



PROGNOSTIC VALUE OF THE 6-MINUTE WALK TEST IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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ABSTRACT

The 6-minute walk test (6MWT) is a simple, non-invasive assessment tool used to evaluate functional exercise capacity in patients with chronic obstructive pulmonary disease (COPD). This study investigates the prognostic significance of 6MWT performance in predicting disease progression, hospitalizations, and mortality among COPD patients. A cohort of individuals with moderate to severe COPD was evaluated using the 6MWT, and outcomes were tracked over a defined follow-up period. Results indicated that a lower 6-minute walking distance (6MWD) was significantly associated with increased risk of exacerbations, reduced quality of life, and higher mortality. These findings support the use of the 6MWT as a valuable predictor of clinical outcomes and as a practical tool for risk stratification in routine COPD management.

ПРОГНОСТИЧЕСКОЕ ЗНАЧЕНИЕ ТЕСТА С 6-МИНУТНОЙ ХОДЬБОЙ ПРИ ХРОНИЧЕСКОЙ ОБСТРУКТИВНОЙ БОЛЕЗНИ ЛЕГКИХ

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ABSTRACT

Тест с 6-минутной ходьбой (6MWT) — это простой неинвазивный метод оценки, используемый для оценки функциональной толерантности к физической нагрузке у пациентов с хронической обструктивной болезнью легких (ХОБЛ). В данном исследовании изучается прогностическая значимость показателей 6MWT в прогнозировании прогрессирования заболевания, госпитализаций и смертности среди пациентов с ХОБЛ. Группа лиц с ХОБЛ средней и тяжелой степени тяжести была оценена с использованием 6MWT, а результаты отслеживались в течение определенного периода наблюдения. Результаты показали, что меньшая дистанция 6-минутной ходьбы (6MWD) была в значительной степени связана с повышенным риском



обострений, снижением качества жизни и более высокой смертностью. Эти результаты подтверждают целесообразность использования 6MWT в качестве ценного предиктора клинических результатов и практического инструмента для стратификации риска при рутинном лечении ХОБЛ.

SURUNKALI OBSTRUKTIV O'PKA KASALLIGIDA 6 MINUTLIK YURISH TESTINING PROGNOSTIK QIYMATI

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ABSTRACT

6 daqiqalik yurish testi (6MWT) surunkali obstruktiv o'pka kasalligi (KOA) bo'lgan bemorlarda funktsional mashqlar qobiliyatini baholash uchun ishlatiladigan oddiy, invaziv bo'lmagan baholash vositasidir. Ushbu tadqiqot KOA bilan og'riqan bemorlarda kasallikning rivojlanishini, kasalxonaga yotqizishni va o'limni bashorat qilishda 6MWT ishlashining prognozik ahamiyatini o'rganadi. O'rtacha va og'ir KOA bilan og'riqan shaxslar guruhi 6MWT yordamida baholandi va natijalar belgilangan kuzatuv davrida kuzatildi. Natijalar shuni ko'rsatdiki, 6 daqiqalik yurish masofasining pastligi (6MWD) alevlenme xavfining oshishi, hayot sifatining pasayishi va o'lim darajasining oshishi bilan bog'liq. Ushbu topilmalar 6MWT dan klinik natijalarning qimmatli bashoratchisi va KOA ni muntazam boshqarishda xavfni stratifikatsiya qilish uchun amaliy vosita sifatida foydalanishni qo'llab-quvvatlaydi.

Introduction. Chronic obstructive pulmonary disease (COPD) is a leading cause of morbidity and mortality worldwide, characterized by persistent respiratory symptoms and airflow limitation due to airway and/or alveolar abnormalities [1]. Accurate assessment of disease severity and prognosis is essential for effective management and individualized treatment planning. While spirometry remains the gold standard for diagnosing COPD, it often fails to capture the full spectrum of functional impairment, especially exercise intolerance, which is a hallmark of disease progression.

The 6-minute walk test (6MWT) has emerged as a practical, low-cost method for evaluating submaximal exercise capacity in COPD patients. It reflects the integrated function of the pulmonary, cardiovascular, and musculoskeletal systems and correlates well with quality of life and daily physical activity levels [2]. Increasing evidence suggests that the distance walked during the 6MWT — the 6-minute walk distance (6MWD) — not only reflects functional limitation but also has prognostic value in predicting outcomes such as hospitalization and mortality [3].



This study aims to evaluate the prognostic utility of the 6MWT in patients with COPD by analyzing its association with disease outcomes over time. Understanding this relationship may enhance clinical decision-making and support early interventions to improve patient prognosis.

Literature Review. The 6MWT was first introduced as part of the American Thoracic Society (ATS) guidelines for the assessment of functional exercise capacity in patients with chronic respiratory disease [4]. Its simplicity and reproducibility have made it a widely used tool in both clinical and research settings. The 6MWD has been shown to correlate with peak oxygen uptake (VO_2 max), a key indicator of aerobic capacity, and with patient-reported outcomes such as dyspnea and health-related quality of life [5].

Several studies have demonstrated the prognostic value of the 6MWT in COPD. Pinto-Plata et al. found that a 6MWD of less than 350 meters was a strong predictor of mortality in COPD patients, independent of FEV₁ and other clinical variables [6]. Similarly, Cote et al. reported that a reduced 6MWD was associated with increased hospitalization rates and disease exacerbations [7]. The BODE index (Body mass index, airflow Obstruction, Dyspnea, and Exercise capacity), which includes the 6MWD, is considered one of the most robust multidimensional tools for predicting mortality in COPD [8].

Despite its widespread use, some limitations of the 6MWT have been noted. Factors such as motivation, comorbidities (e.g., musculoskeletal disorders), and test standardization can affect its reliability. Nonetheless, when performed under standardized conditions, the test provides critical insights into the functional status and prognosis of COPD patients [9]. In conclusion, the growing body of evidence supports the role of the 6MWT not only as a functional measure but also as a reliable prognostic tool in COPD. This study seeks to further explore these associations within a defined clinical cohort, reinforcing the relevance of the 6MWT in routine COPD care.

Methodology. This prospective observational study was conducted at a tertiary pulmonary care center between January 2022 and December 2023. A total of 120 patients with clinically diagnosed moderate to severe chronic obstructive pulmonary disease (COPD), based on GOLD 2023 criteria [1], were enrolled.

Inclusion Criteria:

Adults aged 40–80 years

Confirmed diagnosis of COPD with FEV₁/FVC < 0.70 after bronchodilation

Clinically stable (no exacerbation in the past 4 weeks).

Exclusion Criteria:

History of recent myocardial infarction or unstable cardiac disease.

Severe musculoskeletal or neurological conditions limiting walking.

Incomplete follow-up data.

6-Minute Walk Test Procedure:

All participants underwent a standardized 6-minute walk test (6MWT) according to ATS/ERS guidelines [2,3]. The test was performed indoors on a 30-meter straight course. Vital signs (heart rate, oxygen saturation, blood pressure) were measured before and after the test. The 6-minute walk distance (6MWD) was recorded in meters.

Follow-Up and Outcome Measures:



- Participants were followed for 12 months. The primary outcomes were:
- All-cause mortality,
- COPD-related hospitalizations,
- Frequency of exacerbations (requiring antibiotics or steroids).
- Cut-off points for 6MWD were categorized based on previous literature
- ≥ 350 meters (normal prognosis)
- 200–349 meters (moderate risk)
- < 200 meters (high risk) [6,10]

Statistical analysis was conducted using SPSS v.27. Kaplan–Meier survival analysis was used to assess mortality across 6MWD groups. Cox proportional hazards models were applied for multivariate analysis, adjusting for age, BMI, FEV₁, and comorbidities.

Results

Among the 120 enrolled patients (78 males, 42 females), the mean age was 66.2 ± 7.8 years. The average FEV₁ was 44.5% predicted, and the mean 6MWD was 321 ± 92 meters.

Prognostic Stratification by 6MWD:

Group 1 (≥ 350 m): 42 patients (35%)

Group 2 (200–349 m): 53 patients (44%)

Group 3 (< 200 m): 25 patients (21%)

12-Month Outcomes:

Mortality:

Group 1: 1 death (2.4%)

Group 2: 5 deaths (9.4%)

Group 3: 9 deaths (36%)

Hospitalizations:

Group 1: 12%

Group 2: 28%

Group 3: 56%

Exacerbations:

Mean number per patient/year:

Group 1: 1.1

Group 2: 2.0

Group 3: 3.4

The Kaplan–Meier survival curve showed a significant difference in mortality across the three groups (Log-rank test, $p < 0.01$). In multivariate Cox analysis, a 6MWD < 200 m was independently associated with a 3.6-fold increased risk of mortality (HR: 3.63, 95% CI: 1.52–8.67, $p = 0.004$), even after adjusting for FEV₁ and BMI.

Discussion. This study reinforces the prognostic significance of the 6-minute walk test in COPD, demonstrating that reduced 6MWD is independently associated with increased mortality, hospitalizations, and exacerbation rates over a 12-month period. Our findings are consistent with those of Pinto-Plata et al. and Cote et al., who identified 6MWD as a key predictor of survival and clinical deterioration in COPD [6,7]. The 6MWD reflects the integrative response of various physiological systems, including pulmonary, cardiovascular, and muscular function. A walking distance of less than 200 meters emerged as a critical threshold associated



with poor prognosis — corroborating thresholds suggested in previous meta-analyses [10]. In fact, walking distance has been proposed as a surrogate for overall disease burden in COPD, with prognostic value comparable to composite scores like the BODE index [8,11].

Importantly, the test's simplicity and reproducibility make it suitable for use in outpatient and resource-limited settings. Moreover, it may serve as a motivational benchmark for pulmonary rehabilitation and physical activity promotion.

Nevertheless, limitations of the 6MWT include variability due to effort, comorbidities (e.g., arthritis, heart failure), and learning effects over repeated trials. Future research should explore combining 6MWT with other biomarkers (e.g., NT-proBNP, CRP) or imaging markers to enhance prognostic accuracy [12].

Conclusion. The 6-minute walk test (6MWT) serves as a valuable, non-invasive tool for assessing functional exercise capacity in patients with chronic obstructive pulmonary disease (COPD). This study highlights the prognostic significance of 6MWD, demonstrating that reduced walking distance is associated with increased risk of mortality, exacerbations, and hospitalizations. Our results confirm that a 6MWD of less than 200 meters identifies patients at high risk, with mortality rates significantly higher in this group.

Given its simplicity, reproducibility, and strong correlation with key clinical outcomes, the 6MWT should be integrated into routine COPD management for early risk stratification. It offers clinicians an accessible, reliable method to monitor disease progression and tailor therapeutic interventions. While the 6MWT does not replace more comprehensive assessments like spirometry, its role in enhancing the clinical care of COPD patients is unquestionable. Future studies are encouraged to examine the long-term impact of rehabilitation programs on 6MWD and explore potential combinations with other biomarkers to improve predictive accuracy. Overall, the 6MWT provides a meaningful, cost-effective means of evaluating the functional capacity of COPD patients and guiding clinical decision-making.

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