Very Long Apneas during Prone Position in a Lean Patient with Coronary Artery Disease: Implications for the Cardiovascular Risk

Sofia Fontanello Furlan,[1] Viktor Sinkunas,[1] Pedro Rodrigues Genta,[1] Geraldo Lorenzi-Filho,[1] Luciano F. Drager[1]

Universidade de São Paulo Instituto do Coração,[1] São Paulo, SP – Brazil

Introduction

Obstructive sleep apnea (OSA) is a common condition characterized by recurrent upper airway obstructions during sleep, promoting intermittent hypoxia and sleep fragmentation.[1]Traditional risk factors for OSA include male gender and obesity. Overall, patients with severe OSA presented longer events and more severe hypoxemia. Supine sleep is consistently associated with more severe OSA rates in adults.[2] However, the relationship between OSA indices and prone position is inconsistent.[2] Here, we reported a very peculiar presentation of OSA characterized by very long respiratory events in a prone position in a lean female patient with a history of high blood pressure, diabetes mellitus, chronic kidney disease under dialysis therapy and a recent diagnosis of coronary artery disease (CAD).

Case Report

A 63 year-old female was electively admitted to the Hospital to perform a percutaneous coronary intervention (PCI) procedure. Eventhough she did not complain of daytime sleepiness (Epworth Sleepiness Scale: 9), her relatives described she was very sleepy, presented loud snoring and nocturnal breathing pauses during sleep. Upon inspection, there were no important signs of craniofacial changes that predisposed to OSA. Body-mass index (BMI) was within the normal range (25 kg/m^2) but arterial blood pressure was uncontrolled (152/84 mmHg). Interestingly, a recent ambulatory blood pressure monitoring (ABPM) showed a reverse systolic dipping pattern (blood pressure during sleep equal or higher than wakefulness) (Figure 1). She was under regular use of aspirin, carvedilol, amlodipine and atorvastatin. Arterial blood pressure medications were further adjusted by the medical team. The patient underwent a successful PCI in the *left anterior descending artery* using a bare metal stent. After the procedure, she underwent a sleep study using a portable monitor (Embletta Gold®). The patient had an apnea-hypopnea index of 26.7 events/hour with a lowest peripheral oxygen saturation (SpO_2) of 28% and a total time with a SpO_2 <90% of 33%. Very long apneas (19 episodes lasting >1 minute and the longest event lasting the incredible 3.21 minutes) (Figure 2) were observed. Of note, the patient spent 76% of the time in the prone position (her preferred sleep position).

The patient did not seek our outpatient sleep clinic despite we actively recommended treatment for OSA. After 11 months of the PCI, the patient suffered an acute myocardial infarction. Approximately 2 years after the PCI procedure, she suffered an episode of stroke and four months later a new fatal myocardial infarction during a nap at 3:00 pm despite using standard medications for CAD.

Discussion

This case called our attention due to the unusual presentation of OSA in a high cardiovascular risk patient: BMI in the normal range and very long respiratory events predominantly in the prone position. In a previous study, obstructive apneas lasting up to 3.89 min in a patient with autonomic dysfunction was reported, probably reflecting the lack of protective autonomic control in terminating the apneic events.[3] Our patient had no evidence of autonomic disease, despite the history of diabetes. Indeed, no periods of hypotension were observed in the ABPM. In contrast, we observed a reverse dipping pattern in the ABPM. Reverse dipping has been shown to be associated with a 4-fold increase in the probability of significant OSA, regardless the presence of sleep complaints or positive sleep questionnaires.[4]

One interesting finding is the unusual occurrence of obstructive events in the prone position. It is largely accepted that supine position predisposes to upper airway obstructions during sleep.[5] Preliminary studies reported prone position as adjunctive therapy for OSA.[6,7] In contrast, this case report underscore that prone position may not be an innocent bystander, as observed in infants.[8] Although no cause-effect relationship may be proven, it is conceivable that the prone position combined with a high arousal threshold may contribute to very long events observed during sleep in this patient.

Finally, it is worthy to mention that OSA patients with CAD had no benefits of continuous positive airway pressure (CPAP) in preventing cardiovascular disease according to the SAVE trial.[9] Severe hypoxia burden (as observed in this case) was not included in the usual SAVE study's profile, preventing any definitive conclusion on the benefits of OSA treatment among OSA patients with severe hypoxia burden. The lack of specific OSA treatment may have contributed to the observed cardiovascular outcomes.

Keywords

Angioplasty; Sleep Apnea Obstructive; Coronary Artery Disease; Percutaneous Coronary Intervention; Body Mass Index; Obesity; Blood Pressure Monitoring Ambulatory; Oxymetria.

Mailing Address: Sofia Fontanello Furlan •
Universidade de São Paulo Instituto do Coração - Av. Dr. Enéas de Carvalho Aguiar, 44. Postal Code 05403-000, São Paulo, SP – Brazil
E-mail: sofiaffurlan@yahoo.com.br, sofiaffurlan@gmail.com
Manuscript received March 10, 2020, revised manuscript June 10, 2020, accepted June 10, 2020

DOI: https://doi.org/10.36660/abc.20200191

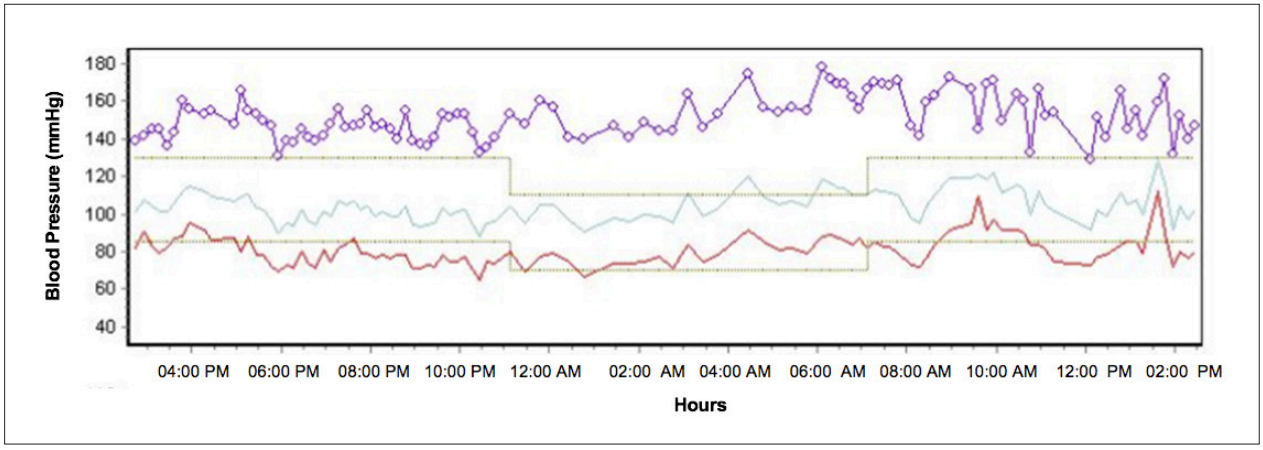

Figure 1 – *Ambulatory blood pressure monitoring showing reverse systolic blood pressure dipping pattern. Mean daytime blood pressure: 150x81 mmHg; Mean nighttime blood pressure: 155x79 mmHg.*

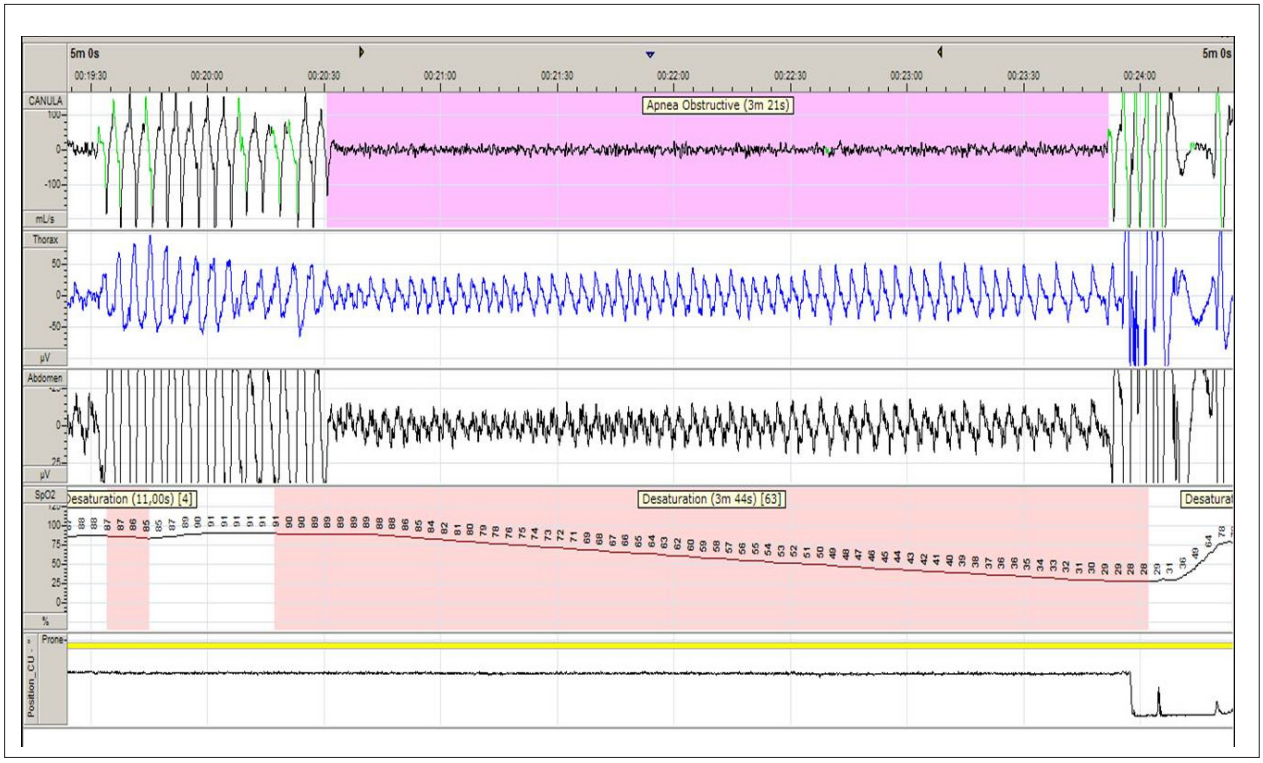

Figure 2 – *The longest obstructive apnea during sleep monitoring. Observe the severe related hypoxemia and the sensor position channel revealing prone position (yellow trace).*

Conclusion

This is an unusual case of very long apneas during prone position in a lean patient with CAD. As suggested in a multicenter observational study, the unfavorable follow-up suggests that OSA is not an innocent bystander in CAD, especially in the presence of diabetes.[10,11] Therefore, the neutral results of SAVE trial should not preclude treatment aiming potential cardiovascular benefits in high risk patients with severe hypoxemia.

Author Contributions

Conception and design of the research: Furlan SF, Drager L; Acquisition of data: Furlan SF, Sinkunas V; Analysis and interpretation of the data: Furlan SF, Sinkunas V, Drager L; Statistical analysis: Furlan SF; Obtaining financing: Lorenzi G, Drager L; Writing of the manuscript: Furlan SF, Sinkunas V, Genta PR, Lorenzi G, Drager L; Critical revision of the manuscript for intellectual content: Furlan SF, Genta PR, Drager L.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Sources of Funding

There were no external funding sources for this study.

Study Association

This study is not associated with any thesis or dissertation work.

Ethics approval and consent to participate

The patient participated in a previous study addressing the potential impact of sleep apnea after percutaneous coronary intervention (approved by the Ethics Committee of the Hospital das Clinicas da Universidade de São Paulo under the protocol number 3931/13/056). All the procedures in this study were in accordance with the 1975 Helsinki Declaration, updated in 2013. Informed consent was obtained from this patient.

References

1. Jordan AS, McSharry DG, Malhotra A. Adult obstructive sleep apnoea. Lancet. 2014;383(9918):736-47.
2. Menon A, Kumar M. Influence of body position on severity of obstructive sleep apnea: a systematic review. ISRN Otolaryngol. 2013:670381.
3. Aulakh PK, Westerman DE, Dedhia RC. The longest obstructive apnea you have ever seen: a patient with new-onset autonomic dysfunction. J Clin Sleep Med. 2018;14(5):893–5.
4. Genta-Pereira DC, Furlan SF, Omote DQ, Giorgi DM, Bortolloto LA, Lorenzi-Filho G, et al. Blood Pressure Patterns Predict Obstructive Sleep Apnea in Patients Undergoing Ambulatory Blood Pressure Monitoring. Hypertension. 2018; 72(4):979-985
5. Cartwright RD. Effect of sleep position on sleep apnea severity. Sleep 1984; 7(2):110–4
6. Afrashi A, Ucar ZZ. Effect of prone positioning in mild to moderate obstructive sleep apnea syndrome. Sleep Breath. 2015;19(3):1027-34.
7. Bidarian-Moniri A, Nilsson M, Rasmusson L, Attia J, Ejnell H. The effect of the prone sleeping position on obstructive sleep apnoea. Acta Otolaryngol. 2015;135(1):79-84.
8. Jeffery HE, Megevand A, Page HD. Why the prone position is a risk factor for sudden infant death syndrome. Pediatrics. 1999;104(2 Pt 1):263-9
9. McEvoy RD, Antic NA, Heeley E, Luo Y, Ou Q, Zhang X, et al. CPAP for prevention of cardiovascular events in obstructive sleep apnea. N Engl J Med. 2016; 375(10):919–31.
10. Lee CH, Sethi R, Li R, Ho HH, Hein T, Jim MH, et al. Obstructive Sleep Apnea and Cardiovascular Events After Percutaneous Coronary Intervention. Circulation. 2016;133(21):2008-17.
11. Koo CY, Drager LF, Sethi R, Ho HH, Hein T, Jim MH, et al. Sleep and Stent Study Investigators. Obstructive Sleep Apnea and Diabetes Independently Add to Cardiovascular Risk After Coronary Revascularization. Diabetes Care. 2018;41(2):e12-e14.