Contents lists available at ScienceDirect





journal homepage: www.sciencedirect.com/journal/sleep-medicine-x



癯

sleepmedicine:

Central sleep apnea (CSA) in a treated brainstem chordoma

Bibi Aneesah Jaumally^a, Diwakar D. Balachandran^b, Ahmed M. Salem^a, Lara Bashoura^b, Saadia A. Faiz^{b,*}

^a Division of Pulmonary, Allergy and Critical Care Medicine, The University of Alabama at Birmingham, Alabama, USA
^b Department of Pulmonary Medicine, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

ARTICLE INFO

Keywords: Cancer Central sleep apnea Chordoma

1. Introduction

A 35-year-old man with history of clival chordoma was referred for excessive daytime sleepiness, snoring and witnessed apneas. He denied any insomnia, parasomnia or restless legs symptoms. His main complaints were fatigue, left sided neck pain, and chronic headaches. He had depression, but no other medical illness. Sleep surveys revealed an Epworth Sleepiness Score with hypersomnia (13/24) and STOP-Bang Score with moderate risk of obstructive sleep apnea (OSA, 4/8). Specifically, he had undergone a staged surgical resection of the chordoma (Fig. 1) followed by postoperative radiation therapy (200 cGy) thirteen months prior. Current medications included aripiprazole (for depression, 5 mg daily), sertaline (for depression, 200 mg daily), transdermal Fentanyl (for pain, 62 mcg every 72 h) and acetaminophen-codeine (for headaches as needed, 300 mg-30 mg, 2 pills 3 times a day). He had been seeing supportive care, and narcotic medications had either been titrated off or reduced (with elimination of oral hydromorphone and gradual reduction of transdermal Fentanyl dosage). Physical examination revealed a body mass index of 34.4 kg/m² and a Mallampati III airway. Diagnostic polysomnogram (Fig. 2) showed severe central sleep apnea (CSA) without hypoventilation. There was no periodic breathing present. During titration with positive airway pressure, there was no significant reduction in central events, and no hypoventilation noted based on transcutaneous CO2 monitoring. Other studies included normal electrocardiogram and echocardiogram (left ventricular function of 62 %). Laboratory data showed a peripheral bicarbonate of 24 mmol/L, but no arterial blood gas was available. Clinical observation and avoidance of CNS depressants were recommended.

2. Image analysis

Fig. 1 is a sagittal T1 MRI with gadolinium showing clival chordoma (white arrow) before (A) and after treatment (B). Residual clival chordoma is present involving the preportine and premedullary cisterns measuring approximately 2.5×1.8 cm in the axial dimension, previously 3.4×2.8 cm.

Fig. 2 is a polysomnography with a 5-min highlighting central sleep apnea (C) during sleep. The Apnea-Hypopnea Index was 32.3 of 32.3 episodes/hour with only 1 obstructive, 246 central and 32 mixed events with an oxygen saturation nadir of 87 %. PSG was performed in accordance with AASM guidelines with hypopneas score with a 4 % cutoff for hypopnea detection [1].

3. Discussion

CSA occurs due instability of ventilatory control centers within the pontine medullary respiratory centers because of hyperventilation, prolonged circulatory time, and chemoreceptor insensitivity to hyperand hypocarbia. The treatment of central sleep apnea typically involves addressing the underlying cause such as congestive heart failure or neurological disease as in this case. Additional treatment options include using positive pressure airway devices such as CPAP or adaptive servoventilation (ASV) and occasionally medications such as acetazolamide or supplemental oxygen therapy.

Intracranial chordomas are slow growing and usually occur in the vicinity of the clivus [2]. The proximity of clival tumors to the pontine-medullary respiratory centers increases the likelihood of CSA

https://doi.org/10.1016/j.sleepx.2024.100127

Received 10 December 2022; Received in revised form 21 September 2024; Accepted 2 October 2024 Available online 5 October 2024 2590-1427/© 2024 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY

^{*} Corresponding author. Department of Pulmonary Medicine, Unit 1462, The University of Texas MD Anderson Cancer Center, P.O. Box 301402, Houston, TX, 77030-1402, USA.

E-mail address: safaiz@mdanderson.org (S.A. Faiz).

^{2590-1427/© 2024} The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC license (http://creativecommons.org/licenses/by-nc/4.0/).



Fig. 1. Radiographic imaging of chordoma before and after treatment.



Fig. 2. Polysomnography highlight central sleep apnea during sleep.

and in another published case, OSA [3]. In primary brain tumor patients, sleep-wake disturbances and insomnia have been also reported [4]. Our patient had significant CSA, and although opioid therapy could have contributed, tumor location and the consequences of surgery and radiation may have led to the development of sleep-disordered breathing. Although surgery and radiation maybe curative, residual symptoms impacting sleep may persist, so healthcare provides should inquire about sleep symptoms, utilize sleep surveys and consider further evaluation for sleep disorders when appropriate.

Funding

This research is supported in part by the National Institutes of Health through The University of Texas MD Anderson's Cancer Center Support Grant (CA016672).

CRediT authorship contribution statement

Bibi Aneesah Jaumally: Conceptualization, Data curation, Writing – original draft, Writing – review & editing. **Diwakar D. Balachandran:** Conceptualization, Data curation, Writing – original draft, Writing – review & editing. **Ahmed M. Salem:** Conceptualization, Data curation,

Writing – review & editing. Lara Bashoura: Data curation, Writing – review & editing. Saadia A. Faiz: Conceptualization, Data curation, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- Berry RB, Brooks R, Gamaldo C, Harding SM, Lloyd RM, Quan SF, Troester MT, Vaughn BV. AASM scoring manual updates for 2017 (version 2.4). J Clin Sleep Med 2017;13:665–6.
- [2] Erdem E, Angtuaco EC, Van Hemert R, Park JS, Al-Mefty O. Comprehensive review of intracranial chordoma. Radiographics 2003;23:995–1009.
- [3] Bilginer B, Turk CC, Narin F, Hanalioglu S, Oguz KK, Ozgen B, Soylemezoglu F, Akalan N. Enigmatic entity in childhood: clival chordoma from a tertiary center's perspective. Acta Neurochir (Wien) 2015;157:1587–93.
- [4] Willis KD, Ravyts SG, Lanoye A, Loughan AR. Sleep disturbance in primary brain tumor: prevalence, risk factors, and patient preferences. Support Care Cancer 2022; 30:741–8.