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COMMENTARY

The implementation of electronic health records in positive airway pressure tracking systems for better patient care: where are we now?

Commentary on Locke BW, Neill SE, Howe HE, Crotty MC, Kim J, Sundar KM. Electronic health record-derived outcomes in obstructive sleep apnea managed with positive airway pressure tracking systems. *J Clin Sleep Med*. 2022;18(3):885–894. doi: 10.5664/jcsm.9750

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Obstructive sleep apnea (OSA) is a common sleep-related breathing disorder. It is associated with several comorbid diseases and health conditions (such as cardiovascular, cerebrovascular, metabolic, and other neurocognitive diseases).[1–4] Systemic hypertension is one of the most prevalent chronic diseases in patients with OSA, with prevalence estimates ranging between 30% and 60%.[5] In 1 study, approximately 71% of patients with treatment-resistant hypertension who were screened for sleep-disordered breathing were found to have OSA.[6] Prospective studies also show that moderate and severe OSA is an independent risk factor for incident hypertension.[7]

In this issue of the *Journal of Clinical Sleep Medicine,* Locke et al[8] conducted a retrospective study to compare blood pressure, other cardiometabolic variables (oxygen saturation [SpO_2] and body mass index), laboratory data, and health care expenditures 1 year before and after the new diagnosis of OSA and the initiation of positive airway pressure (PAP) therapy. They used an electronic health record (EHR) to track the manually entered download data from continuous positive airway pressure (CPAP) devices extracted by proprietary tracking systems. Patients were classified as meeting or not meeting treatment adequacy targets (defined by > 4 hours of nightly usage on available downloads and an apnea-hypopnea index [AHI] < 5 events/h). The authors found that in 680 patients with available data after 1 year of treatment with CPAP, the mean systolic blood pressure decreased by 1.23 mm Hg (95% confidence interval [CI] of change, −0.25 to −2.2 mm Hg) and mean diastolic blood pressure decreased by 1.01 mm Hg (95% CI, −0.38 to −1.6 mm Hg). Unexpectedly, the reductions in systolic blood pressure and diastolic blood pressure were not statistically significant between patients meeting treatment adequacy targets and those who did not. Similarly, SpO_2 improved in both patients who met goals and those who did not (meeting goals: 0.33%; 95% CI, 0.14%–0.53%; not meeting goals: 0.33%; 95% CI, 0.10%–0.55%). Mean body mass index did not change following initiation of CPAP therapy, either in the entire cohort or among subgroups meeting treatment adequacy targets. Surprisingly, total health care costs increased by $4,989 (95% CI, $2,816–$7,124) in the year after initiation of CPAP as compared with the previous year.

CPAP is the gold-standard treatment for OSA. Several observational and randomized clinical trials have demonstrated a reduction in blood pressure with CPAP.[9–12] Although other studies have failed to observe a reduction in blood pressure with CPAP, they were characterized by a lack of statistical power and poor adherence.[13,14] In the present study, the inability to control for residual confounding and the relatively small numbers of patients with available data likely contributed to the lack of difference between those meeting treatment targets and those who did not. The treatment targets used in this study were based on a consensus opinion of an expert committee, with an emphasis on compatibility with reimbursement requirements mandated by the Centers for Medicare & Medicaid Services. However, as noted by Locke et al, there has not been any validation that these targets result in better clinical outcomes; actually, some evidence suggests that lesser amounts of adherence may improve sleepiness.[15] Therefore, the authors should be congratulated for their efforts to validate these commonly used CPAP treatment targets, albeit unsuccessfully. More studies are needed in this area.

The primary "take home" from this study is that it is feasible to utilize the EHR to track download data from PAP devices for use in clinical care. It should be noted, however, that this required manual entry of the data into a flow sheet and creation of a custom "flow sheet"; the potential to increase workload and upfront development costs should not be ignored. To achieve maximum efficiency, there needs to be a direct interface from the CPAP device to the EHR utilizing a data transmission protocol that is standard for all CPAP devices and EHRs. Further studies will be needed to determine the cost and benefits of this approach. Additionally, use of the EHR to track CPAP adherence has promise for use in future prospective trials using clinical populations that focus on studying the impact of PAP therapy on systemic hypertension and other OSA-induced comorbid diseases.

CITATION

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DISCLOSURE STATEMENT

Both authors have reviewed and approved this manuscript. Dr. Quan is a consultant for Whispersom, Best Doctors, and DR Capital. He is chair of the Scoring Manual Committee and a member of the Hypopnea Taskforce, both for the American Academy of Sleep Medicine. Dr. Mashaqi reports no conflicts of interest.