Case Report

Excessive Daytime Sleepiness Revealing Idiopathic Hypersomnia in a Young Air Traffic Controller

MONIN Jonathan1,2, GUIU Gaëtan1, BISCONTE Sébastien1, PERRIER Eric1,3, and MANEN Olivier1,3

1Aeromedical Center, Percy Military Hospital, Clamart, France
2Department of Sleep Medicine, Percy Military Hospital, Clamart, France
3French Military Health Service Academy, Paris, France

Abstract

The authors report the case of a young air controller suffering from asthenia and excessive daytime sleepiness, in whom rare sleep pathology is highlighted: idiopathic hypersomnia. This case raises the problem of the compatibility of sleep disorders with flight safety.

ABBREVIATIONS

REM: Rapid Eye Movements; MSLT: Multiple Sleep Latency Test

INTRODUCTION

Sleepiness is one of the major concerns in aviation medicine because of the potential risk to flight safety. This case highlights the management of an air traffic controller from the discovery of drowsiness to diagnosis, while studying the consequences on his professional fitness.

CASE PRESENTATION

A 23-year-old female military air traffic controller is referred by her chief to the Air base medical unit because of repeated crying attacks during breaks.

On questioning, the patient described years of asthenia with major repercussions on her job as an air traffic controller.

Her only notable medical history is a growth retardation of unknown etiology, for which she benefited from synthetic growth hormone between the ages of 7 and 15. She reports no drug consumption, no psychological or social difficulties and no surgical history. With the exception of oestroprogestogenic contraception, the patient is not undergoing any substantive drug treatment. No overseas stay is reported.

The history of fatigue and daytime alertness disorder begins in high school and continues uninterrupted until 2020, including during college and initial military training. Her sleep requirements are very high, up to 15 hours per day. Despite a regular rhythm of life, with early bedtime and nights that seem complete, with hyperonirism but not very restorative, naps are indispensable and refreshing. However, attention during periods of reduced physical or intellectual activity remains fragile and drowsiness may set in during the day.

During repeated periods of sleep deprivation linked to her job as an air traffic controller, in addition to significant asthenia, attention and mood disorders, and hyper-responsiveness to stress appear. Until then, she had been highly motivated by the military aviation environment, first as a civilian glider and private pilot with 250 hours of flight time, then as an air mechanic, before turning to air traffic control.

Clinical examination of the patient as well as standard blood test gives no obvious somatic etiological guidance. The weight is stable at 53 kg, for a height of 155 cm (Body Mass Index 22kg/m²). The urine drug test is negative for cannabis, ecstasy and cocaine. Pregnancy test is negative. There is no argument for regular alcohol consumption.

Faced with this excessive sleepiness, non-reversible despite 48 hours of rest, she is temporarily considered as unfit for air traffic control and is reclassified as a secretary. She was referred to an Aeromedical Center to explore this excessive daytime sleepiness and decide whether she was fit.

DISCUSSION

Management of excessive daytime sleepiness in aeronautical medicine

During her evaluation, the patient was given an Epworth self-questionnaire, which found that she was very sleepy, with a score of 17/24 (Figure 1). The sleep diary filled in by the patient (Figure 2) revealed hypersomnia with 10 to 12 hours of sleep per night with a persistence of sleepiness during the day. The purpose is now to find the cause of this sleepiness:

- Chronic sleep restriction
As in the general population, the first cause of excessive daytime sleepiness in aircrew members and air traffic controllers is sleep deprivation. Nevertheless, she didn’t report any sleep deprivation.

- Circadian rhythm sleep disorders
  The Horne Ötsberg self-assessment questionnaire [1] and the sleep diary didn’t reveal any circadian rhythm misalignment.

- Excessive sleepiness due to medical condition
  Because of the growth retardation history, an endocrinological evaluation was performed and found no abnormalities in hormones levels, in particular no somatotropic deficiency and a normal cortisol rate.
The psychiatric and psychological evaluation didn't reveal any anxious or depressive syndrome, or major personality disorder which could explain the symptoms. In addition, the cerebral MRI was normal.

The medical interview and examination didn't find any symptoms of sleep apnea, periodic limb-movement disorder or restless legs syndrome. A polysomnography was performed on a 10 hours night, with an apnea-hypopnea index at 0 event per hour, no snoring, and no abnormal legs movements. So, this sleepiness is not linked to a fragmented sleep.

- Primary disorders of sleep and wakefulness

After this first assessment, this patient was hospitalized for 2 days in the sleep medicine department to have a long duration sleep monitoring and a multiple sleep latency test (MSLT).

The night before the MSLT, the patient slept during 10 hours. The MSLT revealed mean sleep latency at 7.2 minutes with no sleep onset on REM periods (Figure 3).

The following 24h, she was asked to sleep as long as she needed. During the night, she slept during 14 hours and 3 minutes, including 150 minutes of slow wave sleep. The day after, she slept during 3 hours, which means a total 24 h sleep times of more than 17 hours.

The are no hypnopomic and hypnagogic hallucinations, no cataplexy, no sleep paralysis.

The determination of hypocretin in the cerebrospinal fluid was not performed.

The conclusion of this assessment is a diagnosis of idiopathic hypersomnia which criteria are reminded on Table 1 [2].

A treatment with wake-promoting agents is prescribed and her follow-up is scheduled.

**The aeronautical fitness decision**

Such a disease in an air traffic controller is obviously a problem for flight safety. Sleepiness during the duty, mood disorders, and cognitive impairments with a major risk of errors are many reasons of taking in consideration this condition in aeronautical medicine.

The main difficulty remains that fatigue is a frequent complaint from aircrew members and air traffic controllers, so it is very important to quickly perform a complete evaluation to check whether this fatigue is physiological or not. This evaluation is a step-by-step process, for which it is important to keep in mind that the main cause of sleepiness is lack of sleep.

This patient has both a military and a civilian qualification for her job of air traffic controller. Thus, the fitness decision will depend on two regulations: the French military regulation and the civilian European regulation.

In military French regulation, patients with idiopathic hypersomnia are to be declared unfit, depending on the intensity of symptoms and functional impairment [3]. This pathology therefore compromises initial enlistment in the armed forces, but may be compatible with fitness in a few specialties in case of diagnosis during the career. However, permanent unfitness for

<table>
<thead>
<tr>
<th>MSLT</th>
<th>Test 1</th>
<th>Test 2</th>
<th>Test 3</th>
<th>Test 4</th>
<th>Test 5</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test start time</strong></td>
<td>8:38</td>
<td>10:25</td>
<td>12:24</td>
<td>14:26</td>
<td>16:26</td>
<td></td>
</tr>
<tr>
<td><strong>Sleep latency (min)</strong></td>
<td>3</td>
<td>7</td>
<td>9</td>
<td>7</td>
<td>10</td>
<td>7.20</td>
</tr>
<tr>
<td><strong>REM sleep</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Figure 3** Multiple sleep latency test
REM : Rapid eye movements, W : wake.

<table>
<thead>
<tr>
<th>Table 1: Idiopathic hypersomnia criteria from the International Classification of Sleep Disorders (2).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Idiopathic hypersomnia diagnostic criteria (must meet criteria A to F)</strong></td>
</tr>
<tr>
<td><strong>A.</strong> Patient has daily periods of irrepressible need to sleep or daytime lapses into sleep occurring for at least 3 months</td>
</tr>
<tr>
<td><strong>B.</strong> Cataplexy is absent</td>
</tr>
<tr>
<td><strong>C.</strong> Multiple sleep latency test (MSLT) shows fewer than 2 sleep onset REM periods or no sleep onset REM periods if the REM latency on the preceding polysomnogram was &lt; or = 15 minutes</td>
</tr>
<tr>
<td><strong>D.</strong> Presence of at least 1 of the following:</td>
</tr>
<tr>
<td>1. MSLT shows a mean sleep latency of &lt; or = 8 minutes</td>
</tr>
<tr>
<td>2. Total 24-hour sleep time is &gt; or = 660 minutes on 48-hour polysomnographic monitoring (performed after correction of chronic sleep deprivation), or by wrist actigraphy in association with a sleep log (averaged over at least 7 days with unrestricted sleep)</td>
</tr>
<tr>
<td><strong>E.</strong> Insufficient sleep syndrome is ruled out</td>
</tr>
<tr>
<td><strong>F.</strong> Hypersomnolence and/or MSLT findings are not better explained by another sleep disorder, other medical or psychiatric disorder, or use of drugs or medications</td>
</tr>
</tbody>
</table>
operational missions and inability to drive military vehicles will be pronounced as long as daytime sleepiness persists. In the Air Force, the Army and the Navy, the Air Traffic Controller specialty is therefore not compatible with the diagnosis of idiopathic hypersomnia [4].

Concerning the civilian fitness, the standards differ slightly.

According to European regulation, air traffic controllers must be free from any active disease that may cause functional incapacity that could interfere with the safe performance of duties, or make the candidate suddenly unfit to safely exercise the privileges of the license [5].

According to the annex of this regulation [6], patients who suffer from excessive daytime sleepiness should be declared unfit. However, a decision of fitness may be considered depending on the extent of symptoms, including vigilance, and subject to satisfactory treatment. The operational experience of the air traffic controller, education on sleep disorders and the specificities of the workplace are important elements to be taken into account.

In the case of this young air traffic controller, she was declared unfit for her duties after the evaluation in the aeromedical center. Her medical file was then sent to the licensing authority who, in accordance with the medical evaluator of air traffic control, confirmed this decision.

CONCLUSION

This case raises the importance of screening sleepiness in air traffic controllers. A step by step assessment is then necessary to be sure that the medical condition of the air traffic controller is compatible with flight safety.

According to both military and civilian regulations, patients who suffer from excessive daytime sleepiness should be declared unfit, even if a fit decision could be possible under conditions. In this case, the evaluation led to the diagnosis of idiopathic hypersomnia, inducing a severe excessive daytime sleepiness, with an indication of wake-promoting agents. This disease, even with an appropriate medication, is not compatible with a military career that includes overseas deployments. In addition, such a disease in an air traffic controller could jeopardize flight safety, that’s why a decision of unfitness seems necessary.

REFERENCES

2. International Classification of Sleep Disorders, American Academy of Sleep Medicine, 3rd edition. 2014.
3. Order of January 25, 2018 amending the order of December 20, 2012 relating to the determination of the medical fitness profile in case of medical or surgical pathology.
5. COMMISSION REGULATION (EU) 2015/340 of 20 February 2015 laying down technical requirements and administrative procedures relating to air traffic controllers’ licences and certificates pursuant to Regulation (EC).
6. Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Part ATCO Requirements for the licensing of air traffic controllers. 2015.