


Coronavirus disease 2019 pandemic related chondrodermatitis nodularis helicis: the role of masks

Flavia Cascino, Guido Gabriele, Beatrice Pulli , Lisa Catarzi, Linda Latini and Paolo Gennaro

Department of Oral and Maxillo-Facial Surgery, University of Siena, Siena, Italy

Main Article

Beatrice Pulli takes responsibility for the integrity of the content of the paper

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Corresponding author:

Beatrice Pulli;

Email: bea.pulli@gmail.com

Abstract

Background. Chondrodermatitis nodularis helicis is a benign, but painful inflammatory condition of the ear, characterised by a tender nodule located on the helix or antihelix. This study aimed to investigate the occurrence of chondrodermatitis nodularis helicis associated with the use of coronavirus disease 2019 masks during the pandemic.

Method. A retrospective single-centre study was performed from February 2020 to February 2022 in the Maxillo-Facial Unit at the University Hospital of Siena, Italy.

Results. During the indexed period, 11 patients were affected by chondrodermatitis nodularis helicis. All patients wore a mask for more than 8 hours a day, every day for several months.

Conclusion. Although there is no certain proof of the correlation between masks and chondrodermatitis nodularis helicis, an increase in the incidence of this condition was highlighted in our single-centre experience in the pandemic period. The prolonged use of coronavirus disease 2019 masks may explain this correlation.

Introduction

Coronavirus disease 2019 (Covid-19) gave rise to and increased the incidence of many diseases.

Chondrodermatitis nodularis helicis is a benign and idiopathic painful inflammatory condition of the ear. It is characterised by a tender nodule located on the helix or antihelix, affecting mainly adults.¹

Chondrodermatitis nodularis helicis is also known as Winkler disease, named for the dermatologist who first described the condition in 1915. It was later defined in 1918 by Foerster, who also outlined the microscopic, clinical and treatment details of the disease.²

The exact aetiology behind the development of chondrodermatitis nodularis helicis remains unclear. Most authors believe it is caused by chronic and excessive pressure on the pinna arising from ischaemia and microtrauma related to sleeping on one side, or the continuous and prolonged use of hearing aids, headphones and other devices.³

All these causes have the same pathogenesis, which seems to be related to microvascular injury.⁴ Additional predisposing conditions include repeated sun damage and exposure to cold.² Occasionally, an association with auto-immune diseases or connective tissue disorders (dermatomyositis and scleroderma) has been discussed.⁵

The diagnosis is generally made clinically, based on the location and presence of a single painful nodule, but, because of its similarity in appearance to a malignant lesion, biopsy may be performed. The differential diagnoses include basal cell carcinoma, keratoacanthoma, squamous cell carcinoma, actinic keratosis, atypical fibroxanthoma, cystic chondromalacia, elastotic nodules of ears, gout tophi and Merkel cell carcinoma.⁶

During the Covid-19 pandemic, mask use was made mandatory for the general population, to protect the public from Covid-19 infection. The prolonged use of masks may cause compression in the auricle region, which could lead to microvascular damage and tissue hypoxia, resulting in the development of lesions.

This study aimed to investigate the occurrence of chondrodermatitis nodularis helicis associated with the introduction of Covid-19 masks during the pandemic period.

Materials and methods

A retrospective single-centre study was performed from February 2018 to February 2022 in the Maxillo-Facial Unit at the University Hospital of Siena, Italy. All enrolled patients signed informed consent forms, which were written in agreement with the ethical principles of medical research involving human objects described in the Helsinki Declaration.

Two cohorts were identified based on the investigated time period: a pre-Covid-19 study group (from 2018 to 2020) and a Covid-19 study group (from 2020 to 2022). Only the second group was analysed and included in our study.

Eligible subjects were females or males who made use of anti-Covid-19 masks for at least 8 hours a day, every day for several months, with a newly emerging painful nodule. Their clinical history and laboratory test results were negative for auto-immune disease.

The exclusion criteria were: known daily use of hats, helmets or headphones, or other devices that potentially caused compression in the auricle region; a history of connective tissue disease or congenital or iatrogenic bleeding disorders; a local infection; and any surrounding malignant lesions. Surgical biopsies were carried out to exclude malignant lesions. All data related to patients were entered into a database and a retrospective evaluation was performed.

Clinical data were gathered from medical files, including sex, age at diagnosis, lesion location and histological data. Clinical features and factors that can be responsible for chondrodermatitis nodularis helices development were evaluated. The occurrence of painful nodules during the Covid-19 pandemic and the participants' type of occupation were recorded.

The type of mask used (surgical masks, N95 particulate-filtering facepiece respirator, filtering facepiece class 2 (FFP2) masks, cloth masks and double-layer surgical masks), total daily mask usage times, interruption of duration of mask use, frequency of daily mask replacement and the presence of symptoms associated with mask use were investigated. In addition, genetic predisposition leading to morphological abnormalities of the ear (risk factors for chondrodermatitis nodularis helices), sleeping habits, the use of additional drugs and changing habits were considered. Diagnosis of chondrodermatitis nodularis helices was made clinically according to the following criteria: a painful erythematous nodule, with or without crust or flat keratosis surrounded by erythema, located on the helix or retroauricular sulcus.

Results

Three patients with chondrodermatitis nodularis helices were identified from February 2018 to February 2020. Eleven patients were included in the study from February 2020 to February 2022. During the Covid-19 pandemic period, 11 patients were affected by chondrodermatitis nodularis helices. There were four women and seven men, ranging in age from 55 to 81 years, with a mean age of 65 years. Two of the patients were smokers (averaging 30 pack-years). The patients had no significant history of predisposing factors.

Pain was moderate in seven patients, severe in three and intolerable in one; pain occurred mostly when the affected area was provoked (10 patients), and that was evaluated before and after local pressure with a visual analogue scale. The right ear was affected in eight patients and the left ear in two. One patient had bilateral chondrodermatitis nodularis helices. Five patients presented with a well-circumscribed, rounded nodule, five cases had a nodule with raised edges and a crust in its centre; there was an overlying ulcer in only one case, with exposed cartilage at the bottom.

On examination, the most frequent location for lesions was the angle of the helix (six patients). Four lesions were located at the top of retroauricular sulcus; two of these nodules were in the middle of the retroauricular sulcus. Being male and longer daily working hours were found to be statistically significant risk factors for the development of chondrodermatitis nodularis helices.

No differences were detected between mask type and chondrodermatitis nodularis helices associated with Covid-19 mask

use. In addition, there was no correlation between chondrodermatitis nodularis helices occurrence and the type of mask in our patients, but, in all cases, patients wore masks that had rubber bands behind the ears.

All patients wore a mask for more than 8 hours a day, every day for several months because of their occupation: 8 out of 11 were healthcare workers, 2 worked in public service, while 1 lived in a hospice.

In all cases, biopsy confirmed the diagnosis and excluded the contemporary presence of neoplasia. Treatment was medical in seven patients, resulting in cure in almost one in two cases. Surgical treatment was necessary in four patients, and consisted of complete excision of the lesion. In only one case, a recurrence occurred during the six-month post-operative follow-up period, and it was medically managed.

Discussion

The precise cause of chondrodermatitis nodularis helices is still debated. However, mechanical injury after actinic (solar) damage, cold and pressure have been considered predisposing factors. In addition, pressure on the ear after sleeping on the affected site might be responsible for the development of chondrodermatitis nodularis helices in a large number of individuals.⁷

Pressure may temporarily occlude the vascular supply, which may lead to sequential changes in collagen and cartilage that is close to the dermis. In these situations, degeneration of the collagen is almost unavoidable.

In addition to mechanical pressure (or friction) on the skin, the bilateral onset of chondrodermatitis nodularis helices might also be provoked by repeated heating of the antihelix induced by microwaves (900–1800 MHz) produced by a mobile phone.⁸

Among possible other causes, an auto-antibody against denatured type II collagen has been demonstrated in chondrodermatitis nodularis helices.⁹ Other factors, such as anatomy, vascular deficiency and trauma, are also important in its pathogenesis.

Juvenile chondrodermatitis nodularis helices is generally associated with dermatomyositis or systemic sclerosis. There are very few reported paediatric cases of chondrodermatitis nodularis helices. Some paediatric cases have been associated with subacute cutaneous lupus erythematosus, dermatomyositis and Beckwith–Wiedemann syndrome with macrotia.¹ During the Covid-19 pandemic, healthcare workers and the general population had a legal obligation to wear personal protective equipment (PPE) in public at all times, both at work and on public transport. This behaviour led to some unforeseen consequences, such as an apparent increased susceptibility to adverse skin reactions.¹⁰

Dermatology complications were a common outcome of mask use during the Covid-19 pandemic. The most commonly reported skin conditions were acne, erythematous rash, dry skin and pressure sores. The duration of exposure and the extent of PPE have been linked to the onset and severity of these skin complications.¹¹

As dermatological reactions increased with the introduction of anti-Covid-19 masks, the incidence of chondrodermatitis nodularis helices significantly increased in the same period. In our experience, the incidence was three-fold higher in cohorts during the Covid-19 pandemic period in comparison with previous years. The random coincidental occurrence of the use of Covid-19 masks and the onset of chondrodermatitis

nodularis helicis cannot be excluded, but some peculiar features of the patients make it unlikely. All patients had lesions in the same location, and regression of symptoms was noted in patients who wore masks that had rubber bands behind the head, avoiding compression on the helix.

- The increased incidence of chondrodermatitis nodularis helicis associated with coronavirus disease 2019 (Covid-19) mask use during the pandemic was investigated
- Prolonged Covid-19 mask use may cause a compression in auricle region, microvascular damage and tissue hypoxia, leading to development of lesions
- An increased incidence of chondrodermatitis nodularis helicis was found in a retrospective single-centre study of 11 patients, performed from February 2020 to February 2022
- The incidence was three times higher than before the Covid-19 pandemic, associated with dermatological reactions linked to mask use

Bilateral simultaneous occurrence and the presence of multiple lesions on one ear are known, but have rarely been reported in the literature. In our series, 1 out of 11 patients presented with bilateral localisation of chondrodermatitis nodularis helicis.

Conclusion

Although there is no certain proof of the correlation between masks and chondrodermatitis nodularis helicis, an increase in the incidence of this condition was highlighted in our single-centre experience during the pandemic period. The prolonged use of Covid-19 masks may explain this correlation. Chondrodermatitis nodularis helicis incidence increased among the general population, and was especially noticeable in those who wore N95 or surgical masks for long hours from the start of the pandemic.

Wearing masks was extremely important during the Covid-19 pandemic, but the general population should be made aware of proper and rational Covid-19 mask use. The authors suggest wearing Covid-19 masks with elastic bands

behind the head to prevent the occurrence of chondrodermatitis nodularis helicis.

Competing interests. The authors declare none.

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