Case 1: Obstructive Sleep Apnea

History

A 66-year-old female presents to her primary care physician with complaints of fatigue and excessive daytime sleepiness for 2 years. The patient reports snoring, unrefreshing sleep, and occasional witnessed apneas during her sleep. She requests a formal evaluation with a sleep physician; however, the nearest sleep clinic was 2 hours away. The patient is informed that a new multispeciality telehealth clinic has been established within 20 minutes of the patient’s house and includes sleep physicians trained in telesleep. After the patient consents to a telehealth visit, she is referred to this clinic.

The patient and her husband both are present for her first telemedicine visit. Upon arrival, the patient is directed to an examining room by a nurse who obtains the patient’s vitals and conducted an Epworth Screening Scale. The patient is seated in front of a camera, which is attached to a computer, and a telehealth provider appears on the screen. The patient reports experiencing excessive day-time sleepiness occurring for the last 3 years, which has been progressively worsening. She reports dozing off during the day while watching TV or trying to read a book. Her husband has noticed she snores loudly.
at night, and he states, “She scares me when she stops breathing.” The patient herself has also reported she has caught herself choking and will wake up with a dry mouth. She now has been experiencing morning headaches and overall has been more forgetful. Finally, she reports her brother was recently diagnosed with sleep apnea, and she states, “He sleeps like a baby when he uses that machine.”

She denies any problems falling asleep, any unpleasant sensations in legs at night, any mood changes, or any hypnopompic or hypnagogic hallucinations. She denies any fever or other constitutional symptoms. She also denies any nasal congestion or sinus pressure.

The patient reports that she wakes up multiple times at night to use the restroom and rarely feels rested.

**Sleep Schedule/Sleep Hygiene**

- Bedtime: 10 pm
- Sleep latency: 15–30 minutes
- Nighttime awakenings: 2–3 times
- Reason for awakenings: Nocturia
- Morning wake up (lights on): 5:30–6:00 am
- Perceived sleep: 5 hours
- Preferred sleep position: Supine
- Caffeinated beverages: 1 cup of coffee daily
- Scheduled naps: None
- Accidents: None
- Near-accidents: Has nodded off while driving
- Mental lapses: Memory problems

**Scales/Questionnaires**

- Epworth Sleepiness Scale (ESS): 19/24
- Fatigue Severity Scale (FSS): 54/63
- Berlin Questionnaire (BQ): Positive

**Past Medical History**

- Hypertension (HTN)
- Osteoarthritis
- Migraines

**Past Surgical History**

- Knee surgery 4 months ago
**Allergies**

- Penicillin

**Medications**

- Lisinopril 40 mg oral daily
- Amlodipine 5 mg oral daily
- Tylenol-3 (Acetaminophen-codeine) every 6 hours as needed

**Social History**

The patient is married and lives with her husband. She has one son who is not living in her home. She does not have any pets.

Occupation: She is retired and previously worked as a nurse. She does report having done night shifts.

She denies smoking and illicit drug use.

She drinks one glass of wine every night with dinner.

**Family History**

- Father: Alive, coronary artery disease, HTN
- Mother: Deceased, breast cancer, HTN
- Brother: Alive and has sleep apnea

**Review of Systems**

All systems were reviewed were negative, except as noted above in the patient’s history.

**Vital Signs**

- Blood pressure: 148/90 mmHg
- Heart rate: 68 beats per minute
- Respiratory rate: 18 breaths per minute
- Height: 59 inches
- Weight: 180 pounds
- BMI: 32 kg/m²
Physical Examination (Obtained Via Telemedicine)

- General: Obese female in no acute distress.
- Respiratory: Lungs are clear to auscultation.
- Cardiovascular: Regular rate, normal rhythm, no murmur.
- Neurologic: Alert, oriented.
- Sleep physical examination:
  - Throat: Modified Mallampati airway score: 4. Oral crowding noted.
- Neck: 16 inches neck circumference.

Differential Diagnosis

- Obstructive sleep apnea
- Idiopathic hypersomnia
- Poor sleep hygiene
- Insufficient sleep
- Mood disorder
- Sleepiness due to a medication/substance

Assessment

Given the high suspicion for sleep-disordered breathing, and a lack of any known significant comorbidities, the patient warranted a home sleep test (HSAT) for the diagnosis of obstructive sleep apnea (OSA). She was informed that the test would be mailed to her home, and it would help evaluate the patient for sleep apnea by monitoring various breathing parameters. The patient was informed that the HSAT (Fig. 9.1 and Table 9.1) would not be able to analyze the patient’s quality of sleep and various sleep stages; however, it would be able to capture any abnormalities in her breathing. The patient was also told that if the test was positive for sleep apnea, she would be prescribed an automatic titrating continuous positive airway pressure (Auto-CPAP) machine.

Diagnostic Testing

Diagnosis

Obstructive sleep apnea
Fig. 9.1 HSAT tracings depicting the measurements taken in an overnight study. Although limited, these parameters are appropriately adequate in meeting standard of care for diagnostic purposes even for patient care conducted via telehealth. (See Table 9.1 for summary interpretation)
Management

The patient’s symptoms of fatigue, excessive day-time sleepiness, snoring, and frequent nocturnal awakenings along with physical exam findings were suggestive of OSA. She underwent an HSAT, which showed an apnea-hypopnea index (AHI) of 12 events/hour, consistent with the diagnosis of mild sleep apnea. She was telephoned her results and was started on an Auto-PAP machine at 5 cm H2O to 20 cm H2O. A sleep medicine technician set up a video visit with her to troubleshoot the use of the machine. The technician identified that the patient was using the mask incorrectly; hence, proper mask fitting was demonstrated over video. Her machine had a built-in modem, which allowed for her telesleep provider to download her compliance data and continue to monitor her adherence. The patient had a follow-up visit in her telemedicine clinic within 3 months and at that time reported significant improvement in her symptoms. Her ESS was down to 3 with improvement in snoring as well. Residual AHI on CPAP compliance report was 0.9 events/hour.

Discussion

The International Classification of Sleep Disorders defines OSA in adults as the presence of five or more predominantly obstructive respiratory events per hour of sleep, coupled with associated signs, symptoms, or medical disorders (e.g., associated sleepiness, fatigue, insomnia, subjective nocturnal respiratory disturbance, observed apnea, hypertension, coronary artery disease, atrial fibrillation, congestive heart failure, stroke, diabetes, cognitive dysfunction, or mood disorder). Alternatively, a frequency of 15 or more obstructive respiratory events per hour also meets the definition, even in the absence of symptoms [1].

An in-laboratory polysomnography (PSG) is the gold standard for diagnosing sleep-related breathing disorders including OSA [2]. However, due to cost and limited access, home sleep testing (HSAT) has emerged as an alternative method to diagnose OSA, especially in telehealth settings [3]. However, HSAT can be less sensitive than PSG due to lack of availability of technologists to adjust sensors, as well as inability to monitor certain physiologic parameters (e.g., electroencephalography (EEG), electromyography (EMG)). In telemedicine settings, PSG must still be made available due to these limitations, especially for patients with complex medical histories.

Positive airway pressure (PAP) is the standard of care for management of OSA and should be offered to all patients diagnosed with the disease. Close follow-up with a multidisciplinary team including sleep specialist, educators, sleep technicians, and

| Table 9.1 | Home sleep test (HSAT) report summarizing findings from Fig. 9.1, showing normal sleep efficiency and sleep latency, with abnormal apnea-hypopnea index (AHI) |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HSAT parameter | Result |
| Total sleep time (hours) | 6.6 |
| Sleep efficiency | 94.6% |
| Sleep latency (minute) | 7 |
| AHI (events/hour) | 12 |
| Low SpO2 | 78% |
nurses is needed to establish effective PAP usage and resolve problems if needed as well as monitor adherence [4]. Technological advances in PAP therapy, including remote monitoring via wireless modems, have revolutionized sleep medicine and paved the way for telehealth. This way, adherence and efficacy data can be transmitted directly from the PAP machine for remote review by the sleep provider, obviating the need for a patient to bring the device or a data card to clinic.

There has been a technological shift toward increasing telemedicine utilization, especially in sleep medicine. This has been facilitated by the recent coronavirus pandemic. Telemedicine has helped connect patients and physicians remotely and has helped improve the access to healthcare while helping increase patient’s adherence to treatment plans. The American Academy of Sleep Medicine (AASM) strongly supports telemedicine for the management of sleep disorders and provides clinical standards and technical requirements to encourage high quality outcomes [5].

Telehealth is a broader term than telemedicine and refers to the exchange of healthcare information via an electronic platform (internet, telephone, or clinical video telehealth) to help aid and provide care for patients. Telemedicine specifically refers to the direct physician-patient encounter conducted electronically. Sleep telemedicine encounters may be conducted synchronously (in real time) or asynchronously (patient site and provider site exchange information at separate times) [6]. An example of an asynchronous encounter would be a post hoc review of downloaded data from a PAP machine or overnight PSG.

Clinical Video Telehealth (CVT) is the most popular type of communication modality utilized within sleep telemedicine, consisting of a patient traveling to a local (originating) site and communicating virtually with a provider at a distant (remote) site (see Fig. 9.2). The originating site could be a local clinic or the patient’s

![Fig. 9.2](image)

**Fig. 9.2** Standard sleep telemedicine setup at the distant (provider) and originating (patient) sites. The provider site includes charting screens for medical record review and documentation, camera with microphone, headphones to hear patient and listen through electronic stethoscope, and a separate screen to see and examine the patient. The patient site includes screens to share data and see the provider, a camera with microphone, an electronic stethoscope (not pictured), and an oral exam camera. *HD*, Hi-definition
home. The remote site would be the central location with the sleep provider’s virtual setup. The originating site being a clinic (as opposed to the patient’s home) has several distinct advantages, including real-time ability to obtain a more detailed physical exam, review test results, and evaluate compliance data. However, this also requires additional resources, which may limit feasibility, including physical space, local support personnel, and audio/video equipment with appropriate high-speed connectivity and privacy settings to ensure fast, seamless, and secure transmission of patient data.

Overall, the sleep encounter is quite amenable to CVT, especially with appropriate availability and education of a telehealth presenter (ancillary support staff) at the patient (originating) site. A sample workflow and timeline is provided at the end of this chapter. This telehealth presenter may be a medical assistant, sleep technician, nurse, or respiratory therapist. In an ideal setting, the staff member’s duties would include facilitating the physical examination, coordinating orders and visits, obtaining PAP data and sleep study results, troubleshooting technological difficulties, assisting with local PAP support (patient education and device delivery), and also being trained in medical emergencies (as a physician may not be present onsite). In practice, some of these duties can also be done remotely by the provider or provider support staff at the central remote site.

A basic intake process at the patient site would not substantially differ from a traditional clinic, with staff checking the patient in, bringing them to the patient room, obtaining vital signs including neck circumference and BMI, and assisting patient in filling out standard questionnaires (e.g., Epworth Sleepiness Scale). If a scale is not available, the patient can also weigh themselves. The support staff could then verbally or electronically provide these data to the provider at the remote site.

The majority of the physician examination can be completed by provider observation on video, including most aspects of a neck, oral, cardiac, pulmonary, and neurological examination. The support staff at the patient site can provide assistance for the oral, cardiac, and pulmonary examinations with the use of an oral camera for the Mallampati score and an electronic stethoscope. Once the visit is completed, the support staff can complete checkout procedures, including order and follow-up coordination, as is typically done in any clinic.

The overall advantages of sleep telemedicine include improved access in areas where providers are not physically available or patient travel is logistically impractical. In addition, many aspects of sleep medicine have already been conducted via telemedicine even prior to the advent of formal telehealth or CVT services. For example, providers have been conducting remote, asynchronous data review for many years even in traditional practices (reading in-lab and home-based sleep studies and reviewing PAP compliance data remotely, on the provider’s schedule, after the testing has been completed and downloaded from the originating equipment to the provider’s office). Evolving technologies also have made implementation more feasible, accessible, and affordable. This includes use of CVT consoles, stand-alone high-definition cameras, mobile devices, electronic stethoscopes, more secure high-speed internet in rural areas, and innovative software options (some which now
include built-in sleep logs). This is used not only in diagnosis and management but also for follow-up and adherence management of these patients. A comprehensive CVT program with use of HSAT, PAP monitoring, and appropriate and regular follow-ups can incorporate each process and achieve desired outcomes.

Studies looking at clinical outcomes in patients receiving OSA management via telemedicine have consistently shown positive results. In a study performed by Fox and colleagues, 75 patients with moderate to severe OSA were initiated on PAP therapy and randomized to follow-up visits conducted via telemedicine versus traditional in-person visits. After 3 months, PAP usage showed significantly greater adherence in the telemedicine arm versus the traditional model [7]. These data have been corroborated in multiple studies [8, 9]. Fields and colleagues conducted a similar study assessing the Veteran population, finding no significant difference in patient satisfaction, PAP adherence, and overall functional outcomes between telemedicine and in-person visits, but more improvement in mental health scores via telemedicine [10]. Another study randomized PAP-naïve stroke patients to standard care versus telemedicine support (standardized educational phone calls) when PAP usage was noted to decline, and found a significant increase in PAP adherence in the telemedicine group [11]. Additionally, though studies with robust comparison between CVT and standard care are lacking, certain head-to-head studies comparing CVT and in-person management collectively suggest that CVT may improve access to care without compromising important clinical outcomes [10, 12, 13].

Finally, economic feasibility of sleep telehealth is a gray zone given wide variance in regional, national, and international reimbursements. The financial challenges of implementing telehealth are heavily reliant on reimbursement from different insurance providers as well as parity laws among states. The feasibility of telemedicine to be sustainable for a health system relies on the balance between costs endured setting up a telemedicine and the revenue received via reimbursements. Clinic space, the telemedicine presenter’s salary, software platforms, and equipment all are considered expenditures endured by the telemedicine provider’s practice. Although some income for telemedicine may come from grants, most practices are reliant on insurance reimbursement.

State and national payers have strict criteria for what constitutes a telemedicine visit; typically, real-time CVT is covered (whereas asynchronous encounters may not necessarily be reimbursed). Prior to the coronavirus pandemic, parity laws were established by the American Telemedicine Association, requiring private insurers to reimburse the same for telemedicine visits as they would for in-person visits. All insurance providers were providing some form of reimbursement for telesleep (with restrictions). Private insurers have had parity laws in 36 states, but coverage was variable depending on the plan chosen. Medicare required videoconferencing with equipment and location restrictions, though Medicaid coverage varied state to state. After the start of the coronavirus pandemic in the United States, many of these restrictions have been relaxed.

Medico-legally, licensing of healthcare providers in the access site might be challenging as well. In the United States, distant site providers must be fully licensed in the originating site’s state; a notable except is federal providers (e.g., Veterans
Affairs) who may be licensed in any state [14]. Despite these limitations, telemedicine appears to be a useful tool to improve limited healthcare access but needs more evidence regarding its comparison to in-person care in terms of clinical, functional, and economic outcomes. The coronavirus pandemic may also be a springboard to facilitate opportunities for patient and provider advocacy to improve care and reimbursements, partner with PCPs and patients needs in remote areas, and enhance telemedicine legislation at the state and federal levels.

**Key Learning Points**

- The American Academy of Sleep Medicine strongly supports telemedicine for the management of sleep disorders and provides clinical standards and technical requirements to encourage high quality outcomes.
- Clinical video telemedicine consists of a patient and provider site, and several limitations can be overcome with the help of support staff and technological resources.
- The diagnosis of OSA can be made via telemedicine and is primarily based on clinical features in combination with HSAT (or PSG in patients with complex comorbidities).
- Sleep telemedicine can play a vital role in diagnosis and management of OSA in resource-limited settings, due to high prevalence of the disease.
- Technological advances in PAP therapy, including remote monitoring via wireless modems, have revolutionized sleep medicine and paved the way for telehealth.
- The use of HSAT and Auto-PAP may be preferred in patients without medical comorbidities in a telemedicine setting, but there should be access to a comprehensive, multidisciplinary management program comparable to in-person care (PAP therapy initiation, close follow-up, and patient education).
- Telemedicine has enhanced clinical outcomes in sleep medicine, including PAP adherence, patient satisfaction, and access to care.

**Case 2: Insomnia**

**History**

A 36-year-old male presents to his psychiatrist with complaints of anxiety and hallucinations. The patient notes he has had trouble sleeping since his time in the military. Upon further questioning, the hallucinations specifically occur during sleep only, without evidence of psychosis. He also reports two episodes of sleep paralysis, which he attributes to excessive fatigue and are the major source of anxiety. These chronic sleep issues have never been evaluated by a sleep physician. The patient
does not drive, and transportation to medical appointments has been an ongoing challenge. The patient is agreeable to having an evaluation with a sleep provider via telemedicine. The patient is referred to a telesleep clinic where his sleep provider performs a formal evaluation via telemedicine format.

Upon questioning by the telehealth provider, the patient admits to many years of difficulty initiating and maintaining sleep, with very irregular sleep habits. He voices frustrations that he is unable to maintain a sleep routine (no set bedtime, no set alarm). He might lay in bed and use his phone for hours on some nights, but other times might fall asleep immediately. He describes tossing and turning throughout the night and frequent awakenings. He does report excessive fatigue and daytime sleepiness. He is unsure if he snores. He describes episodes of inability to move upon awakening but is conscious during these episodes; there were no episodes of loss of tone when already awake. The associated hallucinations started when he was in the military and occur several times per month. They typically consist of hearing gunshots or explosions 1–2 hours after falling asleep, and they awaken him multiple times throughout the night. He denies using any stimulants to help keep him awake but does take his prescribed medications regularly and on time each day.

**Sleep Schedule/Sleep Hygiene**

- Bedtime: ~3 am
- Sleep latency: 10–15 minutes
- Nighttime awakenings: 2–3
- Reason for awakenings: Unsure
- Morning wake up (lights on): 6 am
- Perceived sleep: 3–4 hours
- Preferred sleep position: Prone/side
- Caffeinated beverages: 2 cups coffee
- Scheduled naps: About 2 hours/day
- Accidents: None
- Near-accidents: Has nodded off while driving
- Mental lapses: Many memory and concentration problems. Difficult time remembering things like appointments.

**Scales/Questionnaires**

- Epworth Sleepiness Scale (ESS): 20/24
- Fatigue Severity Scale (FSS): 54/63
- Insomnia Severity Index (ISI): 28/28
- Berlin Questionnaire (BQ): Positive
Past Medical History

• Depression
• Migraines
• Post-traumatic stress disorder

Past Surgical History

None

Allergies

No known drug allergies

Medications

• Melatonin
• Seroquel
• Venlafaxine

Social History

The patient is currently single and lives with his girlfriend. The patient is a veteran who recently returned from active duty. After deployment, he has remained unemployed. He admits to smoking 3–4 cigarettes per day for 15 years. He denies any alcohol or recreational drug use.

Family History

• Type 2 diabetes mellitus, father
• Depression, mother

Review of Systems

All systems were reviewed, and all concerns are noted above in the patient’s history.
Vital Signs

Blood pressure: 123/76 mmHg
Heart rate: 72 beats per minute
Respiratory rate: 14 breaths per minute
Height: 5 feet 3 inches
Weight: 159 pounds
BMI: 28 kg/m²

Physical Examination (Obtained Via Telemedicine)

- General: Alert and oriented, no acute distress.
- Respiratory: Lungs are clear to auscultation.
- Cardiovascular: Regular rate, normal rhythm, no murmur.
- Neurologic: Alert, oriented.
- Sleep physical examination:
  - Throat: Modified Mallampati airway score: 3.

Differential Diagnosis

- Narcolepsy
- Idiopathic hypersomnia
- Primary insomnia
- Obstructive sleep apnea
- Mood disorder
- Sleepiness due to a medication/substance

Assessment

This patient’s telesleep encounter was concerning for a primary insomnia, but the hallucinations, sleep paralysis, and excessive daytime sleepiness also raised suspicion for both narcolepsy and sleep-disordered breathing. Given suspicion of multiple sleep disorders, the patient required three tests. To evaluate for insomnia, sleep diary (Fig. 9.3a) and 14-day actigraphy (Fig. 9.3b) were ordered. Multiple sleep latency test (MSLT) was also ordered to rule out narcolepsy. To validate the MSLT and assess for chronic sleep deprivation (e.g., from OSA), a diagnostic PSG (Table 9.2) was ordered, to be performed just prior to the MSLT (Table 9.3). In order to improve MSLT accuracy, the patient was advised to discontinue the venlafaxine for at least 2 weeks prior to the PSG and MSLT. On the night of the PSG, the patient also underwent a urine drug screen, which was unremarkable.
Diagnostic Testing

Diagnosis

Primary insomnia due to irregular sleep wake cycle (delayed sleep phase)

Management/Treatment

The patient’s symptoms were initially suggestive of multiple sleep disorders, and the negative diagnostic PSG with MSLT effectively ruled out sleep apnea, narcolepsy, and idiopathic hypersomnia. The actigraphy and sleep diary were most suggestive of an irregular sleep wake cycle disorder (delayed sleep phase due to the variable and increasingly later bedtimes). Temporary cessation of venlafaxine did not change his symptoms, and he was using his prescribed medications appropriately (and not using caffeine or other stimulants inappropriately). Therefore, it was unlikely that medications/substances were contributing to his sleep disorder. In addition, his mood disorders were relatively stable as well, though the nighttime

![Sleep Diary](image_url)

**Fig. 9.3** Sleep diary (a) and accompanying actigraphy (b and c) depicting poor correlation between the patient’s perception (sleep diary) and objective data (actigraphy). Incomplete sleep diaries are typical in practice, and even when accounting for this, there was at least one consolidated period of sleep per 24 hours on all days of actigraphy. Overall, given highly variable bedtimes, average daily sleep duration, and wake up times, the study is most consistent with insomnia due to irregular sleep wake cycle (delayed sleep phase)
Fig. 9.3 (continued)
hallucinations were more likely related to PTSD rather than a pure parasomnia, given the specific nature and timing of the hallucinations. Therefore, a diagnosis of primary insomnia was made, and given his poor sleep habits and multiple psychiatric diagnoses, he was prescribed a course of cognitive behavioral therapy via telemedicine. Therapies included regular, live video visits with a counselor, as well as a mobile application on his smartphone that provided educational materials, a sleep diary to track his habits, as well as anxiety management tools. He returned 6 months later for a telesleep follow-up, noting significant improvements in his overall sleep quality, daytime sleepiness, and anxiety. His hallucinations had nearly resolved.
Discussion

Insomnia affects approximately 35–50% of the general adult population, and combined direct and indirect costs are estimated to be over $100 billion [15]. According to AASM, the current mainstay therapies for insomnia include cognitive behavioral therapies (CBT) plus pharmacotherapy. Insomnia management is feasible via sleep telemedicine services; however, providers must have access to appropriate resources including cognitive behavioral therapies for insomnia (CBT-I), prescribing of controlled substances, and appropriate reimbursement models [16].

CBT-I is a highly effective and safe method for treating insomnia and is considered first-line. It often helps dispel misconceptions regarding sleep and is aimed at changing insomnia-perpetuating sleep habits, while trying to minimize the use of pharmacological sleep aids. CBT-I is as effective as medication and is likely more durable over time, though the treatment can be time- and resource-intensive (typically 4–8 weekly treatment sessions should be considered).

Unfortunately, the shortage of qualified providers available to deliver therapy in recent years has resulted in decreased access to treatment [17]. The National Society of Behavioral Sleep Medicine has reported approximately 200 providers available nationwide. Telehealth delivery of CBT-I provides an opportunity to increase access and augment conventional therapies. Both synchronous and asynchronous formats for CBT-I have been established. Synchronous CBT-I may include individual or

Table 9.2 
Diagnostic polysomnography (PSG) report showing slightly reduced sleep efficiency, increased sleep latency, and a normal apnea-hypopnea index (AHI) and periodic limb movement (PLM) index

| PSG parameter                  | Result |
|-------------------------------|--------|
| Total recording time (minute) | 505    |
| Total sleep time (minute)     | 379    |
| Sleep efficiency              | 75%    |
| Sleep latency (minute)        | 154    |
| REM latency (minute)          | 168    |
| REM                            | 9%     |
| AHI (events/hour)             | 4.4    |
| REM AHI (events/hour)         | 15     |
| Low SpO2                      | 92%    |
| PLM index (events/hour)       | 5      |

This effectively rules out sleep-disordered breathing, allowing the testing center to proceed with MSLT

Table 9.3 
MSLT depicting normal mean sleep latency and no sleep onset REM periods

| Nap number | Latency to sleep onset (minute) |
|------------|---------------------------------|
| 1st        | 20                              |
| 2nd        | 3                               |
| 3rd        | 7.5                             |
| 4th        | 15                              |
| 5th        | 7.5                             |

Mean sleep latency: 10.6 minutes
Sleep onset REM periods: None

Overall this study is normal, effectively ruling out narcolepsy and idiopathic hypersomnia

This effectively rules out sleep-disordered breathing, allowing the testing center to proceed with MSLT.
group video-conference therapy sessions with electronic- or internet-delivered follow-up, whereas asynchronous formats may include web-, telephone-, or smart application-based modules and habit trackers for patient self-study. Studies from randomized trials have been emerging showing efficacy of web-based CBT-I when compared to web-based placebo as well as to traditional face-to-face CBT-I [18].

Another important consideration is the link between chronic insomnia and sleep-disordered breathing (SDB) conditions, such as OSA, which has been recognized for over 50 years. Multiple studies have addressed the coexistence of the two highly prevalent conditions [19–21]. Many patients with OSA are found to complain of insomnia, difficulty initiating and maintaining sleep, as well as frequent arousals.

Studies have also shown that patients with SDB combined with insomnia had twice the use of sedative and hypnotic medication as those with SDB alone [19]. Therefore, restraint is advised when considering pharmacotherapy upfront for insomnia, as it could lead to overuse or dependence, as well as difficulty of acceptance and adherence to PAP therapy by patients, who may prefer the “simple” (though incomplete) solution of a medication. Despite ease of access to pharmacotherapy, thorough diagnostic evaluation for SDB and early consideration of CBT-I, should not be overlooked. In general, a thorough and complete insomnia evaluation is quite practical via telehealth. The astute sleep provider must rule out SDB-related conditions, especially OSA, even when the patient presents with insomnia (rather than sleepiness) via telehealth.

Sleep telemedicine providers should exercise caution in using pharmacotherapy alone for insomnia, as controlled substance prescriptions are strictly regulated at the state and federal levels. From a federal standpoint, the DEA has allowed exceptions to the in-person evaluation rule for prescribing controlled substances (provided that the telemedicine visit is conducted in real time, is in accordance with state laws, and is within the provider’s scope of practice). Some of these exceptions include the patient being in a DEA registered facility or the presence of a DEA-registered practitioner; the service being provided to the Veterans Health Administration; the presence of a medical emergency; or the declaration of a public health emergency (such as the coronavirus pandemic).

Providers must consider legal risk especially when laws are unclear or conflicting; in these scenarios, the stricter regulations should be followed. Some states do not allow a patient-physician prescribing relationship to be established via telemedicine, or to cross state lines (meaning, they require an in-state, in-person physical examination to prescribe controlled substances, or provide any prescriptions at all). While some states allow this exam to occur via telemedicine, others provide no specific stance on this issue. It is important to confirm with state regulations in the provider and patient sites, especially when patients are being seen in, reside in, or have insurance based in differing states. Some states choose to regulate this through pharmacy laws rather than through the state medical boards.

Sleep telemedicine providers must closely partner with primary care providers (PCPs) to overcome such challenges, especially across state lines; this co-management with PCPs, especially when rurally based, is typically quite welcomed and mutually beneficial for the patient, PCP, and sleep provider. Figure 9.4 provides
Fig. 9.4 Timeline of a comprehensive sleep telemedicine experience, including workflows for the patient site (blue) and provider site (purple) through the initial visit, testing phase, and follow-up visit. BMI, body mass index; PSG, polysomnography; HSAT, home sleep testing; DME, durable medical equipment; PAP, positive airway pressure; MSLT, multiple sleep latency test; CBT-I, cognitive behavioral therapy for insomnia.
a timeline of a comprehensive sleep telemedicine experience, including workflows for the patient site (blue) and provider site (purple) through the initial visit, testing phase, and follow-up visit.

Key Learning Points

- A thorough sleep evaluation, even in complex patients requiring multiple diagnostic tests, is practical and feasible via telemedicine.
- A complete diagnostic evaluation for sleep-disordered breathing should not be overlooked in the management of insomnia via telemedicine.
- Cognitive behavioral therapy is a highly effective first-line treatment for insomnia, and telemedicine can increase access to this limited resource.
- Asynchronous sleep telemedicine therapies (e.g., electronic diaries, smartphone applications, and wearable trackers) can aid telehealth providers in clinical decision-making and patient management, especially in insomnia.
- Sleep telemedicine providers should exercise caution in using pharmacotherapy alone for insomnia, as controlled substance prescription regulations are strictly regulated at the state and federal level.

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Case 2: Insomnia

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