

Oligometastatic Disease: An Emerging Concept in Oncology

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Introduction

Historically, metastatic triple negative breast cancer (mTNBC) has been considered an incurable disease. It is treated mainly with chemotherapy (CTX) to improve survival and palliate symptoms. Second line CTX has modest activity with response < 20% and time to tumor progression < 6 months. Surgery and radiation are reserved for management of symptomatic or non-responsive disease.

Within this model of care very few metastatic breast cancer patients survive long-term. Median survival (MS) for mTNBC is 2 years and only 1.6% remained relapse free at 15 years.

Metastatic cancers are usually incurable but an emerging concept describes that although most metastatic cancer are disseminated, some may remain locoregionally confined while others progress from locoregional to disseminated. The latter two are defined as oligometastatic (OGM) cancer. OGM tumors may benefit from locoregional therapies (LRT), which include stereotactic body radiation (SBRT), minimally invasive SRG, or ablation. Ablation may be achieved by heat (radiofrequency, microwave, or laser), or by the use of cryoablation (CAB) systems which cool tissue to < -40°C and cause tissue necrosis. CAB can be used in the treatment of bone lesions, renal masses, and lung, prostate, and breast tumors.

Purpose

The present study aims to examine the management of oligometastatic disease and report the efficacy of more aggressive disease management practices aimed at decreasing tumor burden and increasing survival rate and long-term disease control.

Case Description

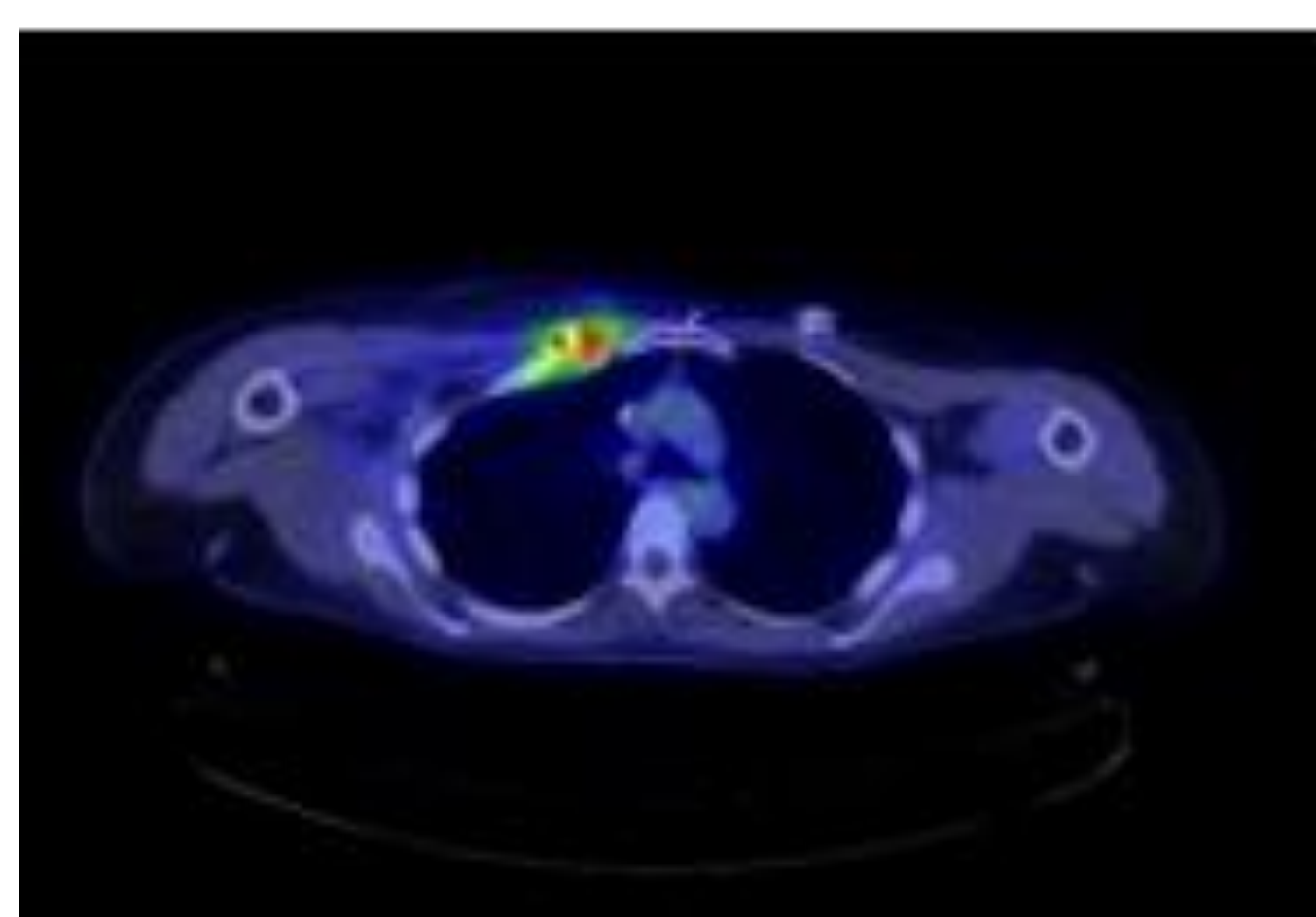
A 46-year old presented with pain in her right axilla. She had been diagnosed with stage II triple negative breast cancer (TNBC) in 2008 treated with surgery (SRG), radiation (XRT) and chemotherapy (CTX). She recurred in the axilla in 2014 treated with SRG and CTX, in the chest wall in 2016 treated with CTX and XRT and an unresectable chest wall mass in 2018. She was considered at high risk for tissue necrosis with additional XRT. She was then treated with chest wall cryoablation (CAB) x 2 with resolution of her symptoms. Pain remained under control for 8 months.

Recognition of OGM Cases

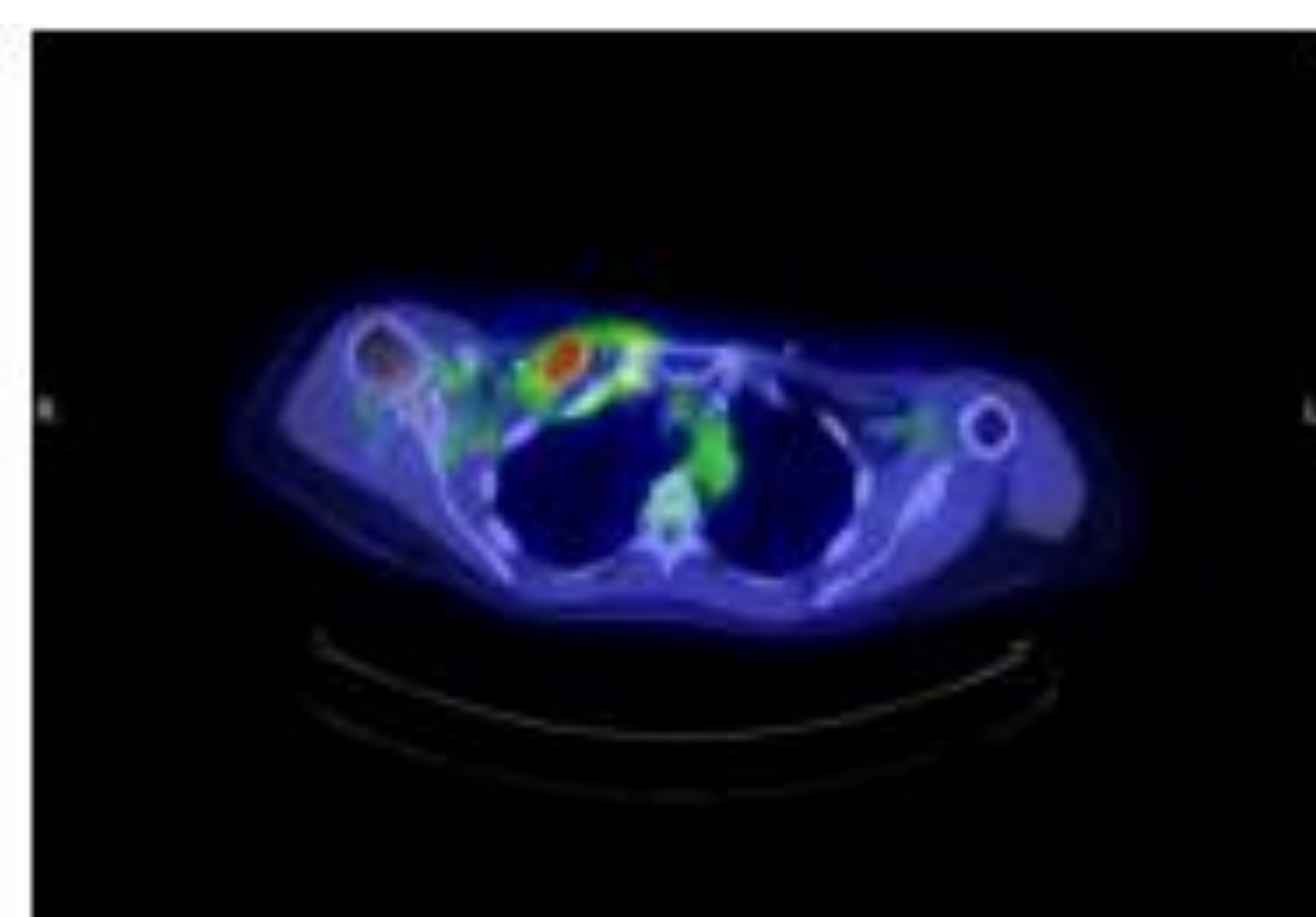
Treatment of OGM disease and improved patient outcome is dependent on the ability to identify these cases. The following research has been conducted in attempts to highlight the differences between oligo- and poly- metastases in cancer patients:

1. A study in 2012 confirmed that oligo- and poly- metastases are distinct entities at both the clinical and molecular level by analyzing microRNA expression patterns from lung metastases. By designating patients into groups based on whether they had high or low rates of tumor progression, the researchers found that MiR-328 and miR-502-5p overlapped in both groups but were consistently under expressed in patients with high rates of progression. Although their role is not yet clear, these microRNAs provide a starting point for further investigation of molecular pathways discriminating between oligo- and poly- metastatic cancers.
2. Circulating tumor cells (CTCs) are also being studied to help identify potential OGM breast cancer patients. Pragmatically, aggressive therapy should be explored in those patients for whom the approach will be beneficial and possibly curative. Therefore, the best prognosis would be for patients in whom the disease is visible, and the ability of existing circulating disease to seed new sites is minimal as identified by CTCs.

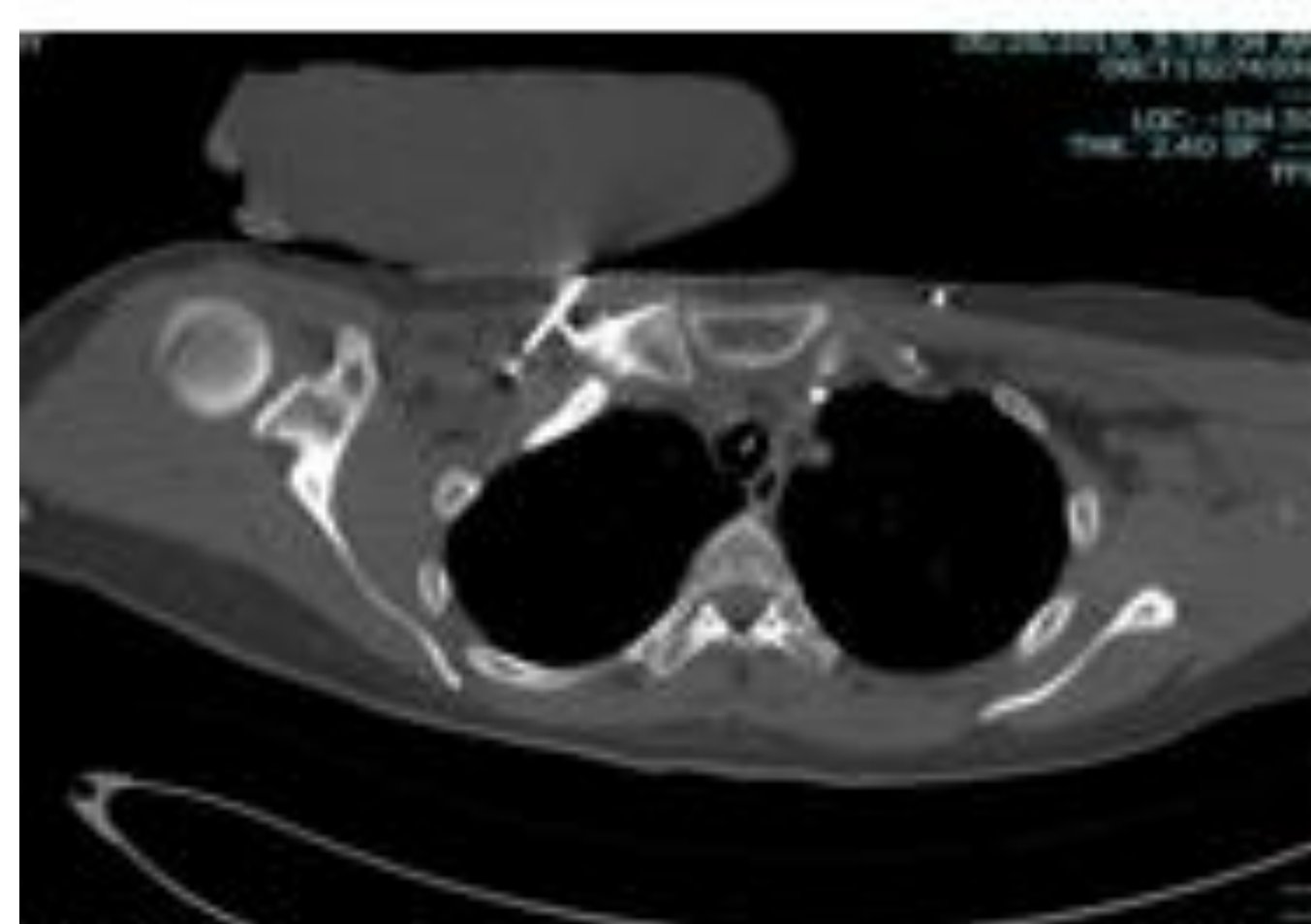
Images



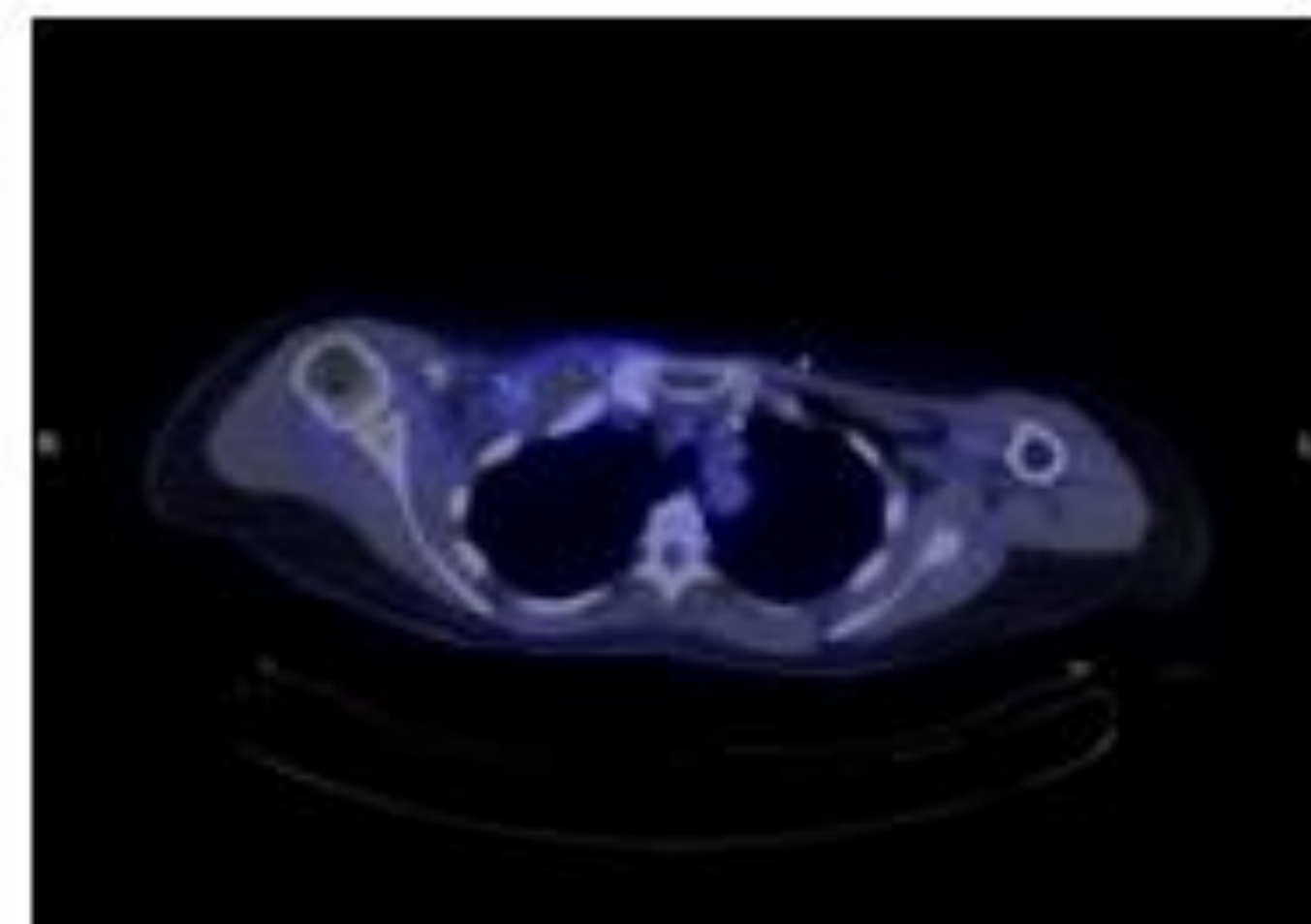
Preop Ablation 2018



Preop Ablation 2019



Intraop Ablation May 2019



Postop Ablation July 2019F

Discussion

This case serves to exemplify the potential benefit of targeted therapy specific for the treatment of OGM cases. Originally, the patient was evaluated for surgical resection; however, she was not considered a surgical candidate and was referred to oncology for palliative care on account of her intense pain. Chest wall cryoablation was eventually performed on the tumor and the patient's pain was relieved.

Metastatic cancer has a very poor prognosis with a 5-yr survival ranging from 4%-38% based on tumor location. Because oligometastatic disease has not yet experienced widespread tumor dissemination, the sites of tumor burden are limited. Therefore, aggressive locoregional treatment could decrease tumor burden and symptomatology.

A prospective randomized clinical trial designed to determine the benefit of local therapy in OGM breast cancer is currently being conducted

Conclusions

Implications for Clinical Practice:

- Patients with a diagnosis of metastatic cancer who have limited seeding sites may benefit from more aggressive treatment and therapy has shown promising results in initial phase 2 trials. Surgical resection of tumors rather than simply palliative care.

Implications for Future Research:

- Further research is warranted for developing screening tools to identify cases of OGM and distinguish them from metastatic cases.
- Precise targeted therapy, specifically for OGM cases is also needed. Current research on stereotactic ablative radiation

References

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