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Diagnostic accuracy of magnetic resonance imaging for predicting pathological complete response in triple-negative breast cancer treated with neoadjuvant chemotherapy and immunotherapy

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Objective: This study aimed to assess the diagnostic performance of preoperative magnetic resonance imaging (MRI) in predicting pathological complete response (pCR) for patients with triple-negative breast cancer undergoing neoadjuvant chemotherapy (NAC) with immunotherapy. **Methods:** This retrospective, single-center, and Institutional Review Board-approved study included female patients diagnosed with triple-negative no special type invasive breast carcinoma, eligible for NAC and immunotherapy, from February 2022 to January 2024. **Results:** Fifty-two patients were included, with a mean age of 46.1 years and a mean tumor size of 39 mm. Regarding treatment response, a high radiological complete response (rCR) rate was observed (84.6%). Among those with rCR, the majority showed a pCR on histopathological evaluation (33 patients; 84.6%), while 5.1% were classified as residual cancer burden (RCB) I and 10.3% as RCB II. Among patients who had only a partial radiological response, 15.3% achieved pCR, 30.8% were classified as RCB I, 46.2% as RCB II, and 7.7% as RCB III (the highest classification) after neoadjuvant treatment. MRI sensitivity for predicting pCR was 94.3%, specificity was 64.7%, positive predictive value was 84.6%, and negative predictive value was 84.6%. MRI accuracy for predicting pCR was 84.6%. During the one-year follow-up, distant metastases occurred in three patients: two rCR (RCB 0 and RCB II) and one partial radiological response (RCB II). One patient died during follow-up, and no cases of locoregional recurrence were documented. **Conclusion:** Our results show that MRI has excellent diagnostic performance in predicting pCR in patients with triple-negative breast cancer treated with NAC associated with immunotherapy.

Keywords: breast cancer; magnetic resonance imaging; neoadjuvant chemotherapy; immunotherapy; pathologic complete response.