

# Impact of COVID-19 on Head and Neck Carcinoma

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The COVID-19 pandemic has significantly impacted all public life and the global economy. Since its discovery, the disease has spread rapidly, which led to an unprecedented public health crisis and the adoption of extreme measures to limit community and hospital spread. As a result of a confluence of extraordinary circumstances caused by this pandemic, the doctrines of treatment for patients with head and neck carcinoma had to be reanalyzed, guaranteeing the well-being of both patients and health professionals as well as society itself.

Keywords: head and neck cancer ; COVID-19 ; treatment ; impact

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## 1. Introduction

In December 2019, an outbreak of pneumonia of unknown origins broke out in the Chinese province of Wuhan, raising general concerns due to the ease of transmission. After numerous studies and after identification, this pathogen was named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) by the Coronavirus Study Group, and the disease was named coronavirus disease 2019 (COVID-19) <sup>[1][2]</sup>. On 11 March 2020, the World Health Organization (WHO) declared COVID-19 as a pandemic, significantly impacting all public life, students, professionals, and the global economy <sup>[3][4]</sup>.

Since its discovery, there has been a rapid spreading of the virus that has led to an unprecedented public health crisis and the adoption of extreme measures to limit community and hospital contamination <sup>[5]</sup>. Within a few weeks, the virus spread to other Asian countries, Europe, America, and finally to the whole world <sup>[6]</sup>.

With a public health emergency continually testing the resilience of health systems around the world, health professionals must have quality evidence to identify risky behaviors, as well as prioritize resources where they are most needed <sup>[7]</sup>. This difficulty of balance between providing the patient with the necessary treatment and minimizing personal contact was felt in all medical practices. Many physicians from all areas and countries were faced with the difficult task of deciding which patients would be screened for surgery in the future and which patients would continue to be treated immediately <sup>[8]</sup>.

Thus, head and neck surgeons were placed in a particularly difficult situation because head and neck cancers are heterogeneous pathologies that can not only be empirically managed: instead, they rely on a multidisciplinary approach. Furthermore, these are pathologies with rapid progression and, if treatments are not carried out, can increase the burden on health systems in the long term <sup>[9]</sup>. Thus, over the world, virtual consultations were prioritized, patient screening was implemented, as well as therapeutic adjustments and postponement of surgical treatments <sup>[9]</sup>. Hence, managing head and neck cancer can be difficult and challenging. In times of pandemic, the adversities are multiple and varied. It is important to understand the real impact of the COVID-19 pandemic on treatment paradigms and how the benefits of social isolation were balanced against the potentially deleterious effects of delays in interventions.

## 2. Impact of the Pandemic on Patients and Healthcare

The demographic characteristics of the patients, age and the proportion of male and female patients admitted in the pandemic and pre-pandemic periods were compared, and no statistically significant differences were found in any of the studies <sup>[10][11][12][13][14]</sup>, with the exception of the studies published by Wai et al. and Riemann et al., whose sample of patients undergoing head and neck surgery during the pandemic was significantly older when compared to the previous year. The authors did not find any justification for this result regarding the age of the admitted patients <sup>[11][15]</sup>.

Regarding the number of persons infected by COVID-19, this was a variable that naturally depended on the implemented testing capacity. Patients whose COVID-19 was detected in the preoperative test had their treatment postponed <sup>[10][13][14]</sup>, always having considered that the delay must be adapted to the severity of the cancer <sup>[13]</sup>. Studies carried out by

Tevetoglu et al., Akhtar et al., Salzano et al., and Batra et al. revealed that all patients undergo PCR testing before being admitted [10][14][16][17]. In some studies, tests were limited, as in the case of the study by Wai et al., in which only a survey about the symptoms was carried out and then some patients did a PCR test. Note that the study by Wai et al. refers to a pandemic period of only one month and in a very preliminary phase of the pandemic [11].

More focused on the impact of the pandemic on patients, some of the studies seek to assess the influence of the pandemic on the TNM classification and on the general stage of admitted patients. The article by Tevetoglu et al. demonstrated a statistically significant increase in patients with T3–T4 tumors when compared to the same period last year. However, they found no differences regarding regional lymph node metastases [10]. Lactourreye et al. found significant differences regarding both the size of the main tumor and the affection of regional lymph nodes since T3–T4 and N2–N3 tumors were significantly more frequent in the pandemic period [13]. These findings allow researchers to unveil that there were already some countries, namely Turkey and France, in which the impact of the pandemic has been felt in patients present at the hospital since the number of patients with the disease in a more advanced phase was significant [10][13].

Regarding the general stage of the disease, there are two analytical studies that explored this issue: those by Wai et al. and Kiong et al. [11][12]. Only Wai et al. presented a significantly higher percentage of patients with more advanced stages of the disease (III and IV), even though no statistically significant differences were found regarding the TNM classification [11]. Another study showed that surgery for head and neck tumors should be scheduled in a timely manner due to the possible increase in tumors' volume between one and three months, potentially compromising the airways and increasing the risk of bleeding, with delays resulting in disease progression [18]. These differences can be justified as an attempt by these countries to admit patients in an advanced locoregional state to avoid potential consequences on their individual survival [13].

Regarding surgeries, it is essential to assess the total surgical volume, which includes diagnostic surgeries, reconstructions, neck dissection surgeries, surgical ablations, transoral robotic surgery, and minor surgical procedures, such as surgical hemostasis or fistula closure. The studies of Wai et al., Laccourreye et al., Akhtar et al., and Salzano et al. compared the total number of surgeries with the pre-pandemic period [11][13][16][17]. The data were far from revealing homogeneity. In the study of Wai et al., there was a statistically significant increase in the number of transoral robotic surgeries and local reconstructions and a statistically significant decrease in the number of thyroidectomies, and all other procedures did not vary significantly [11]. In the study by Lactourreye et al., no significant variation was felt in the surgical volume, confirming the idea that these institutions in the Ile de France region managed to maintain some normality and stability in the treatment of patients without the pandemic having a significant impact [13]. The same did not happen in the studies by Akhtar et al. (India) and by Salzano et al. (Italy), which showed different conclusions. In both studies, there was a statistically significant increase in the proportion of head and neck surgical procedures performed in the 2020 period when compared to 2019 [16][17].

Another aspect that becomes important to compare is the reconstruction surgeries. Major oncologic surgeries of the head and neck often require reconstructive surgeries, more complex procedures, even in non-pandemic situations [19]. Four studies investigated the numbers of reconstructive surgeries [10][11][13][14], and three of those noted significant differences when comparing the numbers before and after COVID-19.

In the study by Tevetoglu et al., there was a significant increase in the number of reconstructive surgeries in cases of oral cancer and, in the study by Wai et al., in cases of head and neck cancer. In these studies, the increase in patients with more advanced cases was also statistically significant [10][11]. It is expected that the more advanced the stage or classification, the greater the surgical excisions and, therefore, the need for reconstruction [10].

On the other hand, Batra et al. revealed a different perspective, with a statistically significant decrease in the number of reconstructions performed [14]. Thus, it is worth noting that this was the only study in the pandemic period, although this difference was not statistically significant, that admitted a higher percentage of patients with T1–T2 tumors and therefore required fewer reconstructive surgeries since cases were selected earlier, to reduce both the time of surgery and to test the reliability and functioning of the designed system to face the pandemic [14].

Specifically, on diagnostic procedures, the study by Riemann et al. presented a statistically significant reduction in the number of diagnoses of suspected lesions, which the authors attributed to the discontinuation of follow-up/routine visits of the patients with head and neck cancer, which in addition to causing a decline in procedures and diagnoses, may result in a longer delay before the diagnosis of a recurrence [15]. The percentage of patients with recurrent disease and with a history of pre-surgical treatment admitted as well as postoperative complications during the pandemic period did not

significantly differ when compared to the pre-pandemic period <sup>[11][12][13][14][16]</sup>, revealing there was no change in the management of these patients.

About the variable “time between the first appointment up to the surgery”, only Wai et al. found significant changes, reporting a decrease in the waiting time from the first hospital admission to surgery, which is valid only in cases where the procedure performed was surgical ablation. It most likely resulted from the reflection of the decrease in patients treated for non-malignant pathologies, such as lipomas or sialadenitis <sup>[11]</sup>. About the “time until the first appointment”, Tevetoglu et al. found significant differences in the time elapsed from the first symptom to the first admission when comparing patients admitted in 2020 and in 2019. In the Turkish study, patients took longer to seek health care <sup>[10]</sup>.

Regarding the length of stay in the hospital <sup>[11][13][14][20]</sup>, there was no statistically significant difference in the length of stay, apart from the study by Batra et al., which attributed the increase to an average of three days of waiting time for a PCR test result, which in some circumstances was inconclusive and required repetition, increasing the length of stay in the hospital <sup>[14]</sup>.

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