Serum Level of Tumor Marker In Breast Cancer Women In Different Age Groups

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Abstract Breast cancer is the most common crucial cancer in women worldwide. The tumor marker Carcinoma Antigen 15-3 is frequently used for screening and monitoring breast cancer. Carcinoma antigen 15–3 (CA15-3) is used to monitor the prognosis for patients after treatment. This study aims to estimate the level of serum tumor marker CA15-3 in different age groups. Participants women diagnosed with breast cancer living in Iraq were admitted to the Middle East lab (private lab), Al-Harthia city. The study involves 176 females aged from 30 to 80 years. Data was collected from the period between March to November 2021. An automated electrochemistry luminescence immunoassay system (ROCHE E170, Germany) measured serum CA15-3 levels. When the CA15-3 marker level was above or below the cut-off value of 25 U/mL, the marker was counted positive or negative. The current study reveals that CA15-3 in the age group between (33-39) was the highest in 39 years (27.7 U/ml). Furthermore, 47 years exhibited the highest level of CA15-3 (150 U/ml) among (40-49 years) category. Meanwhile, 55 years participants showed the highest level of CA15-3 (101 U/ml) in (50-59 years) age group. 66 years old, on the other hand, showed an elevated level of CA15-3 (72 U/ml) compared to other participants in the (60-69) age group.

1. INTRODUCTION

Worldwide, breast cancer (BC) is one of the most critical cancers in women accounting for around 570,000 deaths in 2015. Strikingly, a quarter of all women diagnosed with cancer are diagnosed with breast cancer each year. 1,2. BC is incurable, primarily due to its metastatic nature, often spreading to distant organs such as the bone, liver, lung, and brain. However, Prognosis and survival rates are better if the disease is discovered early on. Because of early detection, the 5-year survival rate for breast cancer patients is above 80% in North America3. Despite being one of the most critical risk factors for breast cancer, the incidence rate increases with age. In 2016, roughly 99.3% of all mortalities associated with BC in America were reported in women over 404. As a result, women over the age of 40 should schedule a mammography screening in advance.

Cancer Antigen 15-3 (CA15-3) is one of the tumor markers licenced by the Food and Drug Administration (FDA) to monitor breast cancer. CA15-3 is a mucinous glycoprotein that is one of the Mucin1 (MUC-1) gene products, expressed in epithelial cells and linked to colon, breast, ovarian, lung, and pancreatic cancers5. Recent years have witnessed a lot of attention paid to the preoperative CEA and CA15-3 levels in breast cancer. Preoperative CEA and CA15-3 levels may be beneficial in the detection and treatment of breast cancer in various age groups, according to a recent study6. The European Group on Tumor Markers advised that the CEA and CA15-3 levels be used for assessing prognosis, the early detection of disease progression, and treatment monitoring in breast cancer (7). As recently reported, however, they found inconsistent findings when it came to serum tumor markers in breast cancer prognosis. Breast cancer serum tumor marker CA15-3 is being investigated for its diagnostic and prognostic utility in this research.

2. METHODOLOGY

Participants women diagnosed with breast cancer who is living in Iraq admitted to the Middle East lab (private lab) in Al-Harthia city. women were residing in the study area for a minimum of 5 months before the study. Current study participants included 176 females with breast cancer aged from 30 to over 80. Data were collected from the period between March to November 2021. At the morning time, serum samples were collected and transferred in to tubes and kept at −80°C. An hour later, blood collected without anticoagulant and centrifuged at 1600 × g for 10 min at 4°C. Serum CA15-3 levels were asessed utilising an automatic electrochemistry luminescence immunoassay system (ROCHE E170, Germany). The cut-off value for CA15-3 was 25 U/mL, and the value was regarded as positive or negative for the marker depending on whether the amount was above

or below the cut-off number, Microsoft Excel 2016 was used to do the data analysis.

3. RESULTS

Prognostic value of serum CA15-3 levels in breast cancer patients. With different age group
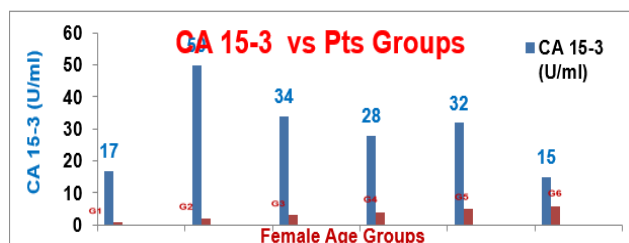

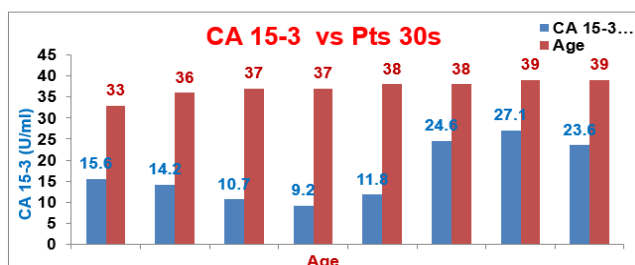**Figure 1** *show the distribution female age group versus CA15-3 levels*

Figure 2 *show the distribution female age group (33-39) versus CA15-3 levels.*
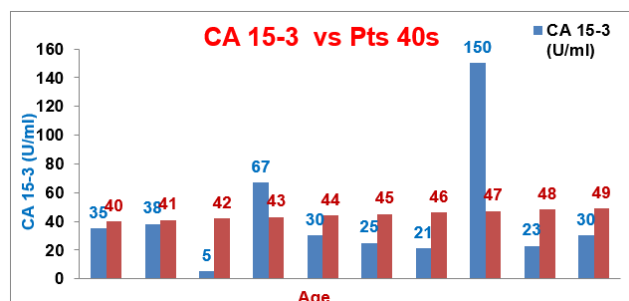

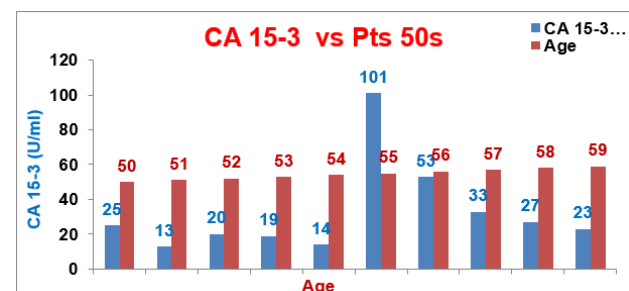**Figure 3** *show the distribution female age group (40-49) versus CA15- levels*

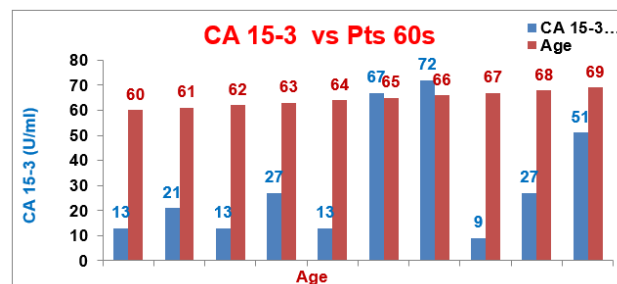**Figure 4** *show the distribution female age group (50-59) versus CA15-3 levels.*

Figure 5 *show the distribution female age group (60-69) versus CA15-3 levels.*
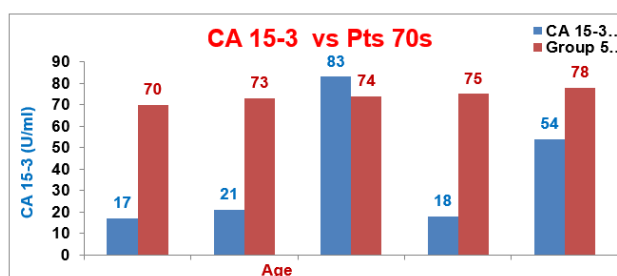

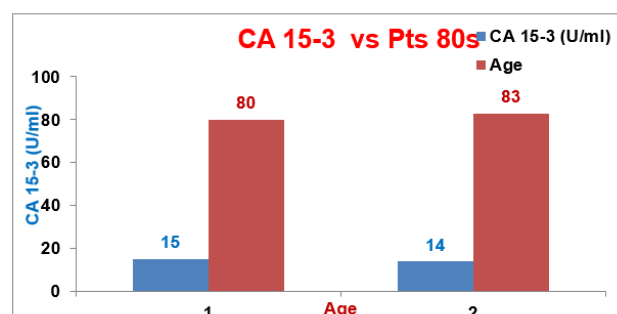**Figure 6** *show the distribution female age group (70-79) versus CA15-3 levels.*

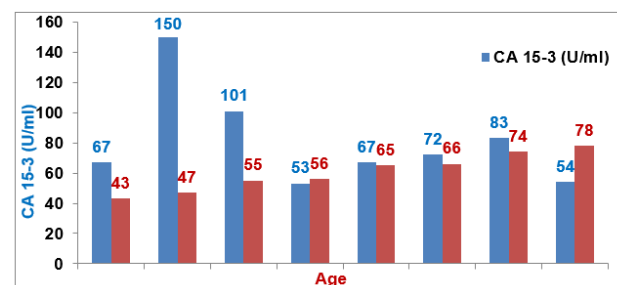**Figure 7** *show the distribution female age group (80-89) versus CA15-3 levels.*

Figure 8 *show the highest CA15-3 levels in different age group.*

4. DISCUSSION

176 individuals were included in the current investigation, and the findings revealed that preoperative blood CA15-3 levels were independent predictors of prognosis in both the early and late stages of the tumor's development. The present research showed that CA15-3 levels were greatest (27.7 U/ml) in the 39 years among (33-39 years) age group. Furthermore, the highest level of CA15-3 (150 U/ml) was

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found in the 47-year-old group within the (40-49 years) age group. Meanwhile, individuals between the ages of 50 and 59 years old had the highest level of CA15-3 (101 U/ml) in the (50-59 years) age group. A higher amount of CA15-3 was found in the blood of individuals aged 66 and older (72 U/ml) as compared to the other participants in the (60-69) age group. 74-year-old Individuals showed the greatest amount of CA15-3 (83 U/ml) in the (70-78) age group. The lowest levels were seen in those over the age of 80 and 83, with 15U/ml and 14U/ml, respectively.

The importance of measuring the level of CA15-3 in BC patients is still up in the air. European Group on Tumor Markers has suggested using CA15-3 levels for assessing prognosis, the early detection of disease progression, and treatment monitoring in BC 8. This may partly because of the inconsistent findings of various studies. On the other hand, a low positive rate of serum tumor markers might play a role in this equation. A study by Wu et.al revealed that CEA and CA15-3 levels were higher in 7.2% and 12.3% of the breast cancer cases, respectively 9.

BC's rate has been consistently increased over the last twenty years. Nevertheless, early identification and increased use of effective systemic treatment improved the survival rates in recent years, and early BC detection accounted for a major part. CA15-3 levels have been shown to correlate with the tumor size and lymph node status (10), and individuals with locally advanced BC had considerably higher levels of CA15-3. With the rise in the number of women diagnosed with early-stage breast cancer, the incidence of aberrant CA 15–3 serum levels was predicted to fall as well. That doesn't imply they don't have a therapeutic value.

Serum tumor markers are less established in breast cancer at the moment due to their lower sensitivity and specificity. Many investigations have shown that CA15-3 and CEA have modest positive rates (11).The American Society of Clinical Oncology (ASCO) recommends the practical use of CA15-3 and CEA as biomarkers for breast cancer despite the fact that they are imperfect. Because CA15-3 is the soluble form of MUC1, its relationship to MUC1's activity may be a factor in its ability to predict prognosis in breast cancer. Activation of membrane receptors by MUC1 has been shown to both help cancer cells to evade the immune system and to increase cancer cell motility.(12)

In conclusion, we demonstrated that the highest level of CA15-3 in the fourth decade of age is a valid prognostic marker since it was directly associated with advanced stages as patients aged, demonstrating the predictive significance of preoperative serum tumor marker CA 15–3.

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