To estimate the serum LDH levels in patients diagnosed of breast carcinoma

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Abstract

Background & Method: This study was carried out over a period of Two Years (August 2014 to August 2016). The study was included 30 female age matched controls which do not have any other breast diseases and 30 female study subjects who had cytopathologically proven BREAST CANCER.

Result: In Study group, out of a total of 30 patients, 15 were found to have abnormal (> 460 IU/ L ) levels of serum LDH. By using Chi-square test p-value < 0.05 therefore there is association between LDH level with group 1 and group 2.

Conclusion: The study had shown significant statistical difference in study group and control group which validates serum Lactate dehydrogenase as diagnostic marker. It is also observed that the values of Lactate dehydrogenase decreases with the due course of treatment, which can judge the response of disease to treatment especially in NACT protocol.

Keywords: serum, LDH, breast & carcinoma

Introduction

Worldwide Breast Cancer is the most common cancer in females with age-adjusted incidence rates of 124/1, 00,000 populations in the USA [1].

The incidence of breast cancer is less in India as compared to western world however it is rising cancer of urban Indian women and the second to carcinoma cervix in the rural women. As per ICMR-population based cancer registry data, breast cancer is the commonest cancer among women in urban registries of Delhi, Mumbai, Ahmedabad, Calcutta and Trivandrum where it constitutes more than 30% of all the cancer in women. In rural Population based cancer registry of Barshi, breast cancer is the second commonest cancer in women after cancer of the cervix [2].

The age adjusted incidence rates (AARs) ranges from 6.2 to 39.5 per 100,000 Indian women, one third that of Western countries with disproportionately higher mortality rate. It is attributed to young age which is associated with larger tumour size, higher number of metastatic lymph nodes, poorer tumor grade, low rates of hormone receptor-positive status, earlier and more frequent loco-regional recurrences and poorer overall survival [2,3]

In India approximately 75,000-80,000 new cases are diagnosed annually as per the cancer registries in the country. The rise in incidence of 0.5-2% per annum has been seen across all regions of India and in all age groups but is more in the younger age group (<45 years) [4, 5]. A recent report by the Indian Council of Medical Research predict the number of breast cancer cases in India to rise to 106,124 in 2015 and to 123,634 in 2020 [6].

Material & Method

This study was carried out over a period of Two Years (August 2014 to August 2016). The study was included 30 female age matched controls which do not have any other breast diseases and 30 female study subjects who had cytopathologically proven Breast Cancer. This study was conducted among the female breast cancer patients proven cytopathologically coming to this hospital.

Serum LDH values was be estimated in these patients.
1. Pre operative.
2. Pre chemotherapy
   A. Neo adjuvant.
B. Adjuvant.
3. 21 days after chemotherapy cycles.
4. 21 days after Surgery.
After seeking informed consent all the patient with breast cancer and controls who are willing to adhere to the estimation of serum LDH pre and post intervention i.e. Surgery/chemotherapy.

Exclusion Criteria
Those who have co morbid diseases like - -
1. Myocardial infarction
2. Myocarditis
3. Muscular dystrophy

Results

Table 1: Serum LDH values in study and control group before intervention

| LDH Group before intervention | Group 1 | Group 2 | Total | p-value |
|-----------------------------|--------|--------|-------|--------|
| Normal (230-460 IU/L)       | 15     | 27     | 42    | 0.002  |
| Abnormal (>460 IU/L)        | 15     | 3      | 18    |        |
| Total                       | 30     | 30     | 60    |        |

By using Chi-square test p-value < 0.05 therefore there is association between LDH level with group 1 and group 2.

Table 2: Levels of Serum LDH in study and control group

| Serum LDH Values (IU/L) | No. of cases |
|------------------------|--------------|
| Study                  | Control      |
| 230 - 460              | 15           | 27           |
| 461 - 500              | 1            | 3            |
| 501-600                | 7            | 0            |
| 601-700                | 4            | 0            |
| 701 - 800              | 1            | 0            |
| 801 - 900              | 0            | 0            |
| More than 900          | 2            | 0            |

Table 3: Distribution of patients with abnormal levels of serum LDH after intervention

| Number of patients with abnormal LDH (before intervention) | Number of patients with abnormal LDH (after intervention) |
|------------------------------------------------------------|----------------------------------------------------------|
| After NACT                                                 | 05                                                       |
| After 21 days of surgery                                   | 15                                                       |
| After 3 cycles of Chemotherapy                             | 13                                                       |

In Study group, out of a total of 30 patients, 15 were found to have abnormal (> 460 IU/L) levels of serum LDH.

Table 4: Distribution of Serum LDH (Abnormal levels from study population) on various time interval

|                     | Mean | No.  |
|---------------------|------|------|
| Before intervention | 657.86 | 15   |
| After NACT          | 522   | 5    |
| After 21 days of surgery | 403.53 | 15   |
| After 3 cycles of chemotherapy | 319.53 | 13   |

Table 5: Serum LDH in relation to Staging of Tumour

| Staging of tumour | Mean LDH (IU/L) |
|-------------------|-----------------|
| I                 | 00              |
| IIA                | 490.09          |
| IIIB               | 406.87          |
| IIIA               | 477.33          |
| IIIB               | 1170            |
| IIIIC              | 00              |
| IV                 | 800             |

Discussion
A number of workers have tried evaluating the role of biomarkers in diagnosis of carcinoma breast but till date biochemical markers have not given promising result about diagnostic criteria [7]. Tumour associated markers reflect behavioural changes from tissue to blood, resulting in change in levels of enzymes, enzyme variants, proteins and hormones both in cancerous tissue and blood because of unchecked proliferation of cells [8]. Therefore alterations in particular enzyme contents in serum could be a good index of malignancy in its early and best manageable stage if sufficiently specific and sensitive.

In the present study the values of Lactate dehydrogenase were observed at various intervals i.e. before intervention, after neo-adjuvant chemotherapy, after 21 days of surgery and after 3 cycles of chemotherapy. Before intervention, out of the 30 cases in study group 15 patients were found to have abnormal (> 460 IU/L) levels of serum LDH as compared to only 3 (out of 30) patients in control group. After intervention significant drop in serum LDH levels was
observed. After NACT, surgery and adjuvant chemotherapy, patients with abnormal levels of serum LDH were 04, 04 and 00 respectively. The mean LDH of study group at different intervals showed a decreasing pattern i.e before intervention (657.86), after NACT (522), after surgery (403.53) and after neo adjuvant chemotherapy (319.53)

The mean Lactate dehydrogenase in patients of breast cancer at the time of presentation was 515.96±197.25 and that of control group was 309±101.32 with a p value 0.0001, p<0.05 which is significant. Similar results were reported by Sandhya Mishra et al. (2004) [9], Amritpal Kaur et al. (2015) [7], RK Seth et al. (2003) [10] and Abdulla Jarari et al. (2013) [11]. Before intervention, the mean Lactate dehydrogenase was 515.96 IU/L with maximum of 1170 IU/L and minimum of 271 IU/L. After 21 days of surgery, the mean Lactate dehydrogenase was 350 IU/L with maximum of 510 IU/L and minimum of 210 IU/L. After 3 cycles of chemotherapy, the mean Lactate dehydrogenase was 296.32 IU/L with maximum of 420 IU/L and minimum of 210 IU/L.

It was observed that the levels of Lactate dehydrogenase significantly reduced with the due course of treatment. Similar results were reported by Sandhya Mishra et al. 2004 [9] and Amritpal Kaur et al. (2015) [7] in which the follow up was 21 days and 1 month respectively. The mean value of Lactate dehydrogenase on 21 days in a study by Sandhya Mishra et al. [9] was 360.2 IU/L which was in near correlation to the mean value of Lactate dehydrogenase in our study which was 435.45 IU/L. It was recommended that 1 month seems to be too short period for any significant change to occur in these parameters and a longer follow up is needed to establish prognostic importance of this investigation”.

Conclusion
The study had shown significant statistical difference in study group and control group which validates serum Lactate dehydrogenase as diagnostic marker. It is also observed that the values of Lactate dehydrogenase decreases with the due course of treatment, which can judge the response of disease to treatment especially in NACT protocol.

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