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OPTIMIZATION OF PALLIATIVE CHEMOTHERAPY AND IMPROVEMENT OF QUALITY OF LIFE IN PATIENTS WITH BREAST CANCER ACCOMPANIED BY PULMONARY METASTASES: A STRUCTURED LITERATURE REVIEW

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Abstract

Background: Pulmonary metastases are frequently observed in advanced breast cancer and significantly contribute to morbidity and mortality. Palliative chemotherapy remains an essential component of treatment, aiming to control disease progression, alleviate symptoms, and maintain quality of life.

Objective: To analyze contemporary evidence regarding optimization of palliative chemotherapy and quality-of-life improvement in patients with breast cancer accompanied by pulmonary metastases.

Materials and Methods: A structured literature review was conducted using publications indexed in PubMed, Scopus, Web of Science, and Google Scholar. Studies published between 2015 and 2025 addressing palliative chemotherapy, metastatic breast cancer, pulmonary metastases, supportive care, and quality-of-life outcomes were included.

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Results: Current evidence demonstrates that individualized treatment selection based on tumor biology, performance status, previous treatment exposure, and patient preferences significantly improves clinical outcomes. Modern chemotherapy regimens combined with supportive care interventions contribute to symptom reduction and quality-of-life preservation.

Conclusion: Optimization of palliative chemotherapy requires a multidisciplinary and patient-centered approach integrating effective systemic treatment with comprehensive supportive care and continuous quality-of-life assessment.

Keywords: Breast cancer, pulmonary metastases, palliative chemotherapy, quality of life, metastatic breast cancer, supportive care, oncology.

Introduction

Breast cancer remains the most frequently diagnosed malignancy among women worldwide and continues to represent a major public health challenge. Although advances in screening programs, molecular diagnostics, surgical techniques, radiotherapy, and systemic therapies have significantly improved survival, metastatic breast cancer remains largely incurable. Approximately 20–30% of patients with early-stage breast cancer eventually develop distant metastases, while a proportion of patients present with metastatic disease at initial diagnosis n[1.3].

The lungs represent one of the most common metastatic sites in breast cancer. Pulmonary metastases may occur either as isolated lesions or as part of widespread systemic dissemination involving bone, liver, brain, and other organs. Respiratory symptoms associated with pulmonary metastases frequently include dyspnea, persistent cough, chest discomfort, recurrent infections, and reduced exercise tolerance. These manifestations significantly impair daily functioning and quality of life [2].

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In contemporary oncology, the management of metastatic breast cancer has shifted toward individualized and patient-centered care. Palliative chemotherapy plays a central role in controlling disease progression, reducing symptom burden, preserving organ function, and improving overall well-being. The challenge for clinicians is to achieve the optimal balance between antitumor efficacy and treatment-related toxicity [3.4].

Unlike curative treatment strategies, palliative therapy prioritizes symptom control and quality-of-life preservation. Consequently, therapeutic decision-making requires consideration of numerous factors, including biological subtype, metastatic burden, patient age, comorbidities, performance status, previous treatment exposure, and individual preferences.

The increasing availability of novel therapeutic agents, including taxanes, capecitabine, platinum compounds, antibody-drug conjugates, and targeted therapies, has expanded treatment options for metastatic breast cancer. Simultaneously, advances in supportive care have improved the management of treatment-related adverse events and enhanced quality-of-life outcomes.

The purpose of this review is to evaluate contemporary approaches to optimizing palliative chemotherapy and improving quality of life in patients with breast cancer accompanied by pulmonary metastases.

Materials and Methods

A structured literature review was performed to evaluate current approaches to palliative chemotherapy and quality-of-life improvement in patients with breast cancer accompanied by pulmonary metastases. Scientific publications indexed in PubMed, Scopus, Web of Science, Google Scholar, and SpringerLink databases were searched.

The search strategy included combinations of the following keywords: “metastatic breast cancer,” “pulmonary metastases,” “lung metastases,” “palliative chemotherapy,” “quality of life,” “advanced breast cancer,”

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"supportive care," "systemic therapy," "taxanes," "capecitabine," "targeted therapy," and "survival outcomes."

Studies published between January 2015 and March 2025 were considered eligible for inclusion. Additional references were identified through manual review of bibliographies from relevant articles and international oncology guidelines.

Publications addressing chemotherapy effectiveness, symptom management, supportive care interventions, quality-of-life assessment, and treatment-related toxicity in metastatic breast cancer were prioritized.

The review included randomized clinical trials, prospective and retrospective cohort studies, systematic reviews, meta-analyses, and recommendations issued by international oncology organizations. Editorials, conference abstracts without full-text availability, duplicate publications, and studies lacking adequate methodological descriptions were excluded.

A total of 327 potentially relevant publications were initially identified. After screening titles and abstracts, 114 studies were selected for full-text assessment. Following application of inclusion and exclusion criteria, 52 publications were included in the final analysis.

The collected data were categorized according to treatment modality, therapeutic outcomes, toxicity profile, survival indicators, and quality-of-life parameters. Particular attention was given to studies evaluating patient-reported outcomes and symptom control measures.

Results

Analysis of the selected literature demonstrated that palliative chemotherapy remains one of the most effective treatment modalities for patients with pulmonary metastatic breast cancer. Although complete remission is rarely achievable in metastatic settings, substantial improvements in disease control,

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symptom relief, progression-free survival, and quality of life have been reported [5.6].

Treatment effectiveness was found to vary according to biological subtype. Hormone receptor-positive tumors generally demonstrated prolonged disease control with endocrine-based strategies combined with targeted therapies. HER2-positive disease showed significant benefit from anti-HER2 agents integrated with chemotherapy. Triple-negative breast cancer remained associated with less favorable outcomes, although recent advances in immunotherapy and antibody-drug conjugates have improved therapeutic possibilities [7].

Several studies highlighted the importance of early symptom-directed interventions. Patients receiving integrated supportive care alongside systemic therapy consistently reported better physical functioning, reduced symptom burden, and improved emotional well-being [9.11].

Performance status emerged as one of the strongest predictors of treatment outcomes. Patients with ECOG performance scores of 0–1 experienced significantly greater benefits from palliative chemotherapy compared with individuals presenting with advanced functional impairment.

Modern taxane-based regimens demonstrated substantial antitumor activity in pulmonary metastatic disease.

Weekly paclitaxel schedules frequently provided favorable efficacy while maintaining acceptable toxicity profiles. Capecitabine-containing regimens also showed significant clinical benefits, particularly among patients previously treated with anthracyclines and taxanes [10.12.

Combination approaches integrating systemic therapy with supportive care interventions produced the most consistent improvements in patient-reported quality-of-life outcomes.

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Table 1 Summary of Major Therapeutic Approaches in Pulmonary Metastatic Breast Cancer

Treatment Strategy	Main Clinical Benefit	Quality of Life Impact
Taxane-based chemotherapy	Tumor control, symptom reduction	Moderate improvement
Capecitabine therapy	Disease stabilization	Good tolerability
Platinum-containing regimens	Effective in selected patients	Variable
Anti-HER2 therapy	Significant survival benefit	Marked improvement
Endocrine therapy + targeted agents	Long-term disease control	High quality-of-life preservation
Immunotherapy	Benefit in selected TNBC patients	Emerging evidence
Supportive care integration	Symptom management	Significant improvement

Discussion

The findings of this review emphasize the growing importance of individualized treatment approaches in metastatic breast cancer with pulmonary involvement. Historically, treatment decisions were largely based on tumor burden and clinician preference. Contemporary oncology practice increasingly incorporates molecular characteristics, patient preferences, quality-of-life considerations, and expected toxicity profiles into therapeutic planning.

One of the most important observations emerging from recent studies is that survival prolongation alone should not be considered the sole indicator of treatment success. For patients receiving palliative treatment, maintenance of physical functioning, emotional well-being, social participation, and symptom control may be equally important. Consequently, quality-of-life assessment has become an essential component of therapeutic evaluation [14.16].

The introduction of patient-reported outcome measures has significantly enhanced clinicians' ability to monitor treatment effectiveness beyond conventional radiological and laboratory parameters. Instruments such as the EORTC QLQ-C30 and EORTC QLQ-BR23 questionnaires provide valuable insights into symptom burden, treatment tolerability, and psychosocial functioning.

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Another important development concerns the integration of multidisciplinary care. Optimal management frequently requires collaboration among oncologists, palliative care specialists, pulmonologists, psychologists, nutritionists, rehabilitation professionals, and nursing teams. Such collaboration contributes to comprehensive symptom management and improved patient satisfaction [17.18]. Several studies reviewed in this analysis demonstrated that early palliative care integration may improve both quality of life and survival outcomes. Patients receiving coordinated supportive care interventions often experience better symptom control, reduced hospitalization rates, and enhanced treatment adherence [19.20].

Particular attention should be directed toward treatment-related toxicity. While aggressive chemotherapy may provide temporary tumor control, excessive toxicity can significantly compromise patient well-being. Therefore, treatment intensity should always be balanced against expected clinical benefits. Personalized dose modification strategies may help maximize efficacy while minimizing adverse events.

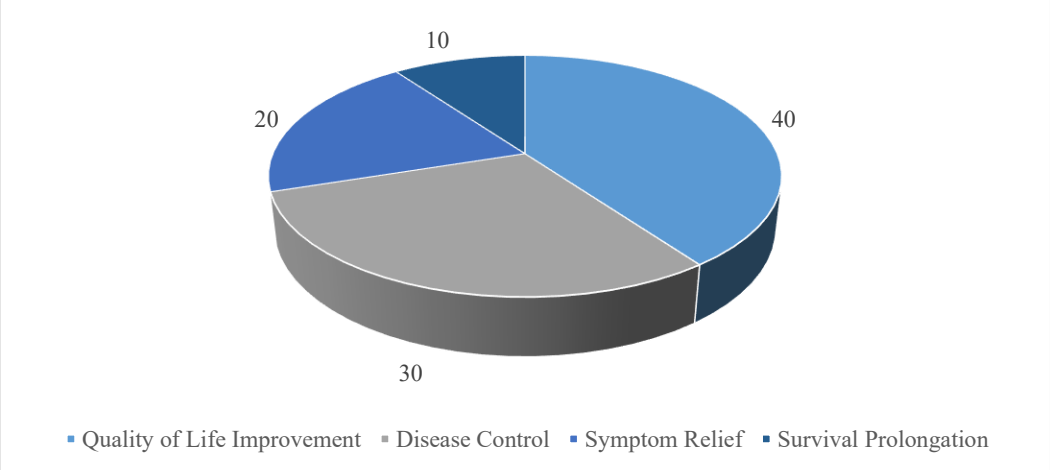

Figure 1. Distribution of Major Treatment Goals in Palliative Management of Pulmonary Metastatic Breast Cancer

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This distribution illustrates the contemporary shift toward patient-centered care in metastatic breast cancer management, where quality of life and symptom control frequently assume equal or greater importance than survival extension alone.

Table 2 Factors Influencing Selection of Palliative Chemotherapy

Factor	Clinical Significance
Performance status	Determines treatment tolerance
Tumor biological subtype	Guides therapy selection
Previous treatment exposure	Influences resistance patterns
Extent of metastatic disease	Affects treatment goals
Comorbid conditions	Impacts toxicity risk
Patient preferences	Supports shared decision-making
Expected quality-of-life benefit	Helps define therapeutic value
Socioeconomic considerations	Influences treatment accessibility

The reviewed evidence consistently supports the concept that optimal palliative chemotherapy should be individualized rather than standardized. Future advances are likely to focus on precision oncology approaches integrating molecular diagnostics, predictive biomarkers, artificial intelligence-assisted decision-making, and patient-centered outcome measures.

Conclusion

Pulmonary metastases represent a major clinical challenge in advanced breast cancer and significantly affect patient quality of life, functional status, and survival. Contemporary evidence demonstrates that palliative chemotherapy remains a fundamental component of treatment, capable of providing meaningful disease control and symptom relief.

The optimization of palliative chemotherapy requires a personalized, multidisciplinary approach that balances antitumor efficacy with treatment tolerability. Patient-centered strategies incorporating quality-of-life assessment, supportive care interventions, and individualized treatment selection appear to offer the greatest clinical benefit.

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Recent advances in systemic therapy, targeted treatment, and supportive care have expanded therapeutic opportunities for patients with metastatic breast cancer. Future progress will likely depend on further integration of molecular medicine, predictive biomarkers, and comprehensive quality-of-life evaluation into routine clinical practice.

The ultimate goal of palliative management should not be limited to prolonging survival but should also encompass preservation of dignity, maintenance of functional independence, symptom control, and improvement of overall quality of life.

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