under French legislation for studies involving human subjects [2].

An Excel database (Appendix 1) available to each department to collate data on procedures performed during the month preceding (Month A: February 17 to March 17, 2020) and the month following (Month B: March 18 to April 18) initiation of lockdown. Procedures

comprised: procedures resulting in diagnosis of cancer (endoscopy-biopsy, tonsillectomy, adenectomy) and cancer resection and treatment of acute complications (tracheotomy for tumoral dyspnea, salivary leakage, radionecrosis). Diagnostic procedures (endoscopy) not resulting in diagnosis of cancer, functional surgery performed after cancer treatment (tracheostomy enlargement, dilation of post-treatment stenosis, implantation or change of vocal prosthesis, tracheotomy and laser treatment for post-treatment dyspnea, reconstructive surgery) as well as head and neck surgeries for benign tumor, precancerous pathology (dysplasia, in-situ carcinoma) or basal cell carcinoma were excluded. Data for included oncologic procedures comprised: patient data (age, gender, body-mass index, smoking status, Charlson comorbidity index [3]), tumor data (location, histology, T, N and M stage [4]), diagnostic or therapeutic, surgical approach (transcutaneous, transmucosal or mixed), type of lymph-node surgery, laryngotracheal axis treatment (laryngeal disobstruction, tracheotomy, permanent tracheostomy), postoperative course (complications, intensive care unit and department stay, tracheotomy time, nasogastric feeding tube duration, hospital stay), and type of surgical mask used. In Month B, data further comprised adverse events (modification or implementation of emergency surgery, unscheduled admission, major complications and/or Covid-19-related death) and Covid-19 status progression in patients and surgeons during the study period and the following month.

Inter-month comparison used Chi<sup>2</sup> or Fisher test for qualitative variables and non-parametric Mann-Whitney U test for quantitative variables, on StatView software (StatView, USA). The significance threshold was set at  $p=0.005$ , in line with improved scientific method [5,6].

## **Results.**

### ***1. Activity.***

224 oncologic procedures were performed, with a 10.9% decrease between Month A (118) and Month B (106). Progression varied between departments, with 15.7%, 24.2% and 23.3% decrease in 3 cases and 4.3%, 20% and 50% increase in the other 3 (Appendix 1), without significant difference ( $p = 0.76$ ).

Appendix 1 shows diagnostic procedures, with a 6.3% decrease (Month A: 47; Month B: 44). Progression varied between departments, with 14.2%, 33.3% and 50% decrease in 3 cases and 20% and 22.2% in 2; the other department had no diagnostic activity during the study period (Appendix 1). Again these differences were non-significant ( $p = 0.81$ ).

Appendix 1 shows therapeutic procedures ( $n=133$ ), with a 12.6% decrease (Month A: 71 - Month B: 62). Progression varied between departments, with 7.6%, 19%, 31.2% and 50% decrease in 4 cases and 20% and 83.3% increase in 2 (Appendix 1), without significant difference ( $p = 0.54$ ).

### ***2. Population, approaches, procedures and postoperative course.***

Table 1 shows the main population characteristics. T3/4 and N2/3 tumor was significantly more frequent in Month B (Table 1). Squamous cell carcinoma and larynx, hypopharynx, oropharynx, oral cavity, nasal cavity and facial sinus locations predominated, at respectively 79% (177/224) and 75.8% (170/224) of procedures (Appendix 1), without significant inter-month difference ( $p$  respectively 0.74 and 0.53).

There were no significant inter-month differences in surgical approach, lymph-node surgery, type of reconstruction, tracheotomy and permanent tracheostomy or in postoperative course in terms of complications and mortality (Table 2 – Appendix 1). Type of mask differed significantly ( $p < 0.0001$ ), with an increase in use of FFP2 masks from 11% (13/118) in Month A to 66.2% (66/106) in Month B. There were no significant differences in tracheotomy time or

nasogastric feeding, intensive care unit and department stay or hospital stay (Table 3, Appendix 1).

### ***3. Covid status, adverse events.***

Percentage nasopharyngeal swab and polymerase chain reaction (PCR) analysis on the eve of surgery varied significantly between months and departments ( $p < 0.0001$ ): from 10.1% in Month A to 33% in Month B (Table 1) and 5.6%, 10%, 10.3%, 17.1%, 18.1% and 40.4% according to department (Appendix 1). No Month A patients were Covid-19-positive, versus 3 in Month B (Appendix 1). The first of these 3 was asymptomatic, scheduled for petrectomy and parotidectomy, and had negative PCR on eve of surgery. At day 6, the surgeon was informed that the examination was in fact slightly positive; PCR at discharge was negative. The patient was readmitted on day 17 for local superinfection, with PCR again positive and becoming negative during the hospital stay. The second patient had suggestive Covid-19 symptomatology and positive PCR at eve of surgery scheduled for glossectomy with free flap and neck dissection, which was therefore postponed for 2 weeks. PCR was still slightly positive at eve of surgery, but the operation was maintained due to increased tumor volume and absence of respiratory symptoms. The third patient had moderate pulmonary pathology and underwent salvage total pharyngolaryngectomy with free flap after a 2-week postponement. The other 291 patients did not develop signs of Covid-19 during the study period or following month; nor did the senior and junior physicians involved in surgery.

### **Discussion.**

The prospective study in more than 500 Chinese hospitals published in *Lancet Oncology* in March 2020 was the first analysis of the relation between Covid-19 and cancer, and suggested that persons with or treated for cancer (mainly lung or colorectal) showed extra risk of viral

infection and of severe disease, especially in case of chemotherapy or surgery in the month preceding infection [7]. In China, these findings led to guidelines advocating changing certain practices during the epidemic in digestive and lung cancer patients, with 2 main aims in view: to limit high-risk situations such as surgery, and to limit contact, especially with health-care establishments. At the same time, several societies, groups and associations specializing in head and neck cancer surgery put forward various advice [1,8-18]. The first idea was a form of triage, adapting the interval to surgery according to the potential danger of the cancer. The second was to reduce head and neck oncologic surgery activity so as to be able to concentrate anesthesiology personnel and equipment on intensive care units that were experiencing exponential rises in admissions due to Covid-19. The third, given a threatened shortage of protective equipment (gloves, masks, etc.), was to protect ENT physicians against possible infection, ENT and head and neck surgery being at high risk of transmission due to tracheotomy and mucosal resection near infected areas.

By comparing data for the months preceding and following the start of lockdown on March 17 from six hospital departments, the present study reflects the impact of lockdown and of the SFORL guidelines [1] on the practice of head and neck oncologic surgery in university hospital departments in the Ile de France region, where the Covid-19 epidemic was most rife. The first finding was that head and neck oncologic surgery was relatively stable in these departments over the two months straddling the start of lockdown, with an overall fall of 10.9%. The decrease was 6.3% for diagnostic procedures and 12.6% for therapeutic procedures, without significant differences between the two time periods or the six departments; nor did it involve any particular change in clinical profile, with 79% squamous cell carcinoma (Table 1) located for 75.8% in the larynx, hypopharynx, oropharynx, oral cavity or nasal cavities and facial sinuses (Appendix 1). These data, and the fact that T3/4 and N2/3 tumors were significantly more frequent in Month B (Table 1) testify in our opinion to the effort made by surgery teams to



avoid any adverse impact on survival of delaying treatment for these tumors [19-21], given that most head and neck cancers double in volume within 1 to 3 months [22] and that the first month of lockdown in France witnessed a dramatic fall in community ENT consultations, which are where the vast majority of such tumors are first detected; community ENT physician in Réunion Island reported a mean decrease of 75.6% in their consultations over this period [23]. Months A and B did not significantly differ in surgical approach, neck dissection, type of reconstruction, postoperative course, complications rate and mortality, intensive care stay, tracheotomy time and nasogastric feeding time, or hospital stay (Table 3 – Appendix 1), confirming the commitment of the surgery teams participating in this prospective study, who did not fundamentally alter their management of cancer and patients during the epidemic. Secondly, although two studies [24,25] reported a decrease in the use of micro-anastomosed free flaps for reconstruction, the present data point to no adverse effects (Table 2). And a third finding of interest was the absence of symptoms suggestive of Covid-19 infection over the study period and following month in the 221 patients uninfected at the beginning of the study period and in the senior and junior surgeons involved in the 224 procedures, testifying in our opinion to good management of the epidemic within the hospitals of the participating departments. It is notable in this regard that a lack of protective masks, feared at one point, did not in fact affect the head and neck surgery departments and that the significant change ( $p < 0.0001$ ) in the type of mask used by the surgeons in the 224 procedures, with FFP2 mask use increasing from 11% in Month A to 66.2% in Month B, was due not to equipment shortage but to individual choice, as seen in the significant variation ( $p < 0.0001$ ) in type of mask when comparing the six departments.

These positive findings should be weighed against the fact that only 1.3% of the patients operated on during the study period (n=3) were affected by the virus. The treatment these 3 patients received, detailed in the result section, was in line with the SFORL guidelines [1], which recommend deferring surgery in Covid-19-positive patients and adapting the delay to the

potential gravity of the cancer, and allowed for successful management of the tumors without any adverse event.

### **Conclusion.**

The present data highlight that the Covid-19 epidemic and March 17 lockdown only very slightly impacted the cancer surgery care pathway in the university hospital ORL departments in the Ile de France region, protecting patients' chances of survival, without spreading the virus. The data support the decentralized strategy operating in the hospitals involved in the study, and validate the SFORL guidelines. They suggest that surgical management of head and neck cancer should be pursued along the same lines in case of a second wave of the epidemic in Ile de France.

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Appendix 1: Excel database

**Table 1:** Main clinical characteristics of the study population (M: median; RT: radiation therapy; H&N: head and neck; SCC: squamous cell carcinoma; \*: distribution based on therapeutic procedures).

	<b>Global</b>	<b>Month A</b>	<b>Month B</b>	<b>P</b>
<b>Gender (female/male)</b>	65 / 159	38 / 80	27 / 79	0.30
<b>Age (years)</b>	18-92 - M:63	18-92 - M:64	29-85 - M:63	0.92
<b>Body-mass index</b>	13-39 - M:24	13-37 - M:23	13-39 - M:25	0.037
<b>Smoking</b>				
Pack-years	0/150 - M:28	0/100 - M:26	0/150 - M:30	0.46
Active (yes/no)	68/50	34 / 80	34 / 70	0.66
<b>Comorbidity</b>				
Charlson index [2]	0-10 - M:2	0-10 - M:2	0-8 - M:2	0.26
H&N cancer (yes/no)	46/178	31/87	15/ 91	0.031
Non-H&N cancer (yes/no)	39/185	20/96	19/87	0.86
Cervical RT (yes/no)	18/206	11/107	7/99	0.62
<b>Type of cancer</b>				
SCC (yes/no)	177/47	99/26	85/21	0.74
T (1 and 2/3 and 4)*	76/38	48/12	28/26	<b>0.002</b>
N (0 and 1/2 and 3)*	103/27	63/6	40/21	<b>0.0004</b>
M (0/1)*	124/6	68/1	56/5	0.098
<b>Initial Covid status</b>				
Not tested/negative/positive	177/44/3	106/12/ 0	71/32/ 3	<b>&lt; 0.001</b>

**Table 2:** Procedures (PB: parotid biopsy; UND: unilateral neck dissection; TM: transmucosal; TC: transcutaneous; MX: mixed transmucosal-transcutaneous; BND: bilateral neck dissection; TRS: permanent tracheostomy; TRT: tracheotomy; LD: laryngeal disobstruction; MAF: micro-anastomosed flap, PMF: pediculated muscle flap; LF: local flap; FF: free flap).

	<b>Global</b>	<b>Month A</b>	<b>Month B</b>	<b>P</b>
<b>Diagnostic</b>				
Endoscopy/tonsillectomy	81/3	44/1	37/2	0.59
Adenectomy/UND/BP	7/2/1	2/1/1	5/1/0	-
<b>Therapeutic</b>				
<b>Tumoral</b>				
Approach (TO/TM/MX)	43/29/39	24/16/21	19/13/18	0.033
Trachea (TRS/TRT/LD)	28/18/1	14/9/0	14/9/1	0.61
<b>Nodal</b>				
Yes/non	85/48	43/28	42/20	0.46
Adenectomy/UND/BND	14/26/45	7/11/25	7/15/20	0.56
<b>Reconstruction</b>				
Yes/no	35/98	16/55	19/43	0.32
LF/PMF/MAF/FF	12/10/9/3	4/5/5/2	8/5/4/1	0.64



**Table 3:** Postoperative course (M: median).

	<b>Global</b>	<b>Month A</b>	<b>Month B</b>	<b>P</b>
<b>Postoperative course</b>				
Simple/complicated	33/191	17/101	16/90	0.99
ENT complications (yes/no)	21/203	11/107	10/96	0.99
General complications (yes/no)	16/208	8/110	8/98	0.99
Death (yes/no)	3/221	2/116	1/105	0.99
<b>Times (days)</b>				
Intensive care service	0/7 M:0	0/7 M:0	0/5 M:0	0.83
Intensive care unit	0/4 M:0	0/2 M:0	0/4 M:2	0.86
Tracheotomy	3/31 M:8	3/31 M:10	4/14 M:8	0.57
Nasogastric intubation	2/42 M:13	2/34 M:12	3/42 M:13	0.35
Hospital stay	1/45 M:3	1-45 M:3	1-45 M:3	0.46