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ORIGINAL RESEARCH

Implementation of a physical therapy protocol in the treatment of obstructive sleep apnea at Hospital Alemão Oswaldo Cruz – São Paulo, Brazil

Implementação de Protocolo de Tratamento para Apneia Obstrutiva do Sono no Hospital Alemão Oswaldo Cruz – São Paulo, Brasil

Implementación del Protocolo de Tratamiento de la Apnea Obstructiva del Sueño en el Hospital Alemán Oswaldo Cruz, São Paulo, Brasil

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ABSTRACT | Obstructive sleep apnea (OSA) is a high prevalence sleep-disordered breathing associated with cardiovascular and metabolic complications. Adherence to continuous positive airway pressure (CPAP) therapy is crucial to treatment success and efficiency. Patients are frequently diagnosed during hospitalization, and they do not have access to the right support or orientation about the risks associated with this disorder and the importance of treatment. In this scenario, it is relevant to standardize a protocol of excellence in the OSA treatment. The primary aim of this report is to describe the OSA treatment protocol implemented in a tertiary care hospital. As a secondary aim, to describe the characteristics of the patients included. This is a descriptive and retrospective study, via the analysis of electronic medical records of the patients, who were included in the OSA treatment protocol designed by the sleep physical therapy group, in the Inpatient Units of a hospital in São Paulo during a five years-period. During the study period, 126 patient were analyzed, and 108 were included and had their profiles described. According to the reviewed medical records, the average age of patients was 73 years with 70% males. The most prevalent comorbidity was hypertension (80%) followed by diabetes (50%). In total, 74% were adherents to therapy with CPAP during hospitalization. It is feasible to implement a protocol for treatment of hospitalized patients with the diagnosis of OSA.

Keywords | Obstructive Sleep Apnea; Continuous Positive Airway Pressure; Physical Therapy Department; Hospital; Inpatients.

RESUMO | A Apneia Obstrutiva do Sono (AOS) é uma desordem respiratória do sono com alta prevalência associada a complicações cardiovasculares e metabólicas. A aderência à terapia com CPAP é crucial para a eficiência e o sucesso no tratamento. Os pacientes frequentemente são diagnosticados durante o período de hospitalização e não têm acesso ao suporte correto ou orientações sobre os riscos associados a esse distúrbio e a importância de seu tratamento. Nesse cenário, é extremamente relevante padronizar um protocolo de excelência no tratamento da AOS. O objetivo primário deste estudo foi descrever o protocolo implementado em um hospital de cuidados terciários. Por sua vez, o objetivo secundário foi descrever as características dos pacientes incluídos. Trata-se de um estudo retrospectivo e descritivo, realizado por meio da análise do prontuário eletrônico dos pacientes incluídos no protocolo de tratamento da AOS elaborado pelo grupo de fisioterapia do sono, em pacientes internados num hopital de cuidados terciários de São Paulo durante cinco anos.

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Durante o período de estudo foram analisados 126 pacientes, sendo 108 deles acompanhados pelo grupo de fisioterapia do sono e tendo seu perfil descrito. De acordo com arquivos médicos revisados, a média de idade dos pacientes analisados foi de 73 anos, sendo 70% do sexo masculino. A comorbidade prevalente foi hipertensão arterial sistêmica (80%), seguida por diabetes mellitus (50%). Quanto ao uso de CPAP, 74% aderiram ao tratamento durante a hospitalização.

Descritores | Apneia Obstrutiva do Sono; Pressão Positiva Contínua nas Vias Aéreas; Serviço Hospitalar de Fisioterapia; Pacientes Internados.

RESUMEN | La apnea obstructiva del sueño (AOS) es un trastorno respiratorio del sueño con una alta prevalencia asociada a complicaciones cardiovasculares y metabólicas. La adherencia a la terapia CPAP es fundamental para la eficacia del tratamiento y su éxito. El diagnóstico suele ser en el período de hospitalización de los pacientes, quienes no cuentan con un correcto apoyo u orientación sobre los riesgos asociados a este trastorno y la importancia del tratamiento. En este contexto, es muy relevante estandarizar un protocolo de excelencia para el tratamiento de la AOS. El objetivo principal de este estudio fue describir el protocolo implementado en un hospital de atención terciaria. Por otro lado, el objetivo específico fue identificar las características de los pacientes incluidos en el protocolo. Se trata de un estudio retrospectivo y descriptivo, realizado mediante el análisis de las historias clínicas electrónicas de los pacientes incluidos en el protocolo de tratamiento de la AOS, el cual fue desarrollado por el grupo de fisioterapia del sueño para aplicar a pacientes ingresados en un hospital de atención terciaria en São Paulo durante cinco años. Durante el período de estudio se analizaron 126 pacientes, de los cuales 108 recibieron seguimiento del grupo de fisioterapia del sueño para delimitar su perfil. A partir de los registros médicos analizados, la edad media de los pacientes fue de 73 años, con el 70% de hombres. La comorbilidad prevalente fue la hipertensión arterial sistémica (80%), seguida de diabetes mellitus (50%). En cuanto a CPAP, el 74% de ellos adhirió al tratamiento durante la hospitalización.

Palabras clave | Apnea Obstructiva del Sueño, Presión de las Vías Aéreas Positiva Contínua, Servicio de Fisioterapia en Hospital, Pacientes Internos.

INTRODUCTION

Obstructive Sleep Apnea (OSA) is defined by periodic obstructions—complete (apnea) or partial (hypopnea)—of the air flow during sleep, resulting in a disrupted sleep, reduction of the intrathoracic pressure, and oxyhemoglobin desaturation, linked to clinical signs and symptoms[1,2]. This condition is considered an important public health problem due to its high prevalence worldwide, severe health consequences, and relevant economic burden[3]. In the Episono study, Tufik et al.[4] showed OSA is present in one third of the population of the city of São Paulo.

Continuous positive airway pressure (CPAP) is the first-line treatment for moderate to severe OSA, aiming at keeping the airway open during sleep[5,6]. The benefits of a correct treatment include the restoration of sleep architecture[7], the management of daytime sleepiness[5], cognitive improvement[8,9], the improvement of metabolic and cardiovascular parameters[10-13], and improved sleep quality and overall quality of life[14].

Recent evidence has shown that the first week of CPAP therapy can predict long-term adherence[15-18]. Given this context, for the treatment success it is essential that the focus must occur soon after diagnosis, in the patient's first contact with the health professional who will be responsible for presenting and explaining the physiology, symptoms, and consequences of OSA, as well as the advantages and possible complications of the CPAP treatment[15].

Some patients are diagnosed with OSA during hospitalization for other causes, and the indication to treatment onset occurs within the hospital itself. In this scenario, we implemented a protocol to provide guidance and educate the patient about sleep and OSA, as well as starting treatment with the use of CPAP following recent scientific evidence. In this report, we describe this protocol and the characteristics of the patients included.

METHODOLOGY

This is a descriptive and retrospective study conducted via analysis of the database of patients who were hospitalized in the inpatient units of the Hospital Alemão Oswaldo Cruz and were included in the sleep physical therapy protocol from January 2017 to December 2021.

The Sleep Physical Therapy Group (SPTG) was originated from the Sleep Medicine Group. The latter is an institutional group formed by physicians, physical therapists, nurses, and polysomnography technologists from the Neurophysiology ward. The SPTG emerged after meetings and discussions on the importance of specialized and personalized care in patients diagnosed with OSA. The group wrote and implemented the protocol to initiate the OSA treatment in hospitalized patients with interdisciplinary care, skilled professionals, and appropriate devices to treat sleep-disordered breathing.

SPTG care protocol: the medical team requested SPTG evaluation for patients with a suspected diagnosis or with a diagnosis confirmed via type I polysomnography. The positive pressure was indicated to patients who had moderate to severe Apnea-Hypopnea Index (AHI) in the polysomnography. Patients who were considered eligible for the adaptation process were evaluated by the physical therapist based on anamnesis; presence of comorbidities; questions about family, work, physical activity and eating habits; physical examination; polysomnography analysis, and other tests. After the evaluation, the case was discussed with the multidisciplinary team. The SPTG evaluated which was the best equipment and the best interface for each patient and performed the positive pressure adaptation. Patients who had already purchased the equipment and the mask, but had problems in the adaptation, were instructed to bring them to the hospital, so the adaptation was conducted with their own equipment. For a first adaptation, equipment and mask from the institution were used, and the patient was instructed to purchase the necessary equipment for discharge. Patients were monitored until hospital discharge via scheduled reevaluations, analysis of the equipment report, change of parameters according to the complaint, complaints resolution, and educational guidance. Patients who performed at least four hours of positive pressure use on at least 70% of the follow-up days were considered adherent.

Figure 1 shows details of how the request, evaluation, and follow-up flow work.

The following devices and interfaces were used during adaptation and treatment phases: S9 AutoSet™ (ResMed), AirSense™ 10 (ResMed), Stellar™ 150 (ResMed), RESmart™ (BMC); Swift™ FX Nano (ResMed), Swift™ FX pillow (ResMed), iVolve N2 (BMC), F1B iVolve (BMC), Comfo Mask (Hsiner). The software ResScan™ (ResMed), PAP link (BMC) was also used to download and analyze the data.

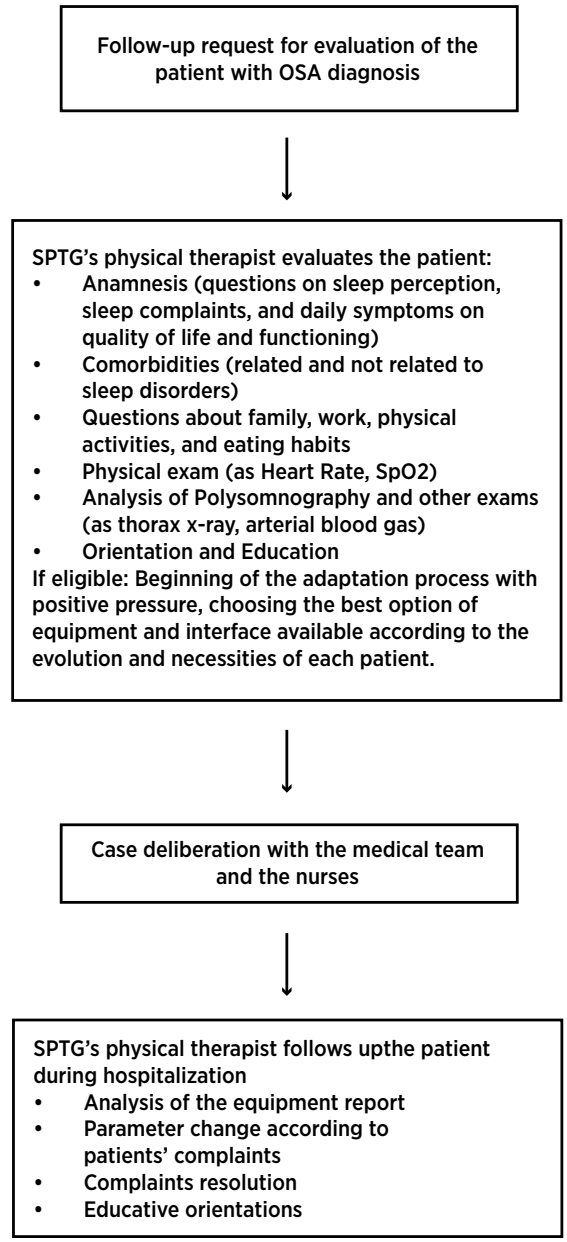


Figure 1. SPTG request, evaluation, and follow-up flow

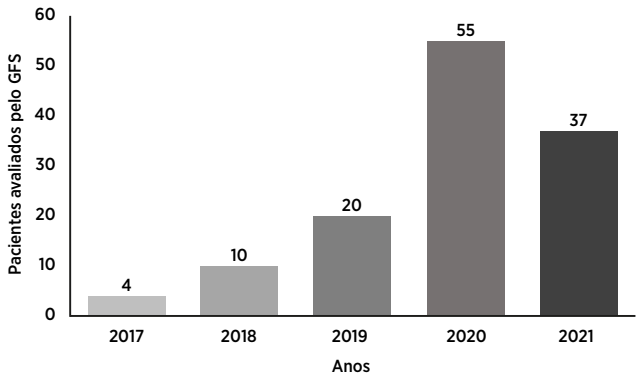
Data from the medical record were manually selected and added to the database. Only the medical records of patients who had previously been followed up with the SPTG and the specific information used in this study were accessed, maintaining the privacy and confidentiality of the patients' data.

The analyses were conducted using SPSS 24.0. Continuous variables with normal distribution are shown

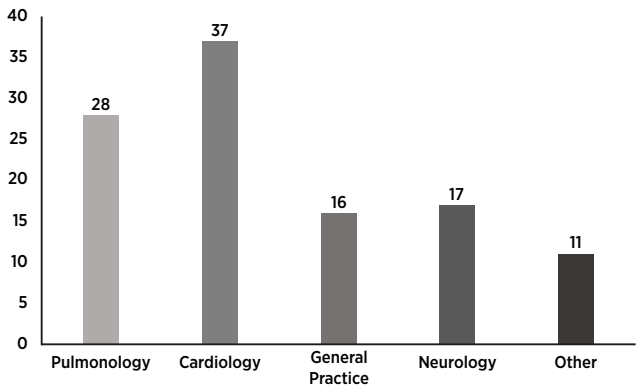
by mean and standard deviation. Categorical variables are presented in absolute and relative frequency.

RESULTS

From January 2017 to December 2021, 126 patients were evaluated by the SPTG. Graph 1 shows the follow-up requests by the SPTG over the years. Overall, follow-up requests increased in this period, except from 2020 to 2021. Graph 2 shows the request for follow-up of the SPTG stratified by medical specialty. Cardiology is the specialty that requested evaluation by the SPTG the most, followed by Pulmonology, Neurology, and General Practice.



Graph 1. Follow-up request by the SPTG over the years.



Graph 2. Request for follow-up by SPTG by medical specialization

After the first SPTG evaluation, 18 patients received adequate guidance and were not eligible for follow-up (main reasons: request for follow-up shortly before discharge; patient was already using CPAP; well oriented, needed solely additional guidance or clarification of doubts); 108 patients were followed up by the SPTG, and their characteristics are described below; nine patients (8.33%) had not undergone polysomnography, but were very symptomatic, with sleep-related complaints, and the adaptation was performed with automatic equipment and report follow-up.

Table 1 shows the characteristics of the studied population. Overall, it was composed of older adults, predominantly male, and overweight. A significant proportion of them had comorbidities such as hypertension, diabetes, and obesity. Daytime and nocturnal complaints were observed in 60.2% and 67.6% of them, respectively. Half of the sample had already been diagnosed with OSA, and 38% had already used CPAP treatment. Among patients, 74.1% were considered adherent to CPAP therapy.

Table 1. Patients' characteristics

	Total N=108
Male, n (%)	76 (70.4)
Age	
Years, mean (SD)	73±13
Age ≥60 years, n (%)	92 (85.2)
BMI, Kg/m^2, mean (SD)	31.57±7.25
BMI classification, n (%)	
<25 Kg/m^2	21 (19.4)
25 Kg/m^2 < 30 Kg/m^2	26 (24.1)
≥30 Kg/m^2	61 (56.5)
Comorbidities	
Hypertension, n (%)	87 (80.6)
Diabetes, n (%)	55 (50.9)
Arrhythmia, n (%)	29 (26.9)
Congestive heart failure, n (%)	11 (10.2)
Coronary artery disease, n (%)	11 (10.2)
Previous cardiovascular event, n (%)	46 (42.6)
COPD, n (%)	11 (10.2)
Active smoking, n (%)	19 (17.6)
Sleep-related complaints	
Daytime complaints, n (%)	65 (60.2)
Nocturnal complaints, n (%)	73 (67.6)
Previous OSA, n (%)	54 (50)
Previous treatment with CPAP, n (%)	41 (38)
Patient adherence* during hospitalization, n (%)	80 (74.1)

SD: standard deviation; BMI: body mass index; COPD: chronic obstructive pulmonary disease; OSA: obstructive sleep apnea; CPAP: continuous positive airway pressure

*Adherence to CPAP therapy was considered when CPAP use was ≥ 4 hours per night for at least 70% of the days monitored.

DISCUSSION

To the best of our knowledge, this was the first study that described a protocol implemented to treat patients

diagnosed with in-hospital OSA. The results showed data consistent with the literature, since the characteristics of patients followed up by the SPTG are typically found in individuals with OSA[4,19]. Initially, the group followed-up a few patients. One of the reasons for the growth in this number was the understanding of the medical team, which acknowledged the importance of evaluation and follow-up by the SPTG; another reason is the dissemination of information about the work of the SPTG within the hospital by health care providers/care staff. In 2020 and 2021, there was a reduction in follow-up requests attributed to the COVID-19 pandemic, impacting several activities and services at the hospital[20,21].

The protocol's relevance is clear, since previous studies have shown the importance of identifying and treating patients with OSA. A large cohort of patients studied by Sharma et al.[22] in a tertiary hospital has shown that CPAP intervention in patients with high-risk OSA can reduce rapid response system events (a safety tool designed for early detection and intervention in a worsening patient admitted to the inpatient unit). OSA is associated with poor clinical outcomes in hospitalized patients, such as increased length of hospital stay and some cardiorespiratory, neurological, and renal complications, although the mortality risk has not been established[23].

One review showed OSA has a 48% prevalence among patients with cardiovascular disease in the hospital, being a very common comorbidity[24]. Spurr et al.[25] reported a low rate of use of CPAP therapy, approximately 5.8%, during hospital stay in patients diagnosed with OSA. The authors indicated that such low rates should be related to the scarce public policies and the few resources in health units for OSA treatment.

It is noteworthy that adherence is the main challenge of any chronic diseases treatment[26]. In our protocol, we use scientific evidence to improve adherence and success with CPAP therapy[27-33]. The SPTG is composed of physical therapists with experience in sleep disorders, capable of: evaluating the patient; analyzing polysomnography; discussing the case with the multidisciplinary team; choosing the positive pressure equipment; the interface (the nasal mask is considered the first option of choice, because it has a smaller contact area with the face, is more comfortable, require lower pressure and have less leakage)[34,35]; the use of comfort accessories (such as humidifier, ramp and expiratory pressure relief), and follow-up of the patient throughout the therapy while in the hospital (analyzing the effectiveness of the therapy, controlling for possible adverse effects). Additionally, there is a special focus on education, reinforcing the importance of treatment at each visit and promoting sleep hygiene, among other guidelines. In the sample, 74.1% of the patients showed good adherence to the CPAP treatment in the follow-up period. However, adherence rates are controversial in the literature. A recent study based on analyses of a database used in telemonitoring showed that adherence rates are greater than 70% in Brazil, Mexico, and the United States[36].

This study has strengths and limitations. We have implemented a robust evidence-based protocol that meets the real need of a large hospital in São Paulo and we believe that sharing our experience and data can encourage other institutions and professionals. This research has a descriptive and retrospective design. However, we were unable to measure the real impact of long-term adherence and potential benefits. Follow-up occurred only in the hospitalization, and we do not know the long-term consequence of the protocol. The data were obtained by accessing information in the electronic medical record, which implies the risk of losing the confidentiality of the information.

CONCLUSION

Implementation of the protocol for hospitalized patients diagnosed with OSA is feasible. Its description represented the standardization of conducts based on the best scientific evidence, the acknowledgement of the performance and importance of the SPTG, as well as the possibility of better care practices with the analysis of the characteristics of the studied population.

Although this is a descriptive study, recent evidence shows that specialized and individualized treatment for OSA from diagnosis can predict adherence and long-term benefits, promoting a safe discharge of patients monitored by the team.

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