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Original article

Surgery under COVID: An observational study

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ABSTRACT

Aim: To evaluate the surgery program strategy adopted in an adult otorhinolaryngology and head and neck surgery department in an area badly affected by the Covid-19 epidemic peak. The main objective was to analyze the reasons for not cancelling surgeries and the postoperative course of operated patients. The secondary objective was to assess the situation of postponed patients.
Material and Methods: A single-center observational study carried out during the COVID-19 period in France included 124 patients scheduled for surgery during the period March 21-May 20, 2020. The number and nature of operations, both performed and postponed, were reviewed.
Results: A total of 54.0% patients were operated on during the COVID period and 46.0% were postponed. Operations were maintained in urgent or semi-urgent cases. The operated patients did not show any signs of infection during their hospital stay. A total of 29.8% of postponed patients were lost to follow-up and 49.1% were rescheduled.
Conclusion: The application of national and international recommendations minimized the risk of loss of chance for operated patients without increasing the risk of contamination. The postponement of canceled operations resulted in considerable loss to follow-up. Intensified follow-up is necessary for these patients.

1. Introduction

The novel 2019 coronavirus disease (COVID-19) is a highly contagious zoonosis caused by SARS-CoV-2 with human-to-human transmission by respiratory secretions [1]. The disease broke out in December 2019 in Wuhan, China (https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline#event-0), and went on to become a worldwide pandemic [2]. In France, the first confirmed case was diagnosed late January 2020 [3]. Subsequently, the eastern and Paris regions (Grand-Est and Île-de-France) were the most badly affected (https://www.santepubliquefrance.fr/maladies-et-traumatismes/maladies-et-infections-respiratoires/infection-a-coronavirus/documents/bulletin-national/covid-19-point-epidemiologique-du-21-mai-2020). Infected patients mostly develop a benign respiratory disease but at-risk populations such as the elderly, overweight or cancer patients are exposed to severe clinical forms [4].

Given the rapid spread of the virus, the French authorities asked for all non-urgent surgery to be postponed so as to reserve enough health resources for a massive influx of patients (*ARS, COVID-19 prise en charge chirurgicale*: https://www.iledefrance.ars.sante.fr/coronavirus-covid-19-information-aux-professionnels-de-sante). Even so, for pathologies such as cancer that require timely treatment, "minimal" theater access could be conserved in some hospitals to ensure reasonable times to treatment. In this unprecedented situation, several scientific societies (https://www.entnet.org/content/otolaryngologists-and-covid-19-pandemic) and expert groups published guidelines [5–7] to protect patients and care-staff.

The present article assesses the hospital management of patients initially scheduled for surgery during what turned out to be the peak period of the epidemic. The main objective was to analyze reasons for not postponing surgery and assess the postoperative course of patients actually operated on in an adult university ENT and head and neck surgery department. The secondary objective was to assess the situation of postponed patients.

2. Material and Method

This single-center cross-sectional observational study included 124 scheduled patients who were operated on or postponed during the COVID-19 peak, between March 21 and May 20, 2020, in an adult university hospital ENT department in Paris, France. There were no exclusion criteria. Clinical or biological data on

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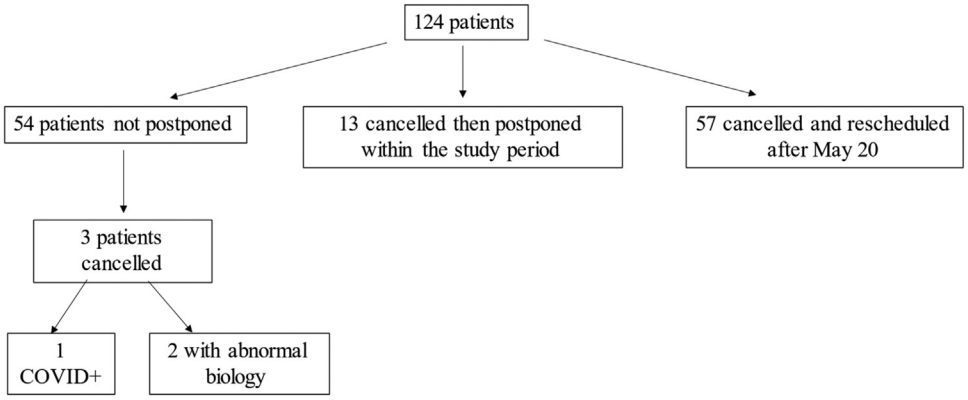

Fig. 1. Flowchart.

Table 1
Patient characteristics.

	Total (%)	Postponed (%)	Postponed and operated on (%)	Operated on as scheduled (%)
Patients	124 (100)	57 (100)	13 (100)	54 (100)
Age (years)				
Median	52	41	54	57
Range	17–92	17–83	41–64	20–92
Gender				
F	45 (36.3)	23 (40.4)	6 (46.2)	16 (29.6)
M	79 (63.7)	34 (59.6)	7 (53.8)	38 (70.4)
Pathologies				
Benign	99 (79.8)	56 (98.2)	13 (100)	30 (55.6)
Malignant	25 (20.2)	1 (1.8)	0	24 (44.4)
Surgeries	130 (100)	57 (100)	13 (100)	60 (100)
Type				
Otology	20 (15.4)	18 (31.6)	1 (7.7)	1 (1.8)
Rhinology	26 (20.0)	16 (28.1)	4 (30.7)	6 (10.0)
Tracheostomy	3 (2.4)	0	0	3 (5)
Head and neck	52 (40.0)	17 (29.8)	6 (46.2)	29 (48.3)
Endoscopy	22 (16.9)	2 (3.5)	1 (7.7)	19 (31.6)
Laryngology	5 (3.8)	4 (7.0)	1 (7.7)	0
Traumatology	2 (1.5)	0	0	2 (3.3)
Urgency				
Group A	5 (3.8)	0	0	5 (8.3)
Group B	57 (43.8)	0	9 (69.2)	48 (80.0)
Group C	68 (52.4)	57 (100)	4 (30.8)	7 (11.7)

COVID-19 status, patient age, gender, type of surgery, urgency and postoperative course were collected prospectively, and recorded anonymously to respect the rules of data privacy, either retrospectively for March and April or prospectively for May.

Three types of operation were distinguished according to urgency, following Couloigner et al. [6]. Surgical indications and reports were discussed in a departmental meeting for validation. Patients operated on between March 21 and May 20 were contacted by a department physician by telephone 72 and 48 h before surgery to screen for signs of COVID-19 infection: temperature > 38 °C, cough, myalgia, anosmia/ageusia, and/or digestive disorder. Patients with positive signs were cancelled and asked to come for a PCR test (Fig. 1). As of April 3, all scheduled patients received a PCR test in the hospital on the eve of surgery. Only patients with negative test results were operated on. No surgeries were performed without PCR results. Patients whose operation was postponed were contacted by the department secretaries and physicians during the 4 months following the study period. After 5 unsuccessful calls, patients were deemed lost to follow-up.

As the present study did not impact treatment, local review board (CERAPHP.5) approval was not required under French law (Act No. 2012-300 of March 5, 2012).

The main aim of the study was to analyze the reasons for maintaining the scheduled surgery and the postoperative course. The secondary objective was to assess the situation of patients whose surgery had been postponed, 4 months after the study period. A descriptive analysis was performed of the reasons for maintaining the scheduled surgery between March 21 and May 20 and of the patients' COVID-19 status. Secondly, the situation of patients whose surgery had been postponed was analyzed.

Data were entered on an Excel spreadsheet. Three patient groups (operated on as scheduled, postponed and operated on, and postponed and not yet operated on) were compared statistically on criteria of age, gender and benign/malignant status. Pairs of non-matched groups were compared on Student test for quantitative data and on Fisher test for qualitative data. The significance threshold was set at $P < 0.005$ [8,9].

3. Results

A total of 124 patients were included (Fig. 1). 53.8% of surgeries (70/130) were postponed during the study period.

3.1. Reasons for maintaining the scheduled surgery and postoperative course

A total of 88.3% of maintained procedures (53/60) concerned pathologies of urgency level A or B. 44.4% (24/54) concerned cancer;

Table 2
Symptomatology in postponed patients.

COVID symptomatology	Patients	%
No symptoms	41	71.9
No response to phone-call	8	14.1
Operated on, PCR-	4	7.0
Symptomatic	4	7.0

Table 3
Situation of postponed patients.

Situation	Patients	%
Postponed and operated on	28	49.1
Lost to follow-up	17	29.8
Postponed and not yet operated on	12	21.1

these patients had a mean Charlson score of 5.24. 69.2% of patients first cancelled then postponed to the end of the study period (9/13) were level B (requiring reassessment at 1 month) (Table 1).

Three of the patients for whom surgery was maintained were COVID-19-positive on preoperative PCR (2 symptomatic, 1 asymptomatic), with head and neck cancer. One underwent emergency tracheostomy, and the other 2 were finally postponed. The first patient died of COVID; the other 2 showed weakly symptomatic forms of the disease.

The patient groups postponed and operated on and postponed and not yet operated on were statistically comparable for age, as were the groups operated on as scheduled, postponed and not yet operated on ($P < 0.005$), whereas the groups operated on as scheduled and postponed and operated on were not comparable ($P > 0.005$). None of the groups were comparable for gender. The benign and malignant groups were not comparable ($P > 0.005$).

No patients were infected while in hospital. All were followed up on days 7 and 14 and were free of suspect symptoms.

3.2. Situation of postponed patients

Patients postponed beyond the study period were those with less urgent pathologies (level C) scheduled for functional surgery. These patients were rescheduled during follow-up. Table 2 shows clinical symptoms suggesting COVID infection in patients postponed during the study period. Only 1 symptomatic patient had a negative PCR test.

Table 3 presents the situation of postponed patients 4 months after the study period. Patients postponed beyond the study period were operated on in the department at a mean 2 months after the study period.

4. Discussion

The COVID-19 crisis was an unprecedented situation requiring hospitals to quickly reorganize to be able to give priority to infected patients. Certain surgeries, however, could not be postponed, and protective measures were undertaken for patients and staff.

In our department, 44.4% of patients operated on as scheduled had head and neck cancer. Their mean Charlson score was > 5: i.e., at greater risk of severe forms if infected [10]; protective measures were therefore vital. The protocol of clinical screening followed by systematic PCR ahead of admission seems to have prevented inter-patient contamination. No patients developed clinical symptoms in hospital or on returning home. These findings are in agreement with those of Laccourreye et al. [11], who validated this hospital strategy for patients requiring prompt surgery.

The organizational strategy also succeeded in limiting contact between infected and other patients, while maintaining close surveillance. Even so, certain situations raise questions. One COVID-positive patient was rescheduled at 3 weeks after the original date, in line with current guidelines [12]. He had a cancer of the tongue, which grew progressively during this wait time. When finally admitted, his PCR test was weakly positive; should he have been considered contagious, or was this just a relic of inactive viral genome [13]? Theoretically, this question would require viral culture [14]. After discussion with our virologists, given the resolution of symptoms and the 3-week latency (several studies reporting symptom regression at days 9 to 10 with PCR becoming negative within 11 days [15,16]), this patient was considered cured, and surgery could be performed.

The patient undergoing emergency tracheostomy died 4 days after surgery due to multi-organ failure caused by COVID-19. He showed lung and bone metastases of an oral cavity cancer. The decision to perform tracheostomy in a COVID-positive patient with incurable cancer is debatable. Tracheostomy is now known to incur a high risk of COVID-19 contamination in care-staff [17]. Even so, it seemed unacceptable not to treat this patient, who was suffering from acute laryngeal dyspnea with hypoxemia.

Surgical cancellations in or department during the COVID-19 period seemed to have little impact on the management of head and neck cancer with surgery scheduled during the study period. Apart from 1 patient whose operation was cancelled due to COVID infection and 2 others cancelled for medical reasons, surgeries were performed within 1 month, as recommended in French ENT guidelines [6]. In contrast, the health crisis strongly impacted specialties performing functional surgery, as described by Hervochon et al. [18]. In our adult general ENT department, 56.5% of operations were postponed, and in 59.7% of functional otologic or rhinologic cases in less elderly patients. Even so, some of the postponed patients had pathologies requiring surgery within a month. 69.2% of patients postponed and operated on had group B pathology and were rescheduled during the study period without serious surgical consequences. 29.8% of patients postponed and not operated on during the study period did not get back in touch to reschedule, despite reminders. On the other hand, 49.1% of postponed patients were rescheduled within 4 months of the study period. This delay led to a drop in activity for the department and a post-crisis bottleneck in theater, with delayed scheduling. The aim in coming weeks will be to make sure that patients managed for pathologies requiring prompt surgery are scheduled with short wait times without unduly delaying scheduling for patients who had been postponed.

5. Conclusion

Implementing national and international guidelines allowed adapted management of cancer patients, minimizing loss of chance without increasing the risk of infection. Patients whose surgery was postponed had pathologies that nevertheless required regular monitoring and, in some cases, rescheduling in priority at the end of the health crisis. This reorganization also needs to avoid delaying treatment for new patients with urgency-level A or B pathology.

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Disclosure of interest

The authors declare that they have no competing interest.

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