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Case report

RESOLUTION OF PEDIATRIC NOCTURNAL RESPIRATORY DISTRESS DUE TO UNDIAGNOSED ASTHMA: A CASE REPORT

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Abstract

Introduction: Sleep disturbances in children may result from a range of medical or behavioral causes, with asthma often overlooked when symptoms are limited to nighttime. Asthma with atypical presentation, manifesting predominantly as nocturnal respiratory symptoms, is common but frequently misdiagnosed due to absence of daytime symptoms.

Case report: A 10-year-old boy presented with a two-year history of nightly dry cough, dyspneic episodes, and distress. ENT evaluation revealed allergic rhinitis, and allergen testing confirmed sensitization to environmental allergens. Despite treatment with nasal corticosteroids and antihistamines, symptoms persisted. Overnight polygraphy showed significant nocturnal hypoxemia. Spirometry with bronchodilator testing confirmed reversible airway obstruction. Initiation of inhaled corticosteroid therapy led to complete and sustained resolution of symptoms.

Conclusions: This case illustrates how asthma with atypical presentation can mimic primary sleep disorders. Comprehensive respiratory evaluation, including spirometry, is essential for accurate diagnosis. Early initiation of inhaled therapy can result in rapid clinical improvement and reduce unnecessary investigations.

Keywords: pediatric asthma, nocturnal symptoms, polygraphy, spirometry, inhaled corticosteroids, sleep disturbance

Introduction

Sleep disturbances in children are common and typically attributed to behavioral insomnia, upper airway obstruction, or neurological events[1]. However, asthma may occasionally present with symptoms limited to the nighttime, reflecting an atypical or predominantly nocturnal presentation of the disease. This form of presentation may involve recurrent nocturnal cough, shortness of breath, or a sensation of air hunger, often in the absence of classic daytime wheezing or exercise-induced symptoms[2-5].

Because these manifestations overlap with sleep-disordered breathing and anxiety-related arousals, they are frequently misinterpreted, leading to diagnostic uncertainty and treatment delays. Recognizing such atypical asthma presentations is essential, as timely initiation of appropriate therapy can significantly improve sleep quality, daytime functioning, and overall quality of life. This case underscores the importance of considering asthma among the differential diagnoses of pediatric sleep disturbances, particularly when nocturnal respiratory symptoms occur without clear evidence of upper airway obstruction.

Case report

A 10-year-old boy with unremarkable perinatal and developmental history was referred for evaluation of paroxysmal nocturnal cough and dyspnea that had persisted for two years. The episodes occurred exclusively at night, waking him up every night and lasting approximately 30 minutes. They were characterized by dry coughing followed by a sensation of breathlessness and associated distress. Because the child appeared anxious and frightened during these episodes, his parents initially believed that he was experiencing panic attacks and sought consultation with a psychologist. However, no psychological disorder was identified, and the episodes continued to occur nightly, leading to further medical evaluation. Despite frequent nighttime awakenings, he remained alert during the day and exhibited no signs of fatigue or attention difficulties. There was no history of wheezing, exercise intolerance, or recurrent respiratory infections. Psychosocial background revealed no significant stressors. The patient and his family lived in an urban area in a newly constructed home. There was no family history of asthma or allergic diseases. Over the two-year period, the symptoms occurred every night and lasted approximately 30 minutes. In an effort to identify a potential environmental trigger, the child's mother changed his sleeping arrangements to different rooms within the home, but the symptoms persisted. Notably, the same nocturnal episodes occurred even when staying at other homes during vacations or visits to relatives, further suggesting that the cause was not limited to a specific household environment. His body weight was 47 kg and height 158 cm, corresponding to a BMI of 18.8 kg/m², within the normal range for age. He was an athletically built boy and an active volleyball player, participating regularly in training and competitions. His physical endurance was excellent, and he reported no exercise-induced symptoms ENT examination, including nasopharyngoscopy, was performed to rule out structural airway obstruction. Findings revealed mild adenoidal hypertrophy and mucosal changes consistent with allergic rhinitis. GERD was not considered a primary differential, given absence of regurgitation or typical reflux symptoms.

Allergy testing showed elevated total IgE (1306 IU/mL) and positive skin prick reactions to mold and weed pollens. Antihistamines and intranasal corticosteroids were prescribed but failed to improve symptoms.

Overnight cardiorespiratory polygraphy revealed a mild obstructive apnea-hypopnea index (2.5 events/hour), predominantly obstructive (1.4 events/hour), with no central events of clinical concern. Notably, nearly 50% of sleep time was spent with SpO2 below 95%, despite absence of snoring or limb movements.

The decision to perform spirometry with bronchodilator testing was prompted by the polygraphy results, which showed nocturnal hypoxemia with oxygen saturation (SpO_2) between 91–95% for more than 50% of total sleep time. This unexpected finding raised suspicion of an underlying pulmonary cause of desaturation, leading to further functional respiratory evaluation. Spirometry was performed to assess pulmonary function. Spirometry revealed a pre-bronchodilator FEV1/FVC ratio of 74%, which increased to 84% after administration of salbutamol, demonstrating significant reversibility consistent with asthma. The absolute values of FEV1 and FVC were 101% and 115% of predicted, respectively, indicating preserved lung volumes and supporting a diagnosis of mild obstructive airway disease with good reversibility. This pattern is characteristic of asthma, particularly in pediatric patients with minimal daytime symptoms.

Daily treatment with inhaled corticosteroids (fluticasone) was initiated. Within three weeks, nighttime symptoms resolved completely and remained absent on follow-up.

Follow-up 1.5 years after initiation of inhaled fluticasone (Flixotide) showed sustained clinical stability. During the summer, the patient discontinued therapy on his own initiative. At reassessment one month later, fractional exhaled nitric oxide (FeNO) was measured for the first time, showing elevated values (122-127 ppb), consistent with ongoing eosinophilic airway

inflammation. This confirmed the underlying asthmatic nature of the disease, despite the absence of symptoms.

Discussion

This case highlights asthma with atypical presentation, manifesting exclusively with nocturnal symptoms, as a potential masquerader of sleep-disordered breathing. The absence of classical daytime symptoms or wheezing contributed to delayed diagnosis. Objective evaluation using spirometry and polygraphy is instrumental in differentiating asthma from primary sleep disorders[2-6].

While nocturnal asthma is classically defined by a ≥15% reduction in FEV_1 between bedtime and morning measurements, this specific physiological definition could not be applied here because nocturnal spirometry was not available. Such testing is logistically challenging even in high-resource settings[6]. Therefore, this case is more accurately described as asthma with atypical nocturnal presentation, confirmed by reversible airway obstruction on bronchodilator testing in accordance with current GINA criteria[2].

Asthma is often exacerbated by allergen exposure during sleep, including dust mites and mold, which can trigger nocturnal bronchoconstriction[7,8]. Our patient's sensitization to mold likely contributed to nighttime symptoms. The failure of antihistamines and nasal corticosteroids to resolve symptoms further emphasized the need for targeted pulmonary therapy[9].

Although gastroesophageal reflux disease (GERD) can occasionally cause nocturnal cough through microaspiration or vagally mediated bronchoconstriction, it rarely results in sustained nocturnal hypoxemia in the absence of aspiration or structural lung disease[10,11]. In our institution, 24-hour impedance pH monitoring was not available during the diagnostic phase, which limited the ability to objectively exclude silent gastroesophageal reflux as a contributing factor. However, the implementation of 24-hour impedance pH measurement is planned in future diagnostic protocols to better evaluate potential comorbid GERD in similar cases.

This case also illustrates the diagnostic limitations commonly encountered in low-resource settings, where access to advanced tests such as nocturnal spirometry, FeNO, and impedance pH monitoring may be limited. In such contexts, the combination of polygraphy findings and reversible airway obstruction remains a practical and reliable approach to diagnosis[2,7].

The substantial nocturnal desaturation observed on polygraphy, despite a low AHI, prompted pulmonary evaluation - emphasizing the diagnostic value of considering asthma even in the absence of daytime manifestations[3,8]. Central apneas were minimal and not considered clinically relevant based on age norms and clinical context. This case also underscores the importance of a therapeutic trial in suspected asthma. The rapid and complete symptom resolution following ICS initiation strongly supports the diagnosis. Early recognition can prevent both unnecessary investigations (e.g., neurological workup) and long-term morbidity associated with untreated asthma.

Conclusions

Asthma with atypical presentation should be considered in the differential diagnosis of children with unexplained nighttime respiratory symptoms. Clinicians should integrate allergological history, environmental context, and objective testing (e.g., spirometry, polygraphy) in their assessment. Early identification and targeted therapy can dramatically improve quality of life and avoid delays in management.

Following appropriate treatment, the child's quality of life and that of his parents improved markedly. He now experiences uninterrupted sleep, normal daily functioning, and active participation in sports competitions.

Conflict of interest statement. None declared.
Written informed consent for publication was obtained from the patient

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