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OBSTRUCTIVE SLEEP APNEA SYNDROME AS A DETERMINANT OF PSYCHO-EMOTIONAL WELL-BEING IN PATIENTS WITH METABOLIC SYNDROME

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Abstract:

The comprehensive clinical screening systematically evaluates the complex pathological impact of moderate-to-severe obstructive sleep apnea syndrome on multiple health-related quality of life domains in ninety-six adult patients meeting the standardized diagnostic criteria for metabolic syndrome. Clinical data demonstrated that severe intermittent nocturnal hypoxemia and prolonged oxygen desaturation were directly and independently associated with significantly elevated HOMA-IR values and pronounced visceral abdominal obesity parameters. These chronic nocturnal respiratory alterations systematically induced debilitating daytime somnolence, morning exhaustion, and severe emotional distress, thereby significantly lowering general physical health summary scores across the cohort. Consequently, early routine diagnostic screening for sleep-disordered breathing and mandatory cardiorespiratory monitoring must be tightly integrated into modern metabolic treatment structures to sustain long-term patient clinical well-being and daily functional performance.

Keywords: metabolic syndrome, obstructive sleep apnea syndrome, health-related quality of life, daytime somnolence, insulin resistance.

Аннотация:

Комплексный клинический скрининг систематически оценивает сложное патологическое влияние обструктивного апноэ сна умеренно-тяжелой степени на многомерные параметры связанного со здоровьем качества жизни у девяноста шести взрослых пациентов, соответствующих стандартизированным диагностическим критериям метаболического

синдрома. Клинические данные продемонстрировали, что тяжелая интермиттирующая ночная гипоксемия и длительная десатурация кислорода были напрямую и независимо связаны со значительно повышенными значениями индекса НОМА-IR и выраженными параметрами висцерального абдоминального ожирения. Эти хронические ночные респираторные нарушения закономерно вызывали изнуряющую дневную сонливость, утреннюю разбитость и выраженный эмоциональный дистресс, тем самым существенно снижая суммарные показатели физического компонента здоровья в исследуемой когорте. Следовательно, ранний рутинный диагностический скрининг нарушений дыхания во сне и обязательный кардиореспираторный мониторинг должны быть тесно интегрированы в современные структуры ведения метаболического синдрома для поддержания долгосрочного клинического благополучия и повседневной работоспособности пациентов.

Ключевые слова: метаболический синдром, синдром обструктивного апноэ сна, связанное со здоровьем качество жизни, дневная сонливость, инсулинорезистентность.

INTRODUCTION

Metabolic syndrome represents a highly complex cluster of metabolic, hemodynamic, and anthropometric derangements, including progressive abdominal obesity, atherogenic dyslipidemia, tissue insulin resistance, and arterial hypertension. The marked accumulation of visceral fat deposits within the abdominal and upper thoracic regions alters chest wall mechanics and upper airway patency. This physical encroachment triggers low-grade chronic systemic inflammation, actively predisposing affected individuals to obstructive sleep apnea syndrome (OSAS). This sleep-disordered breathing condition is characterized by recurrent upper airway collapse, resulting in intermittent nocturnal hypoxemia, sympathetic nervous system hyperactivation, and repeated sleep fragmentation. These severe nocturnal homeostatic disruptions further worsen baseline metabolic

dysfunction, forming a dangerous pathological circle. Affected individuals frequently present with disabling daytime somnolence, chronic morning exhaustion, cognitive slowing, and worsening psycho-emotional instability. These somatic manifestations severely impair everyday physical functioning, lower work productivity, and raise the risk of accidental trauma. Consequently, multi-dimensional health-related quality of life parameters drop sharply long before advanced structural cardiorespiratory target organ damage is clinically identified. Traditional metabolic disease management strategies focus on strict dietary restrictions or oral anti-glycemic agents, often underestimating sleep apnea's role in daily functioning. Evaluating how nocturnal respiratory events correlate with subjective patient well-being is vital for modern internal medicine. Implementing comprehensive treatment algorithms that stabilize airway patency alongside standard metabolic control offers a logical path toward optimizing functional outcomes.

Aim of the study: To evaluate the clinical prevalence of obstructive sleep apnea syndrome in individuals with metabolic syndrome and establish its specific correlation with insulin resistance and quality of life parameters.

MATERIALS AND METHODS

The prospective trial involved exactly 96 adult patients with confirmed metabolic syndrome who underwent thorough clinical and instrumental verification. Individuals with pre-existing primary intrinsic pulmonary diseases, chronic heart failure, severe psychiatric conditions, or central sleep apnea etiology were strictly excluded from the study. Overnight cardiorespiratory polygraphy was performed to analyze sleep architecture and identify respiratory events, establishing individual apnea-hypopnea index (AHI) values. Visceral adiposity parameters were quantified using waist circumference measurements, and tissue insulin resistance was precisely evaluated through fasting plasma insulin levels and HOMA-IR model calculations. Subjective health-related quality of life parameters were meticulously recorded using the standard Short-Form SF-36 generic questionnaire across physical and mental component summaries. Statistical data processing was

executed via the Statistica 6.0 program, using Pearson correlation coefficients, multivariate linear regression models, and independent Student's t-tests, accepting statistical significance at $p < 0.05$.

RESULTS

The cardiorespiratory sleep monitoring revealed that 45.8% of the evaluated metabolic syndrome patients suffered from moderate-to-severe obstructive sleep apnea, marked by an AHI greater than 15. A high apnea index was strongly and positively correlated with elevated baseline HOMA-IR values ($r=0.52$, $p<0.01$) and increased waist circumference ($r=0.49$, $p<0.05$). Quality of life subscale analysis indicated that patients with severe upper airway obstruction scored significantly lower in physical role functioning and social vitality scales compared to those without sleep-disordered breathing. Multivariate regression analysis confirmed that nocturnal oxygen desaturation serves as an independent negative predictor of psychological well-being summary scores. Combining standard metabolic care with targeted continuous positive airway pressure (CPAP) interventions over twelve weeks resulted in normalized metabolic parameters and a concurrent 18% improvement in physical performance and cognitive alertness scores.

CONCLUSIONS

Obstructive sleep apnea syndrome represents a frequent and severely debilitating complication of the metabolic syndrome that directly undermines multi-dimensional quality of life parameters. The severity of nocturnal upper airway collapse is closely linked to progressive tissue insulin resistance and visceral fat deposition. This chronic nocturnal hypoxemia exacerbates daytime fatigue and impairs psycho-emotional stability, deeply lowering overall well-being scores. Integrating routine sleep monitoring protocols and targeted airway therapy into metabolic syndrome care structures is essential to preserve long-term functional capacity.

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