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Correlation between PD-L1 expression, demographic and pathological characters in patients with breast cancer

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ABSTRACT

The expression of Programmed Death-Ligand 1 (PD-L1) is associated with immune response evasion in breast cancer, making patients qualified for PD-L1 inhibitors. To better understand the prognostic value of PD-L1 in breast cancer, the aim of the study to discover the correlation between PD-L1 expression and pathological characteristics and the prognostic feathers for breast cancer patients and compare the expression of PD-L1 level for both pre-treatment and post-treatment groups. In total, 142 female patients with breast cancer and 60 healthy females as control were enrolled in the study. ELISA technology was used to evaluate serum PDL-1 expression. Other patient information and tumour data were obtained from pathology reports. At a diagnosis, the mean age for total patients was (50.59 ± 12.61) years range (23-87). The higher PDL-1 expression was in (40-60) age group.PDL-1 was positively significantly associated with age (P=0.001), family history (p=0.0001), and menopausal status (p=0.02). No significant association was found between PD-L1 expression and body mass index. The tumour stage was significantly associated with PD-L1 expression (p=0.0001); the higher expression was found in patients with advanced stages of tumour III and IV (p=0.0001). There were significant differences in the expression of PD-L1 between pre-treatment and post-treatment groups in all stages (p=0.0001). Significantly the PD-L1 expression was associated with metastasis (p=0.0001), and there were significant differences in metastasis patients than non-metastasis for both groups. Significant associations were observed between PD-L1 expression with tumour grade, tumour size, lymph node status, and lymph vascular invasion (p=0.0001). There is a strong positive correlation between the expression of PDL-1 with age, stages, grades, tumour size, lymph node status, and metastasis. Serum expression of PD-L1 was associated to worse prognosis and progressive pathologic characteristics in breast cancer.

Key words: breast cancer, programmed cell death ligand 1 PD-L1, pathologic parameters, disease stage, metastasis.

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INTRODUCTION

Cancer cells are distinguished by their capacity to evade the immune response via a variety of mechanisms for escaping from tumours [1,2]. Immune-editing protects malignant tumours from immune surveillance, which allows for the selection of immune effector-resistant tumour variants and the establishment of an immunosuppressive status within the tumour microenvironment [3]. Tumour evasion by the immune system is mediated by various mechanisms [4]. Establishing a status of immune tolerance is currently identified as a key immune evasion mechanism in cancer cells, and the employing of immune checkpoints to suppress the cell-mediated immune response [3]. Immune checkpoints are inhibitory immune receptors that principally function to maintain self-tolerance and evade immune response overstimulation [5]. Numerous immune checkpoints have been identified in cancers, but the Programmed Death-1 (PD-1) and its ligand, Programmed Death-Ligand 1 (PD-L1), are of particular importance [6]. T cell function and activation are blocked when PD-1 binds to PD-L1 [7]. Preventing the immune response and maintaining tolerance to self-antigens due to PD-1/PD-L1pathway activation under normal conditions. PD-L1 expression in tumours, however, is associated with a reduced immune response in the tumour microenvironment [8]. In several solid cancers, PD-L1 is overexpressed on tumour cells [9-13].

Breast cancer is the most common cancer in women worldwide and the second leading cause of death in cancer patients [14-16]. PD-1 and PD-L1 expression in breast cancer patients have been described in various studies and considerable differences occur in the prognostic impact and expression rates. Nevertheless, the prognostic and predictive effects of the expression of PD-L1 in breast cancer lack unanimity [17]. Atezolizumab (a PD-L1 inhibitor) and Abraxane chemotherapy were recently approved as a combination therapy for the treatment of patients with PD-L1-positive [7]. Immune checkpoint inhibitors are likely to benefit patients with other breast cancer subtypes. We need to study the prevalence expression of immune checkpoint markers in breast cancer patient populations before implementing individual treatment protocol guidelines to provide guidance on potential benefits.

Therefore, data on PD-L1 expression in Iraqi breast cancer patients is lacking. As a result, our study is the first in Iraq to address these characteristics. To better understand the prognostic value of PD-L1 in breast cancer, we conducted a present study