Sleep Medicine:X 7 (2024) 100097

Contents lists available at ScienceDirect

Sleep Medicine: X

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

# May home cardiorespiratory polygraphy be considered a realistic alternative to polysomnography for catathrenia screening?

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## 1. Introduction to the case

A 25-year-old Mauritanian woman was referred to the sleep clinic (Department of Pneumology, Hedi Chaker University Hospital, Sfax, Tunisia) for unusual nocturnal sounds occurring every night and bothering her roommate. The patient had a history of allergic rhinitis and sinus tachycardia treated with β-blocker. She had a regular sleep schedule with good sleep quality and daytime vigilance. Her physical and neurological examinations were normal. As full polysomnography (PSG) was not readily available, the patient could only undergo home sleep cardiorespiratory polygraphy (NOX T3 Portable Sleep Monitor; ResMed, San Diego, CA, USA) consisting of oronasal flow pressure sensors, thoracic and abdominal respiratory inductance plethysmography effort bands, body position sensor, actigraphy, audio recording, and pulse oximeter. Recorded tracing showed several respiratory events that most of which were automatically scored by Noxturnal software as central apnea. However, the manual analysis revealed 4 clusters of sudden switches from eupneic to bradypneic breathing (Fig. 1). Each cluster lasted 8 seconds to 2 minutes and was started by a deep inspiration followed by a protracted expiratory phase without oxygen desaturation. Episodes of protracted expiration were accompanied by attenuation of respiratory effort, increased heart rate (by about 15 heartbeats per minute), and 4-25 second-periods of groaning sounds detected by the audio channel (Video 1). All other polygraphic parameters including apnea-hypopnea index (AHI = 0.5/hour), oxygen desaturation index (ODI = 0.5/h), mean transcutaneous oxygen saturation (mean $SpO_2$ = 96.8 %) as well as sleep time with oxygen saturation below 90 % ($ST_{90}$ = 0 %) were in normal ranges. The patient refused any further exploration. A final diagnosis of catathrenia was made based on the combination of suggestive clinical presentation and polygraphy findings. The patient and her relatives were reassured of the benign nature of her disease and declined any treatment.

Supplementary video related to this article can be found at https://doi.org/10.1016/j.sleepx.2023.100097

## 2. Image analysis

Fig. 1A representative 3-min-epoch obtained from a nocturnal sleep cardiorespiratory monitoring showed a cluster of 10 typical catathrenia events (CEs) with the distinctive breathing pattern (sudden deep inspiration (1) followed by protracted expiration (2) with concomitant attenuation of respiratory effort). There were no abnormalities in nocturnal oximetry, while heart rate transiently increased with each CEs. Protracted expiration is characterized by a very low expiratory flow which is reflected by the concomitant attenuation of both expiratory portion of the airflow (as captured on a nasal pressure transduced channel) and respiratory effort (as detected by thoracoabdominal movements) signals [1]. Concomitantly, increased sound is shown on audio amplitude signal which rules out central apnea. Channels from top to bottom are: audio volume (*volume audio*), position (*position*), airflow (*flux nasal*), thoracic (*thorax*) and abdominal (*abdomen*) movements, transcutaneous oxygen saturation (*SpO2*), heart rate (*pouls bpm)* and activity (*activité*).

## 3. Video analysis

A representative 3-min-epoch obtained from a nocturnal sleep cardiorespiratory monitoring with audio monitoring. Ten successive episodes of prolonged (4 to 15 seconds), expiratory groaning sounds can be heard during a cluster of catathrenia events (CEs). At the end of each CEs, the patient recovers regular breathing. Channels from top to bottom are: audio volume (*volume audio*), position (*position*), airflow (*flux nasal*),

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https://doi.org/10.1016/j.sleepx.2023.100097
Received 2 May 2022; Received in revised form 29 November 2023; Accepted 8 December 2023
Available online 18 December 2023

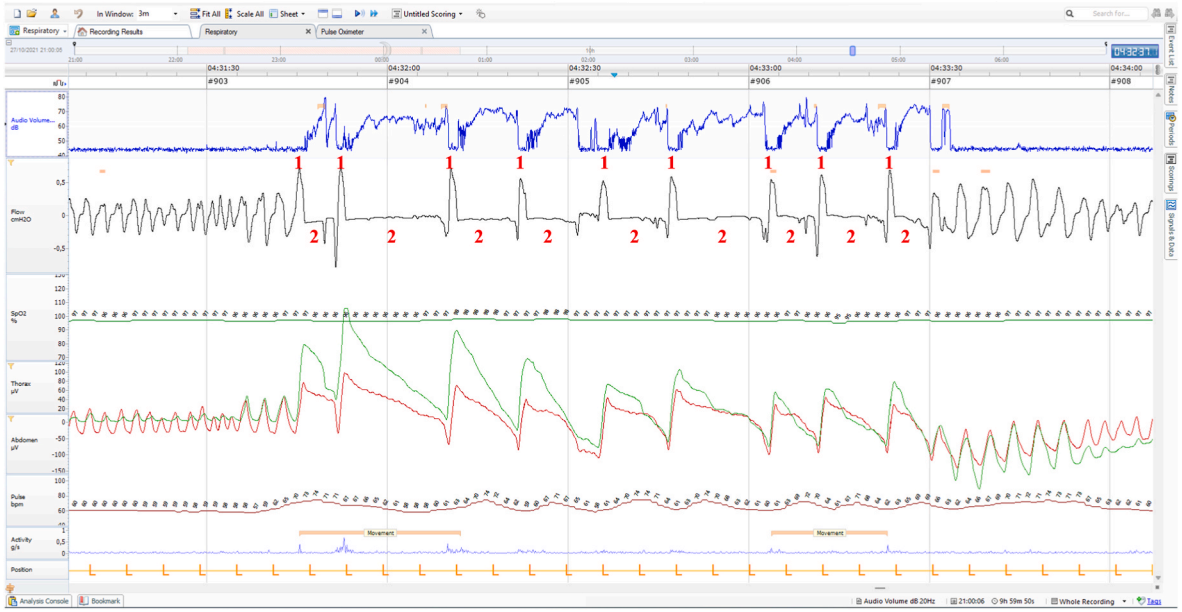


**Fig. 1.** A representative 3-min-epoch obtained from a nocturnal sleep cardiorespiratory monitoring showing a cluster of 10 typical catathrenia events.

thoracic (*thorax*) and abdominal (*abdomen*) movements, transcutaneous oxygen saturation (*SpO2*), heart rate (*pouls bpm)* and activity (*activité*).

## 4. Discussion

Catathrenia is an uncommon condition, classified as isolated symptoms and normal variants among sleep-related breathing disorders (SBD) in the *International Classification of Sleep Disorders*, third edition (ICSD 3rd ed) [2]. Full night-time standard PSG with video monitoring represents the 'gold standard' to diagnose catathrenia and rule out other SBD [3]. However, this test is time-consuming, expensive and uncomfortable for the patient. It's also not readily available, particularly in low-income countries such as Tunisia that still lacks basic medical equipment and trained personnel. Home sleep cardiorespiratory polygraphy has been recently suggested as an easier, cheaper and more realistic alternative to PSG for catathrenia screening [4]. A suggestive clinical presentation, a multichannel respiratory signal recording (capturing at a least respiratory effort, airflow, and high-quality audio signals) and a careful manual analysis by an expert reviewer are required for a more certain identification of catathrenia by home sleep cardiorespiratory polygraphy [5]. In our case, polygraphy data were considered compatible enough with the diagnosis of catathrenia. To the best of our knowledge, this is the fourth reported case of catathrenia documented by home sleep cardiorespiratory polygraphy [4,5].

## CRediT authorship contribution statement

**Sameh Msaad:** Writing – original draft. **Sourour Abid:** Validation. **Issraa Wadhane:** Writing – review & editing. **Rahma Gargouri:** Writing – review & editing. **Nesrine Kallel:** Software. **Fatma Triki:** Resources. **Nadia Moussa:** Visualization. **Samy Kammoun:** Supervision.

## Declaration of competing interest

No conflict of interest.

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