

# Assessment of the D-Dimer Levels and their Correlation with Lymph Node Involvement in Carcinoma Breast

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## Abstract

**Background:** Mammography is a widely used screening approach in the detecting of breast cancer and proved to help reduce the mortality effectively. D-dimer (or D dimer) is a fibrin degradation product (or FDP), a small protein fragment present in the blood after a blood clot is degraded by fibrinolysis. Hence; the present study was undertaken for assessing the d-dimer levels in carcinoma breast. **Materials & methods:** A total of 25 breast carcinoma patients were enrolled. Data was collected using self-structured Performa which consisted of detailed history, thorough examination, investigations and results. Blood venous samples (3 ml) were collected from all patients before any surgical intervention, and clinical staging was done. All the results were recorded and analysed using SPSS software. **Results:** Mean D Dimer levels were found to be 2.458 µg/mL. Mean D-Dimer levels among patients with and without lymph node involvement was 2.896 µg/mL and 1.354 µg/mL respectively. Significant results were obtained while comparing the mean D-Dimer levels among patients with and without lymph node involvement. **Conclusion:** D-dimer was found to be an independent predictive factor for lymph node metastasis. However; further studies are recommended.

**Key words:** D-Dimer, Lymph node, Breast Carcinoma

## INTRODUCTION

For decades together, cervical cancer was the most common cancer in women in India, and more deaths in women in India were attributed to cervical cancer than any other cancer. Anatomically, the breast has milk-producing glands in front the chest wall. They lie on the pectoralis major muscle, and there are ligaments support the breast and attach it to the chest wall. Fifteen to 20 lobes circularly arranged to form the breast.<sup>1-3</sup> Mammography is a widely used screening approach in the detecting of breast cancer and proved to help reduce the mortality effectively. Other screening methods, such as Magnetic Resonance Imaging (MRI), which is more sensitive than mammography, have also been implemented and studied during the last decade. There're numerous risk factors such as sex, aging, estrogen, family history, gene mutations and unhealthy lifestyle, which can increase the possibility of developing breast cancer. Advanced breast cancer is either locally advanced or metastatic spread.<sup>4-6</sup>

The foremost step in tumor metastasis is remodeling and fibrin deposition in the tumor extracellular matrix. A tumor to be successfully metastasize from its original site, it must undergo many coerce steps, this including the invasion into either the vascular or lymphatic lumen, conveyance through the circulation, and establishment of viability in base tissues. D-

dimer (or D dimer) is a fibrin degradation product (or FDP), a small protein fragment present in the blood after a blood clot is degraded by fibrinolysis. It is so named because it contains two D fragments of the fibrin protein joined by a cross-link. D-dimer may prove to be a safe, convenient and easily available biomarker which can be combined with conventional sentinel node biopsy in clinically node-negative breast cancer to assess metastatic-disease in the axilla and reduce false negative results.<sup>7-9</sup>Hence; the present study was undertaken for assessing the d-dimer levels in carcinoma breast.

## MATERIALS & METHODS

The present study was undertaken for assessing the d-dimer levels in carcinoma breast. A total of 25 breast carcinoma patients were enrolled.

### Inclusion Criteria

- All diagnosed patients of carcinoma breast
- Patients willing to give informed written consent.

### Exclusion criteria

- Blood coagulation disorders
- Conditions known to increase coagulation marker levels like DIC, MI, vaso-occlusive crisis in sickle cell disease, thromboembolic events, CLL, mechanical valve repair.
- Smokers.
- Carcinoma breast in males.

Data was collected using self-structured Performa which consisted of detailed history, thorough examination, investigations and results. Blood venous samples (3 ml) were collected from all patients before any surgical intervention, and clinical staging was done including; tumor size, site, nodal involvement, distant metastases (TNM). Ultrasound of abdomen and chest x-ray was taken to each patient. D-dimer levels were analysed using auto-analyser. All the results were recorded and analysed using SPSS software.

## RESULTS

A total of 25 subjects were enrolled. 32 percent and 28 percent of the patients belonged to the age group of 41 to 50 years and 51 to 60 years respectively. Mean age of the patients was 48.52 years. 56 percent of the patients were of postmenopausal status while 44 percent of the patients were of premenopausal status. Mean D Dimer levels were found to be 2.458 µg/mL. Mean D-Dimer levels among patients with and without lymph node involvement was 2.896 µg/mL and 1.354 µg/mL respectively. Significant results were obtained while comparing the mean D-Dimer levels among patients with and without lymph node involvement.

**Table 1:** Age-wise distribution of patients

Age group (years)	Number of patients	Percentage
Less than 30	2	8
30 to 40	4	16
41 to 50	8	32
51 to 60	7	28

<b>More than 60</b>	4	16
<b>Total</b>	25	100

**Table 2:** Distribution of patients according to D-Dimer levels

D-Dimer levels ( $\mu\text{g/mL}$ )	Number of patients	Percentage
$\leq 0.25$	1	4
<b>0.26 to 1</b>	2	8
<b>1.01 to 2</b>	7	28
<b>2.01 to 3</b>	3	12
<b>3.01 to 4</b>	8	32
<b>More than 4</b>	4	16
<b>Total</b>	25	100
<b>Mean <math>\pm</math> SD</b>	2.458 $\pm$ 1.211	

**Table 3:** Correlation of D-Dimer levels with lymph node involvement

Lymph node status	Mean ( $\mu\text{g/mL}$ )	SD
<b>Involved</b>	2.896	1.865
<b>Not involved</b>	1.354	1.315
<b>p- value</b>	0.000 (Significant)	

## DISCUSSION

Usually, cancer is named after the body part in which it originated; thus, breast cancer refers to the erratic growth and proliferation of cells that originate in the breast tissue. There are several types of tumors that may develop within different areas of the breast. Most tumors are the result of benign (non-cancerous) changes within the breast. For example, fibrocystic change is a non-cancerous condition in which women develop cysts (accumulated packets of fluid), fibrosis (formation of scar-like connective tissue), lumpiness, and areas of thickening, tenderness, or breast pain. The D-Dimer is a by-product of the blood clotting and break-down process that can be measured via analysis of a blood sample. D-dimer is released when a blood clot begins to break down.<sup>6-10</sup> Hence; the present study was undertaken for assessing the d-dimer levels in carcinoma breast.

In the present study, A total of 25 subjects were enrolled. 32 percent and 28 percent of the patients belonged to the age group of 41 to 50 years and 51 to 60 years respectively. Mean age of the patients was 48.52 years. 56 percent of the patients were of postmenopausal status while 44 percent of the patients were of premenopausal status. Mean D Dimer levels were found to be 2.458  $\mu\text{g/mL}$ . Patel et al in their study 30 patients of breast carcinoma who underwent radical mastectomy (cases) and 30 cases without carcinoma (controls) were included. Their study showed that high plasma D-dimer levels can be used as a marker for lymph node involvement and higher histopathological grade. Due to the ease with which plasma D-dimer levels can be obtained and its cost effectiveness, quantitative D-dimer levels can be added to models for predicting axillary lymph node involvement.<sup>10</sup> In another study conducted by SH et al, authors evaluated the role of D-dimer in patients of carcinoma breast, in predicting lymph node metastasis in carcinoma patients and to look for relationship of

these markers with histopathologic parameters. Clinical data was obtained from clinical examination of patients admitted in the Department of Surgery with history of breast lump and confirmed with fine needle aspiration cytology (FNAC). Of all histopathologic variables examined, D-dimer levels directly correlated with extent of lymph node involvement and lymphovascular invasion, D-dimer levels correlated strongest with the number of positive lymph nodes, but not with tumor size, estrogen receptor status, and progesterone receptor status. Their study clearly showed that plasma D-Dimer levels are elevated in carcinoma breast patients. Increased D-Dimer levels are an important marker of clinical stage, lymphovascular invasion, lymph node involvement, and tumor metastasis.<sup>11</sup>

In the present study, mean D-Dimer levels among patients with and without lymph node involvement was 2.896  $\mu\text{g/mL}$  and 1.354  $\mu\text{g/mL}$  respectively. Significant results were obtained while comparing the mean D-Dimer levels among patients with and without lymph node involvement. Lu Y et al evaluated the relationship between D-dimer levels and breast cancer. A total of 1244 patients with breast cancer from 15 eligible studies were included in the meta-analysis. D-dimer levels were higher in the breast cancer group than in the benign and healthy control groups. In addition, elevated D-dimer levels were associated with progesterone receptor-negative tumors. Similarly, there was a significant correlation between D-dimer levels and tumor node metastasis staging and lymph node involvement. In contrast, other clinicopathological factors, including estrogen receptor expression and human epidermal growth factor receptor 2 expression, were not associated with D-dimer levels.<sup>12</sup>

## CONCLUSION

D-dimer was found to be an independent predictive factor for lymph node metastasis. However; further studies are recommended.

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