sciendo

DOI: 10.2478/rjr-2024-0026

Romanian Journal of Rhinology, Volume 14, No. 56, October - December 2024

ORIGINAL STUDY

Comparison of histopathological diagnoses of ENT diseases in the COVID-19 pandemic with other periods

Suheyla Kandemir[1], Ahmet Erim Pamuk[2], Tuba Yigit[3]

[1]Department of Otorhinolaryngology, Kırıkkale University, Faculty of Medicine, Kırıkkale, Turkey

[2]Department of Otorhinolaryngology, Hacettepe University, Faculty of Medicine, Ankara, Turkey

[3]Department of Medical Pathology, Kırıkkale Yüksek İhtisas Hospital, Kırıkkale, Turkey

ABSTRACT

OBJECTIVE. It is aimed to reveal the frequency of histopathological diagnosis in ENT diseases during the COVID-19 period and whether it is different from diagnoses in other periods.

MATERIAL AND METHODS. The files of 1442 patients diagnosed with pathological material in the ENT clinic between 2017 and 2022 were retrospectively scanned. Two groups were created: the 1st group of patients between 2017-2019 (non-COVID-19 period) (Group 1) and the 2nd group of patients between 2020-2022 (COVID-19 period) (Group 2).

RESULTS. Pathological samples were sent from 1163 patients in Group 1 and from 279 patients in Group 2. Of 1442 patients, 815 were male and 627 were female, and the mean age was 25 (3-94 years). There was a statistically significant difference between the groups in terms of age (p=0.001). There was no significant difference in terms of gender (p=0.756). The most common histopathological diagnoses in both periods were chronic tonsillitis lymphoid hyperplasia (bilateral tonsillectomy + adenoidectomy) (19.5%), chronic inflammation lymphoid hyperplasia (adenoidectomy) (19.3%) and nasal polyp (19.2%). The incidence of malignant tumors was found to be 1.4% in Group 1 and 2.8% in Group 2. The incidence of benign tumors was found to be 7.6% in Group 1 and 12.8% in Group 2. In terms of frequency, the ratio of malignant and benign tumors was higher in Group 2.

CONCLUSION. The number of patients with histopathological diagnoses decreased due to the decrease in hospitalizations during the COVID-19 period. Delayed diagnosis in malignant pathologies significantly worsens the prognosis. All these results show that new cancer diagnostic strategies are needed for epidemic diseases such as COVID-19.

KEYWORDS: COVID-19, otolaryngology, histology, pathology.

INTRODUCTION

A novel coronavirus, SARS-CoV-2, first appeared as an outbreak in Wuhan, China, in December 2019[1]. The disease has spread worldwide, causing an ongoing pandemic and becoming a global health problem[2,3]. COVID-19 mainly causes lung infection. It causes cough, fever, and malaise, but other symptoms in the body have been reported[1]. The course and symptoms of COVID-19 can vary significantly from asymptomatic disease to very severe clinical progression[4].

The COVID-19 pandemic has reduced patient access to healthcare, impacted diagnosis and treatment of diseases, and strained healthcare system capacity worldwide[5]. As of March 2020, many countries have made statements demanding a reduction in the intensity of elective surgery to protect surgical staff and health resources.

The first COVID-19 positive patient in our country was seen on March 11, 2020. Since the isolation of the new type of coronavirus, research on COVID-19 disease has begun in many countries. There are many issues regarding the COVID-19 disease that have not yet been clarified.

In this study, it is aimed to discuss the frequency of histopathological diagnoses in the COVID-19 period and whether it is different from the diagnoses in other periods in the light of literature information. Critical

Corresponding author: Suheyla Kandemir, Instructor, M.D., Kırıkkale University Faculty of Medicine, Department of Otorhinolaryngology, 71450, Kırıkkale, Turkey
ORCID: https://orcid.org/0000-0003-3354-2212
e-mail: dr.suheyla_bostan@hotmail.com
Received for publication: July 17, 2024 / **Accepted:** September 5, 2024

analysis of such data is necessary to provide rapid diagnosis and treatment to our patients in the event of a possible future outbreak.

MATERIAL AND METHODS

Patients diagnosed with pathological material in the Otorhinolaryngology (ENT) Department of a secondary health care institution between 2017 and 2022 were included in the study. Two groups were formed by scanning the files of the patients retrospectively. Group 1 consisted of patients between 2017-2019 (non-COVID-19 period) and Group 2 consisted of patients between 2020-2022 (COVID-19 period). Histopathological diagnoses of the patients were recorded. Patients whose histopathological diagnosis could not be reached were excluded from the study.

The steps of the standard histopathological examination applied in our routine are: macroscopic examination and formalin fixation, decalcification process when necessary, sampling of samples, follow-up process (with automatic follow-up device), embedding of the tissues in paraffin block, preparation of sections (4-5 micrometres thick), staining of the sections with Hematoxylin & Eosin (HE) and finally, examination of HE stained sections under a light microscope.

This study was approved by the Kirikkale University Non-Interventional Clinical Research Ethics Committee (Approval Date: June 8, 2022; No. 2022.05.26).

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows v.25.0 (IBM Corp., Armonk, NY, USA) and Microsoft Excel (Microsoft Corp., Redmond, WA, USA). Shapiro-Wilk test and Normal distribution parameters were used to assess the normality of data distribution. Nominal categorical variables were compared with Fisher's exact test and chi-square test. Nonparametric variables were evaluated with Kruskal-Wallis and Mann-Whitney U tests. The statistical significance level was set at $P < 0.05$; all reported P values are 2-sided.

RESULTS

A total of 1442 patients, 627 female and 815 male, participated in the research. There were 1163 patients (508 female, 655 male) in Group 1 and 279 (119 female,160 male) in Group 2. The mean age of Group 1 patients was 29.32± 20.75 (mean±SD), while the mean age of Group 2 patients was 34.58± 21.86 (mean±SD). There was a statistically significant difference in age between the two groups (p=0.001). However, there was no significant difference in terms of gender (p=0.756) (Table 1).

A total of 69 different pathology diagnosis codes were entered in all periods. Group 1, the non-COVID-19 period, had 66 different diagnoses, while Group 2, the COVID-19 period, had 43 different diagnoses. The most common of these diagnoses are shown in Table 2.

Table 1. Demographic and clinical features of patients.

	Group 1 (Control period)	Group 2 (COVID-19 period)	P[a]
Age (mean±SD)	29.32± 20.75	34.58± 21.86	**0.001***
Gender (female/male; n)	508/655	119/160	0.756

[a]Mann-Whitney-U; *p< 0.05

Table 2. The most common pathological diagnoses.

Pathological Diagnosis; Treatment		Group 1 (Control period)	Group 2 (COVID-19 period)	Total
Chronic tonsillitis lymphoid hyperplasia; Bilateral tonsillectomy + adenoidectomy	n	249	32	281
	% in group	21.4%	11.5%	19.5%
	% in total	17.3%	2.2%	**19.5%**
Nasal polyp	n	235	42	277
	% in group	20.2%	15.1%	19.2%
	% in total	16.3%	2.9%	**19.2%**
Chronic inflammation, lymphoid hyperplasia, adenoidectomy	n	241	38	279
	% in group	20.7%	13.6%	19.3%
	% in total	16.7%	2.6%	**19.3%**

Table 3. Histopathological materials.

	Group 1 (Control period)	Group 2 (COVID-19 period)	Total
Surgery+Biopsy	1037 (89.1%)	232 (83.1%)	1269 (88%)
Only Biopsy	126 (10.8%)	47 (16.8%)	173 (11.9%)
Benign tumors	89 (7.6%)	34 (12.8%)	123 (8.5%)
Malignant tumors	17 (1.4%)	8 (2.8%)	25 (1.7%)
Total	1163 (80.6%)	279 (19.3%)	1442 (100%)

The most common histopathological diagnoses in Group 1, in order of frequency, are: Chronic tonsillitis lymphoid hyperplasia (bilateral tonsillectomy + adenoidectomy), Chronic inflammation lymphoid hyperplasia (adenoidectomy) and Nasal polyp. The most common histopathological diagnoses in Group 2, in order of frequency, are: Nasal polyp, Chronic inflammation lymphoid hyperplasia (adenoidectomy) and Chronic tonsillitis lymphoid hyperplasia (bilateral tonsillectomy + adenoidectomy) (Table 2).

In our study, it was seen that some patients underwent only biopsy for diagnostic purposes, while some patients underwent surgery and biopsy. When we looked at all patients, 1269 (88%) patients underwent surgery and biopsy, while 173 (11.9%) patients only underwent biopsy. In Group 1, 126 patients underwent only biopsy, while in Group 2, 47 patients underwent biopsy. While the number of patients who underwent surgery and biopsy in Group 1 was 1163, there were 279 patients in Group 2 (Table 3).

In both groups, the most common histopathological benign diagnosis was irritation fibroma (2.6% in Group 1 and 1.0% in Group 2), the most common premalignant diagnosis was reparative atypia/dysplasia (1.4% in Group 1 and 0.7% in Group 2), and the most common malignant diagnosis was squamous cell carcinoma (0.6% in Group 1 and 0.3% in Group 2).

The incidence of malignant tumors was 1.4% in Group 1 and 2.8% in Group 2. The incidence of benign tumors was 7.6% in Group 1 and 12.8% in Group 2. When we look at all patients, 8.5% are benign and 1.7% are malig-

Table 4. Squamous cell carcinoma

Pathological Diagnosis; Localisation; Squamous cell carcinoma		Group 1 (Control period)	Group 2 (COVID-19 period)	Total
Lower lip	n	3	2	5
	% in group	0.3%	0.7%	0.3%
	% in total	0.2%	0.1%	0.3%
Tongue	n	1	1	2
	% in group	0.1%	0.4%	0.1%
	% in total	0.1%	0.1%	0.1%
Auricle	n	2	0	2
	% in group	0.2%	0.0%	0.1%
	% in total	0.1%	0.0%	0.1%
Larynx	n	2	0	2
	% in group	0.2%	0.0%	0.1%
	% in total	0.1%	0.0%	0.1%
Nose	n	1	1	2
	% in group	0.1%	0.4%	0.1%
	% in total	0.1%	0.1%	0.1%
Palatum durum	n	0	1	1
	% in group	0.0%	0.4%	0.1%
	% in total	0.0%	0.1%	0.1%

nant (Table 3). In terms of frequency, the rate of malignant and benign tumors was higher in Group 2.

The most common malignant tumor was squamous cell carcinoma. In Group 1, the localizations of squamous cell carcinoma were nose, larynx, auricle, tongue and lower lip. In Group 2, it was seen in the hard palate, nose, tongue and lower lip (Table 4).

DISCUSSIONS

After COVID-19 originated in China, it has spread around the world and negatively impacted lives everywhere. People started to stay out of their homes to protect themselves from the virus epidemic. A curfew was imposed on people of certain ages. People were even prevented from leaving their cities. The COVID-19 pandemic has strained the capacity of the worldwide healthcare system and reduced patients' access to healthcare[5]. Especially when a specialist examines and treats the nose and throat, which is at risk of aerosol formation in the ENT area, the risk of coronavirus transmission increases[6,7]. Restriction of routine examinations of ENT physicians and measures, such as curfews and contact restrictions, imposed due to the pandemic, caused patients to go to the doctor less often despite having symptoms[8-10]. In general, it has been observed that the rate of admission to hospital is lower in cancer patients[9].

During the epidemic, changes were made in the planning of surgical treatments. Elective surgical interventions have been postponed in order not to fill the service capacity of the hospitals. It has also been reported that COVID-19 infection significantly increases mortality in the postoperative period[11]. Therefore, hesitations of patients and healthcare professionals were also effective in taking this decision.

The prognosis of head and neck cancers spans a heterogeneous spectrum that depends on staging, various epidemiological factors, and anatomical region[12]. These include cancers of the oral cavity, larynx, pharynx, salivary glands, and sinus and nasal cavity. More than 800,000 new head and neck cancers were detected in 2018. This accounts for 4.9 percent of cancer cases and 4.8 percent of cancer deaths worldwide. This result made head and neck cancers the 7th most common cancer in the world[13]. In our study, the most common sites of squamous cell carcinoma were nose (1 case), larynx (2 cases), auricle (2 cases), lower lip (3 cases) and tongue (1 case) in Group 1, and tongue (1 case), nose (1 case), lower lip (2 cases) and hard palate (1 case) in Group 2.

It was found that head and neck cancers doubled in about 3 months. A one-month delay in treatment can reduce the local control rate by 10 percent and improve tumor node metastasis (TNM) staging[14,15]. Higher staging is associated with more aggressive therapeutic options and worse prognosis[16,17].

Kiong et al.[18] compared a 6-week period during the COVID-19 outbreak and before the pandemic. They found a 25% reduction in newly diagnosed head and neck cancers. Tevetoglu et al.[19] compared the same six-month period before and during the COVID-19 outbreak. They reported that the number of T3 and T4 head and neck cancers and the consequent need for reconstruction with regional free flaps increased significantly during the pandemic period. Focusing on oral cavity carcinoma, Metzger et al.[20] analyzed a total of 624 patients, of whom 566 were treated between 2010 and 2019 and only 58 in 2020. He noted that patients admitted in 2020 were diagnosed at a significantly higher tumor stage.

In our study, it was determined that there was a decrease in the number of materials sent for histopathology during the COVID period compared to the control period. While 279 materials were sent during the COVID period, 1163 materials were sent during the control period. It is thought that this decrease in number may be due to the fear of patients applying to hospitals during the pandemic period or the intensity of hospitals, especially during pandemic periods. However, in our study, the rate of benign and malignant tumor diagnoses among the materials sent during the COVID period was found to be higher compared to other periods. While the malignant tumor rate was 1.4% in the control period, it was 2.8% in the COVID period. Benign tumors were seen as 7.6% in the control period and 12.8% in the COVID period. This is because patients applied to hospitals only due to severe illnesses during the COVID period. In our study, only biopsies were taken from all patients with malignant and benign tumors. They were referred to tertiary health institutions for further surgical intervention. It was not clearly determined whether the disease was diagnosed at an advanced stage.

There are some limitations in this study. First, our study was not conducted in a large tertiary healthcare facility where continuous cancer surgeries are performed. Second, the study was retrospective and was conducted only within the boundaries of our hospital. However, our study relies on a suitably high number of patients with a suitably long-time frame to provide meaningful comparison and a robust explanation. In conclusion, nationwide multicenter studies are needed.

CONCLUSIONS

The COVID-19 pandemic has adversely affected the health system in our country as well as all over the world. This study showed that the number of patients with pathological samples and diagnosed during the COVID-19 period decreased significantly compared to the control period. These results showed that new cancer diagnosis strategies are needed to prevent delay in diagnosis and treatment during pandemic periods such as COVID-19.

Funding: None.

Contribution of authors: All authors equally contributed to this article.

Conflict of interest: None.

Financial disclosure: None.

Authors' information

Suheyla Kandemir, Instructor, MD, Kırıkkale University Faculty of Medicine, Department of Otorhinolaryngology, Kirikkale, Turkey. E-mail: dr.suheyla_bostan@hotmail.com. ORCID: https://orcid.org/0000-0003-3354-2212

Ahmet Erim Pamuk, Instructor, MD, Hacettepe University Faculty of Medicine, Department of Otorhinolaryngology, Ankara, Turkey. E-mail: dr_erim@hotmail.com ORCID: https://orcid.org/0000-0002-8813-0357.

Tuba Yigit, Instructor, MD, Kırıkkale Yüksek İhtisas Hospital, Department of Medical Pathology, Kırıkkale, Turkey. E-mail: tkavakli09@gmail.com. ORCID: https://orcid.org/0000-0002-1643-6269.

REFERENCES

1. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020;395(10223):497-506. DOI: 10.1016/S0140-6736(20)30183-5.
2. Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. Lancet. 2020;395(10223):470-73. DOI: 10.1016/S0140-6736(20)30185-9.
3. Karako K, Song P, Chen Y, Tang W, Kokudo N. Overview of the characteristics of and responses to the three waves of COVID-19 in Japan during 2020-2021. Biosci Trends. 2021;15(1):1-8. DOI: 10.5582/bst.2021.01019.
4. Pascarella G, Strumia A, Piliego C, Bruno F, Del Buono R, Costa F, et al. COVID-19 diagnosis and management: a comprehensive review. J Intern Med. 2020;288(2):192-206. DOI: 10.1111/joim.13091.
5. Ward ZJ, Walbaum M, Walbaum B, Guzman MJ, Jimenez de la Jara J, Nervi B, et al. Estimating the impact of the COVID-19 pandemic on diagnosis and survival of five cancers in Chile from 2020 to 2030: a simulation-based analysis. Lancet Oncol. 2021;22(10):1427-37. DOI: 10.1016/S1470-2045(21)00426-5.
6. Tran K, Cimon K, Severn M, Pessoa-Silva CL, Conly J. Aerosol generating procedures and risk of transmission of acute respiratory infections to healthcare workers: a systematic review. PLoS One. 2012;7(4):35797. DOI: 10.1371/journal.pone.0035797.
7. Judson SD, Munster VJ. Nosocomial transmission of emerging viruses via aerosol-generating medical procedures. Viruses. 2019;11(10):940. DOI: 10.3390/v11100940.
8. De Felice F, Polimeni A, Tombolini V. The impact of Coronavirus (COVID-19) on head and neck cancer patients' care. Radiother Oncol. 2020;147:84-5. DOI: 10.1016/j.radonc.2020.03.020.
9. Dinmohamed AG, Visser O, Verhoeven RHA, Louwman MWJ, van Nederveen FH, Willems SM, et al. Fewer cancer diagnoses during the COVID-19 epidemic in the Netherlands. Lancet Oncol. 2020;21(6):750-1. DOI: 10.1016/S1470-2045(20)30265-5.
10. Lazzerini M, Barbi E, Apicella A, Marchetti F, Cardinale F, Trobia G. Delayed access or provision of care in Italy resulting from fear of COVID-19. Lancet Child Adolesc Health. 2020;4(5):e10-1. DOI: 10.1016/S2352-4642(20)30108-5.
11. Lei S, Jiang F, Su W, Chen C, Chen J, Mei W, et al. Clinical characteristics and outcomes of patients undergoing surgeries during the incubation period of COVID-19 infection. EClinicalMedicine. 2020;21:100331. DOI: 10.1016/j.eclinm.2020.100331.
12. Chow LQM. Head and neck cancer. N Engl J Med. 2020;382(1):60-72. DOI: 10.1056/NEJMra1715715.
13. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2018;68(6):394-424. DOI: 10.3322/caac.21492.
14. Jensen AR, Nellemann HM, Overgaard L. Tumor progression in waiting time for radiotherapy in head and neck cancer. Radiother Oncol. 2007;84(1):5-10. DOI: 10.1016/j.radonc.2007.04.001.
15. Wyatt RM, Beddoe AH, Dale RG. The effects of delays in radiotherapy treatment on tumour control. Phys Med Biol. 2003;48(2):139-55. DOI: 10.1088/0031-9155/48/2/301.
16. O'Sullivan B, Huang SH, Su J, Garden AS, Sturgis EM, Dahlstrom K, et al. Development and validation of a staging system for HPV-related oropharyngeal cancer by the International Collaboration on Oropharyngeal cancer Network for Staging (ICON-S): a multicentre cohort study. Lancet Oncol. 2016;17(4):440-51. DOI: 10.1016/S1470-2045(15)00560-4.
17. Adelstein D, Gillison ML, Pfister DG, Spencer S, Adkins D, Brizel DM, et al. NCCN Guidelines Insights: Head and Neck Cancers, Version 2.2017. J Natl Compr Canc Netw. 2017;15(6):761-70. DOI: 10.6004/jnccn.2017.0101.
18. Kiong KL, Diaz EM, Gross ND, Diaz EM Jr, Hanna EY. The impact of COVID-19 on head and neck cancer diagnosis and disease extent. Head Neck. 2021;43(6):1890-7. DOI: 10.1002/hed.26665.
19. Tevetoglu F, Kara S, Aliyeva C, Yildirim R, Yener HM. Delayed presentation of head and neck cancer patients during COVID-19 pandemic. Eur Arch Otorhinolaryngol. 2021;278(12):5081-5. DOI: 10.1007/s00405-021-06728-2.
20. Metzger K, Mrosek J, Zittel S, Pilz M, Held T, Adeberg S, et al. Treatment delay and tumor size in patients with oral cancer during the first year of the COVID-19 pandemic. Head Neck. 2021;43(11):3493-7. DOI: 10.1002/hed.26858.

This is an open access article published under the terms and conditions of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0) License (https://creativecommons.org/licenses/by-nc-nd/4.0/). CC BY-NC-ND 4.0 license requires that reusers give credit to the creator by citing or quoting the original work. It allows reusers to copy, share, read, download, print, redistribute the material in any medium or format, or to link to the full texts of the articles, for non-commercial purposes only. If others remix, adapt, or build upon the material, they may not distribute the modified material.