Summary

Breast cancer is the most common cancer and leading cause of cancer deaths among women worldwide. In 2000, breast cancer resulted in an estimated 189,000 deaths in developed countries and 184,000 deaths in developing countries, accounting for16 and 12 percent, respectively, of all cancer deaths in women **(Ferlay et al., 2000)**.

Adjuvant radiotherapy is administered to those patients who have undergone breast-conserving therapy and post mastectomy patients with primary tumors greater than 5 cm or more than and four positive lymph nodes. Post mastectomy patients with less advanced disease may also be candidates for adjuvant radiotherapy, as two clinical trials have demonstrated a survival advantage for post mastectomy radiotherapy, although confirmatory trials are awaited **(Overgaard et al., 1999)**.

Radiation therapy to the chest has also been shown to have cardiotoxic effects. As an increasing number of women survive breast cancer, the impact of cancer treatment on cardiovascular health is becoming ever more important. Since the early detection and treatment of cardiotoxicity can reduce its clinical effects, it is particularly important that oncologists must be aware of these side-effects and manage them appropriately **(Bird and Swain, 2008).**

The aim of the present work is to identify the clinical and echocardiographic evidence of cardiovascular toxicity and their incidence after radiotherapy in patients who underwent mastectomy for the left sided breast cancer, the present work also aimed to identify risk factors for developing such toxicity.

50 patients were included in the study; their age ranged between 35 to 63 years with a mean of 49.54 ± 8.04. 15 patients (30%) were hypertensive , 6 patients (12%) had diabetes Mellitus, 5 patients (10%) had dyslipidemia. **(Table 1) .**

Patients with advance breast cancer, with metstatasis, with renal or hepatic impairment and those with either valvular or ischemic heart disease were excluded from the study.

All patients included in the study were subjected to the following:

Full history taking, complete general and local examination of the heart, chest and abdomen, 12 leads resting ECG, and full trans thoracic echo-Doppler study before and after 6,9 months of radiotherapy.

Results:

The diastolic BP increased significantly from 69 ± 20.5 mm Hg to 89.3 ± 13.4 mm Hg after 6 months and then it still significantly higher compared to baseline after 9 months (78.9 ± 12.6 mm hg) ($P < 0.05$). The pulse rate and systolic BP changed little with follow up. Six patients (12%) developed new hypertension after 9 months follow up period.

After 6 and 9 months of radiotherapy 3 patients (6%) and 2 patients (4%) had non ischemic chest pain respectively. Those patients had pericardial rub, ECG, and echocardiographic evidence of pericarditis, No patient developed angina pectoris along follow up period.

In the present study 19 patients (38%) after 6 months developed dyspnea and the number increased to 22 patients (44%) after 9 months . the dyspnea in all cases was mild to moderate degree (grade I -II)

After 6 months of follow up a cardiac cause for dyspnea was evident in 9 (18%) patients in the form of diastolic dysfunction the remainder cases [10 patients (20%)] were due to early post radiation pneumonitis and generalized fatigue caused by early doses of radiotherapy.

After 9 months follow up cardiac causes of dyspnea was found in 11 cases (22%) ; systolic dysfunction in one case (2%),and diastolic dysfunction in 10 patients (20%), The remainder cases are [11(22%) patients] had dyspnea due to the development of

early pneuminitis as diagnosed clinically ,and by chest x-ray and by chest specialist **(Table 2).**

After 6 months ECG changes developed in 3 patients in the form of low ECG voltage and sinus tachycardia. After 9 months , there was 5(10%) patients with abnormal ECG ; 2 patients in the form of low ECG voltage and 2 cases developed infrequent premature ventricular contractions and 1 case developed ST –T wave changes.**(Table 2)**

There were a trend for non significant increase in LV dimensions at end systole and end diastole together with a slight decrease in global LV systolic function (percentage of FS and EF) **(Table 3).**

The pulmonary artery systolic pressure increase little on follow up ,no patients developed pulmonary hypertension (Table 3).

One patient (2%) developed systolic dysfunction as evident by significant decrease of EF from 60% to 39.9%. This case had functional mild to moderate mitral regurgitation, abnormal systolic wall motion and resting ST-T wave ECG changes.

Diastolic dysfunction developed in 9 patients (18%) developed diastolic dysfunction at 6 months ; 5 cases (10%) in stage I diastolic dysfunction and 4 cases (8%) in stage II.

After 9 months 10 cases (20%) developed diastolic dysfunction ; five cases (10%) in stage I and the other five in stage II. No one developed stage III **(Table 4).**

The patients with diastolic dysfunction were significantly older than those with normal diastolic function as the mean age of patients with DD was 53.5 ± 5.9 years vs. 43.5 ± 5.5 years ($P < 0.01$). Also the prevalence of hypertension was significantly higher among patients with diastolic dysfunction (30%) than those with normal diastolic function (15%) ($P < 0.001$). The incidence of ECG changes was significantly higher among patients with diastolic dysfunction (30%) than those with normal diastolic function (5%) ($P < 0.01$) **(Table 5).**

There was no significant difference between patients with diastolic dysfunction and those with normal diastolic function regarding the prevalence of dyslipidemia and diabetes Mellitus ($P > 0.05$) **(Table 5).**

The overall incidence of cardiac complications after radiotherapy was 50% i.e. one half of the studied population had one ore more complications , The complications distributed as follows **(Table 6)** :

mild to moderate heart failure (22%) [systolic in 2% and diastolic in 20%], hypertension (12%), ECG abnormalities (10%), mitral regurgitation (2%) and pericardial effusion (6%).

The complications were age dependent while other risk factors such as hypertension , diabetes ,and dyslipidemia had no significant relation **(Table 7&8).**