ISSN: 2837-4835

Case Report

International Internal Medicine Journal

Enhancing Olfactory Loss in COVID-19: The Impact of Body Position

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Submitted: 2023, Jun 20; **Accepted**: 2023, July 15: **Published**: 2023, July 24

Citation: Kalita, S., Mehdiratta, N., Hirsch, A. R. (2023). Enhancing Olfactory Loss in COVID-19: The Impact of Body Position. *Int Internal Med J, 1*(3), 01-04.

Abstract

Objective: *To understand that COVID-19-induced hyposmia may fluctuate with spatial position.*

Introduction: *COVID-19-induced hyposmia, exacerbated by supination, has yet to heretofore been described.*

Methods: *Case Study: A 52-year-old right-handed woman was ansate until two years before presentation when she developed cold symptoms and sudden onset of loss of smell and taste, with a positive Reverse Transcription-Polymerase Chain Reaction test for COVID-19. Over three weeks, her smell and taste gradually returned to 85% of normal. She reported that her smell and taste would markedly worsen when she would lie down, to 30% of normal, but would improve with standing, moving, and sitting. Even reclining for a short nap would cause her sense of smell to drop, requiring her to stand for hours before her smell would recover, which caused her to fear sleeping and forced her to move around constantly. She markedly altered her lifestyle because of her fear of sleeping and assiduously avoided lying down: when so overwhelmed by tiredness that she must sleep, she would sleep sitting up.*

Results: *Chemosensory Testing: Olfaction: Brief Smell Identification Test: 9 (normosmia). Alcohol Sniff Test: 3 (anosmia). Dirhinus amyl (pentyl) acetate Test: -7.0 (hyperosmia). Retronasal Olfaction: Retronasal Index: 8 (normosmia). Gustation: Phenylthiocarbamide Taste Test: 10 (normogeusia).*

Discussion: *Despite cerebral autoregulation, recumbency may function to decrease venous return, altering calcium concentrations and hence olfactory ability. In the supine orientation, intrathoracic pressure increases, thus mimicking the Valsalva maneuver. This further increases intracranial pressure, decreases cerebral blood flow, and increases cerebral carbon dioxide. Perhaps this causes increased gamma-aminobutyric acid, an inhibitory neurotransmitter within the olfactory bulb, which reduces associated olfactory ability. Peradventure assuming the supine position induces general relaxation and stage.*

One sleep. Sleep reduces the intensity of perceptual experiences of all the senses, including the olfactory sense [1]. On the other hand, the supine and relaxed state may induce a positive effect. Based on Wolpe's reciprocal inhibition principle, such a relaxed effect causes fear inhibition, whereby there cannot be coexistent simultaneous opposite emotions [2]. Since fear has been demonstrated to improve olfactory ability, assuming the supine position induces relaxation and thus reduces fear-induced increased olfactory ability (Yakov, 2013; Keedwel, 2005). On the other hand, assuming the supine position may induce a kinesthetic distraction, changing the focus of attention away from chemosensation to a change in position. Lying in the lateral decubitus position possibly causes a modification in the olfactory cycle with greater engorgement in the inferiorly situated nostril, which may have a lesser olfactory ability [1]. In those with olfactory deficits after COVID-19 or other conditions, a reduced olfactory ability with lying down may have significant health risks. Further investigation into the impact of position on those with olfactory deficits from all sources, including COVID-19, is warranted.

1. Introduction

Myriad interoceptive and exteroceptive phenomena impact olfactory ability. These range from satiation, degree of wakefulness, emotional state, horological influences, visual stimuli, and level of sexual arousal (Hirsch, 2000). COVID-19 has been identified as a cause of olfactory dysfunction in 47.85% of those infected, anosmias in 35.39%, and hyposmia in 36.15%. While COVID-19 has been described to improve olfactory, it has also been report-

ed to cause hyposmia and anosmia (Agyeman, 2020; Mair, 2020). COVID-19-induced hyposmia, exacerbated by supination, has not heretofore been described. Such a case is presented [2-11].

2. Methods: Case Study

This 52-year-old right-handed woman was nasute until two years before presentation when she developed cold symptoms and sudden onset of loss of smell and taste, with a positive Reverse Transcription-Polymerase Chain Reaction test for COVID-19. Over three weeks, her smell and taste gradually returned to 85% of normal. However, she could not smell the aroma of bleach or cut grass. She received her first Pfizer COVID-19 vaccination one year before the presentation. One week after receiving the vaccine, her smell and taste diminished to 60% of normal. She found that she could not smell chemicals or flowers nor taste hamburgers. She could not taste the bun or the hamburger meat but could taste the condiments. Her smell and taste returned to 85% of usual two weeks later. Two months later, she received a second Pfizer vaccination which caused her smell and taste to drop to 60% and return to 85% of normal after two weeks. Five months later, she received her third vaccination. After the third vaccination, her smell and taste dropped to 30%, which remained diminished for one month and gradually returned to 85% of normal. Five months before presentation, after exposure to a family member with COVID-19, she developed nasal congestion, and her smell and taste dropped to 20-50% of normal such that Windex had no smell and turkey and red meat had no taste. Over the next two months, her smell and taste gradually improved but varied daily. On presentation, she described her variation in smell as such that on her best days, it would be as high as 85%, and on worst days, it would drop to 40% of normal. She also found that her smell was emotion dependent such that when she was in a happy, relaxed emotional state, her sense of smell would be 85% normal, whereas when she felt overwhelmingly sad, her smell would drop to 20-30% of normal. She admitted to palinopsia for a few seconds, flavorful eructation, and first taste phenomena for crackers. She denied dysosmia, cacosmia, phantasma, dysgeusia, ageusia, chanteuse and Palin ageusia. She reported that her smell and taste would markedly worsen when she would lie down, to 30% of normal, but would improve with standing, moving, and sitting. Even reclining for a short nap would cause her sense of smell to drop, requiring her to stand for hours before her smell would recover, which caused her to fear sleeping and forced her to constantly move around. She markedly altered her lifestyle because of her fear of sleeping and assiduously avoided lying down: when so overwhelmed by tiredness that she must sleep, she would sleep sitting up.

3. Results

Abnormalities in the physical examination: General: 2+ Bilateral pedal edema. Bilateral palmar erythema. Neurologic examination: Cranial Nerve (CN) Examination: CN II: Fundoscopic Examination: Peripapillary Pigmentation OS. CN III, IV, and VI: right ptosis. Neuropsychiatric testing: Clock Drawing Test: 4/4 (average). Animal Fluency Test: 22 (standard). Go-No-Go Test: 6/6 (typical). The comprehensive chemosensory evaluation involved standardized tests to assess the patient's olfactory and gustatory capabilities, as Tables 1 and 2 outlined. The observed deficits in olfactory function, specifically abnormality in the perceived Odor intensity and anomic to alcohol Odor. Regarding gustatory function, the diminished sensitivity to brothy tastes was noted. A board-certified neurologist administered the tests in a controlled environment.

Assessment of Olfaction	Score and Exposition
Brief Smell Identification Test	9 (normosmia)
Alcohol Sniff Test	3 (anosmia)
Suprathreshold Amyl Acetate Odor Intensity Test	normosomia
Suprathreshold Amyl Acetate Odor Hedonic Test	crossed pattern (abnormal)
Dirhinus Amyl Acetate Odor Threshold Test	-7.0 (hyperosmia)
Retronasal Index	8 (normosmia)

Table 1: Olfactory Assessment

Tests for Gustation	Score and Exposition
Phenylthiocarbamide Disc Taste Test	10 (normogeusia)
Waterless Empirical Taste Test	
Sweet	7 (normogeusia)
Sour	6 (normogeusia)
Salty	6 (normogeusia)
Bitter:	8 (normogeusia)
Brothy	4 (hypogeusia)
Total	39 (normogeusia)

Table 2: Gustatory Assessment

4. Discussion

While reduced olfactory ability lying down has been reported, the clinical significance of such results has been questioned. These studies predominantly evaluated those with norm Osmia. In the present case, COVID-19 induced reduced olfactory ability to such a degree as to be perceptually observed by the patient precipitating anxiety and nyctophobia. The mechanism of such positional-dependent reduced olfactory ability remains obscure. Despite cerebral autoregulation, recumbency may function to decrease venous return, altering calcium concentrations and hence olfactory ability. In the supine orientation, intrathoracic pressure increases, thus mimicking the Valsalva maneuver. This further increases intracranial pressure, decreases cerebral blood flow, and increases cerebral carbon dioxide. Perhaps this causes increased gamma-aminobutyric acid, an inhibitory neurotransmitter within the olfactory bulb, which reduces associated olfactory ability. Peradventure assuming the supine position induces general relaxation and stage 1 sleep. Sleep reduces the intensity of perceptual experiences of all the senses, including the olfactory sense [1, 11-14].

On the other hand, the supine and relaxed state may induce a positive effect. Based on Wole's reciprocal inhibition principle, such a relaxed effect causes inhibition of fear, whereby there cannot be coexistent simultaneous opposite emotions [15]. Since fear has been demonstrated to improve olfactory ability, assuming the supine position induces relaxation and thus reduces fear-induced increased olfactory ability, which explains how such positional change functions to reduce olfactory ability [16,17]. On the other hand, assuming the supine position may induce a kinesthetic distraction, changing the focus of attention away from chemo sensation to a change in position. When lying down, this distraction effect is mediated through vestibular, cutaneous, and proprioceptive sensations, thus reducing olfactory sensation. Pronation-induced change in cutaneous input from the somatic touch sensation serves a similar distracting function to reduce olfactory ability. On an anatomical basis, lying down enhances blood flow to the nasal turbinate's and mucosa, which induces eddy currents in the nose, causing temporary nasal engorgement [18,19].

If already partially congested, it may act to occlude the olfactory stimuli and thus reduce ability entirely. Lying in the lateral decubitus position possibly causes a modification in the olfactory cycle with greater engorgement in the inferiorly situated nostril, which may have the lesser olfactory ability [1]. Moreover, the supine position induces nasal engorgement, which may cause a transition from nasal to mouth breathing, reducing airflow to the olfactory epithelium and, thus, olfactory stimuli sensations. In those who have olfactory deficits after COVID-19 or other conditions, reduction in olfactory ability with laying down may have significant health risks; for example, ethyl mercaptan possesses a gas-like smell and is infused into natural gas, serving as a warning for a gas leak. Sleep with lying down decreases olfactory ability, and thus, the ease of detecting such a leak is diminished. Further investigation into the impact of position on those with olfactory deficits from all sources, including COVID-19, is warranted [20].

5. Conclusion

This case pertains to individuals experiencing a diminished sense of smell following a COVID-19 infection, specifically encountering reduced olfactory ability while in a reclining position. The potential health hazards associated with this condition necessitate further investigation into the influence of body positions on individuals with olfactory deficits stemming from various causes, including COVID-19.

Declarations

Ethics approval and consent to participate: The patient provided informed consent.

Consent for publication: Written informed consent was obtained from the patient to publish this case report.

Availability of data and material: Not applicable

Competing interests: The authors declare that they have no competing interests.

Funding: Not Applicable.

Acknowledgments: Not Applicable.

References

1. Carskadon, M. A., & Herz, R. S. (2004). Minimal olfactory perception during sleep: why odor alarms will not work for humans. Sleep, 27(3), 402-405.
2. Hirsch, A. R. (1992). Scientisation, olfactory demographic and abnormalities. International Journal of Aromatherapy, 4(1), 16-17.
3. Hirsch, A. R. (2018). Chemosensory malingering. In Neurological malingering (pp. 119-184). CRC Press.
4. Hirsch, A. R. (Ed.). (2022). Nutrition and Sensation. CRC Press.
5. Hirsch, A. R. (2000) "Aphrodisiacs and Stimulants, In: Francis FJ (Ed.). Food Science and Technology." NY: John Wiley & Sons, Inc., Vol. 1, pp. 81-87.
6. Dumlao, J.M., Menon, J., Hirsch, A. R., Viols, O. "Smell and Prejudice: Affect influences on olfactory threshold." Chemical Senses, 2010; 31: A49.
7. Keller, A., & Malaspina, D. (2013). Hidden consequences of olfactory dysfunction: a patient report series. BMC Ear, Nose and Throat Disorders, 13(1), 1-20.
8. Saniasiaya, J., Islam, M. A., & Abdullah, B. (2021). Prevalence of olfactory dysfunction in coronavirus disease 2019 (COVID-19): a meta-analysis of 27,492 patients. The Laryngoscope, 131(4), 865-878.
9. Plaza, A. A., Basi, T. K., & Hirsch, A. R. (2021). Nonplus from COVID-19 Vaccination: Chemosensory Recovery. Ann. Neurol., S121-S121.
10. Agyeman, A. A., Chin, K. L., Landersdorfer, C. B., Liew, D., & Ofori-Asenso, R. (2020, August). Smell and taste dysfunction in patients with COVID-19: a systematic review and me-

ta-analysis. In Mayo Clinic Proceedings (Vol. 95, No. 8, pp. 1621-1631). Elsevier.
11. Mair, M., Singhavi, H., Pai, A., Singhavi, J., Gandhi, P., Conboy, P., ... & Das, S. (2021). A meta-analysis of 67 studies with presenting symptoms and laboratory tests of COVID-19 patients. The Laryngoscope, 131(6), 1254-1265.
12. Garcha, H.S., & A. R. Hirsch. (2017). "Position-dependent palinosmia and phantogeusia." CNS Spectrums, 22:120:73.
13. Lundström, J. N., Boyle, J. A., & Jones-Gotman, M. (2006). Sit up and smell the roses better: olfactory sensitivity to phenyl ethyl alcohol is dependent on body position. Chemical senses, 31(3), 249-252.
14. Lundström, J. N., Boyle, J. A., & Jones-Gotman, M. (2008). Body position-dependent shift in odor percept present only for perithreshold odors. Chemical senses, 33(1), 23-33.
15. Wolpe, J. (1968). Behavior therapy in complex neurotic states. In Research in Psychotherapy Conference, 3rd, May-Jun, 1966, Chicago, IL, US. American Psychological Association.
16. Yakov, Y.L., Hirsch, A.R., Heng, C.T., Yakov, S. "Affect Dependent Phantosmia." Abstracts from the Thirty-fourth Annual Meeting of the Association for Chemoreceptor Sciences. Chemical Senses, 2013; 38:3:263.
17. Keedwell, P. A., Andrew, C., Williams, S. C., Brammer, M. J., & Phillips, M. L. (2005). The neural correlates of anhedonia in major depressive disorder. Biological psychiatry, 58(11), 843-853.
18. Rundcrantz, H. (1969). Postural variations of nasal patency. Acta oto-laryngologica, 68(1-6), 435-443.
19. Douek, E. (1974). The sense of smell and its abnormalities. Churchill Livingstone.
20. Greenberg, M. I., Curtis, J. A., & Vearrier, D. (2013). The perception of odor is not a surrogate marker for chemical exposure: a review of factors influencing human odor perception. Clinical Toxicology, 51(2), 70-76.
21. Mester, A. F., Doty, R. L., Shapiro, A., & Frye, R. E. (1988). Influence of body tilt within the sagittal plane on odor identification performance. Aviation, space, and environmental medicine.