NEED FOR ROUTINE X-RAY CHEST AND ULTRASONOGRAPHY OF LIVER IN WORKUP, DIAGNOSIS AND STAGING OF EARLY CARCINOMA OF BREAST IN PATIENTS PRESENTING FIRST TIME: A PROSPECTIVE SINGLE INSTITUTIONAL STUDY

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ABSTRACT

BACKGROUND

Carcinoma breast is a common malignant tumour in urban Indian women and second common among the rural. Early diagnosis and prompt treatment reduces the incidence of metastases and complication. The work-up and staging of invasive breast cancer includes: history and physical exam, a complete blood cell count, liver function tests, bilateral diagnostic mammography, breast Ultrasonography if necessary; tumour ER and PR determinations, HER-2 tumour status determination and pathology review. Mammography and thorough clinical workup in every suspected patient result in initiating early management.

Aim of the Study- To find out the percentage of early breast cancer (Stages I and II) cases without any systemic symptoms and signs of metastasis, which are upgraded to metastatic breast cancer with the detection of findings in routinely done Chest radiography and Liver Ultrasonography.

MATERIALS AND METHODS

A retrospective analytical study of 1112 patients with invasive carcinoma attending the Govt. Medical College, Kozhikode between 2008 and 2011; 909 out of 1112 patients were included as per criteria, out of which 505 patients were having early carcinoma breast. Out of 1842 radiological investigations 909 Chest x-rays, 909 Liver ultrasonograms, 10 CT abdomen, 8 CT chest and 6 Bone scans were analysed. True-positive result was determined as being one that unequivocally confirmed metastatic disease. A false-positive result was taken as being any staging investigation that was initially reported as being either abnormal or indeterminate, but upon subsequent investigation was proven to be negative.

RESULTS

Majority of the patients were aged above 45 years accounting for 58% of post-menopausal age; 6 were male patients; 2 patients had bilateral disease. Less than 6 months duration of symptoms was found in majority of them; 96% patients had Invasive Ductal Carcinoma and 15 (1.65%) out of 909 cases had Stage I disease, while 54.45% cases had Stage II and 43.9% had Stage III breast cancer; 35 out of 909 patients had metastasis detected either in the lung or liver with the help of CXR and LUS; 4 out of 35 cases had early stage breast cancer, while the rest belonged to the group of locally advanced breast cancer.

CONCLUSIONS

In conclusion our study strengthens the recommendation to limit baseline staging tests, especially LUS and CXR, to patients at higher risk of distant metastases (Stage III).

KEYWORDS

X-Ray Chest, Ultrasonography, Liver, Malignant Growths, Breast, Staging, Diagnosis.

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BACKGROUND

Carcinoma breast is the commonest malignant tumour in urban and the second commonest after carcinoma uterine cervix among the rural women of India. It is also the most extensively researched cancer, and a wide array and hugely varying management strategies are in use in the different parts of the world. Breast cancer incidence in India has steadily increased over the years and as many as 100,000 new patients are being detected every year. India accounts for nearly 6 percent of deaths due to breast cancer globally and one out of every 22 women in India is diagnosed with breast cancer according to a study by Indian Council of Medical Research. The presence of distant metastases at diagnosis has traditionally been considered a contraindication to surgery. Some recent studies have suggested a survival benefit for surgery of the primary tumour in the patient presenting with metastatic disease.[1,2] But systemic therapy remains the initial therapeutic approach. Extensive evaluations to look for metastatic disease are not warranted in asymptomatic patients with stage I and II cancer.[3]

The recommended workup and staging of invasive breast cancer includes: history and physical exam, a complete blood cell count, liver function tests, bilateral diagnostic mammography, breast ultrasonography if necessary; tumour ER and PR

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determinations, HER-2 tumour status determination and pathology review. Genetic counselling is recommended if the patient is considered to be at high risk of hereditary breast cancer as defined by the NCCN Genetic/Familial High-Risk Assessment: Breast and Ovarian Guidelines.[4] For patients with clinical stage T3N1M0 disease, additional staging studies including bone scan, abdominal imaging using CT, ultrasound or MRI and chest imaging should be considered. These studies are not indicated in patients with stage I disease without signs/symptoms of metastatic disease nor are they needed in many other patients with early-stage breast cancer.[5] For patients with stage I, stage II or T3N1M0 disease, radionuclide bone scanning, abdominal imaging with CT, ultrasound or MRI and chest imaging are typically indicated only for those patients with signs or symptoms related to the bone, abdomen or chest (e.g. pain, abnormal laboratory tests, pulmonary symptoms). These recommendations are supported by a study evaluating patients with newly diagnosed breast cancer by bone scan, liver Ultrasonography and chest radiography.[6]

Metastases were identified by bone scan in 5.1%, 5.6% and 14% of patients with stage I, II and III disease, respectively, and no evidence of metastasis was detected by liver ultrasonography or chest radiography in patients with stage I or II disease.[4] Liver can represent a site of breast cancer metastases, even though the occurrence of liver metastases as a first site of dissemination is rare (Approximately 9%), and depends on some biological data.[7,8] Ciatto et al[9] observed a detection rate of 0.2% reviewing 836 liver Ultrasonography performed at the time of diagnosis. Recently, Samant et al[10] suggested liver Ultrasonography only for patients with biochemical abnormal examinations or locally advanced disease. The importance of biochemical data is also stressed by Kamby et al,[7] which reviewed more than 40 trials and suggested excluding liver ultrasonography from staging procedures in patients with breast cancer and normal biochemical examinations of liver function. Lung metastases are also infrequent at the time of diagnosis. Ciatto et al[9] observed a detection rate of 0.3% ranging from 0.1% to 0.2%, 0.7% and 1.2 in stage I, II and III respectively. Vestergaard et al[11] and Logager et al[12] reviewing respectively, the records of 263 stage I and 280 stage II breast cancer patients observed a detection rate of 0.2% and 1.2% of chest x-rays in symptom-free patients.

Staging chest x-rays, however, continue to be recommended for all patients with invasive breast cancer even though pulmonary metastases are the initial site of metastasis in only 5% to 15% of patients.[13] The detection rate of occult metastases by Computed Tomography (CT) scans and Positron Emission Tomography (PET) scans is also low and the routine use of these tests is neither medically appropriate nor cost effective. In patients with stage III disease, occult metastases are more frequent and staging studies are recommended by most organisations. Some trials suggest biochemical evaluation as the better tool for the screening of metastatic disease at the time of diagnosis of breast cancer.[7] In these trials Aspartate Transaminase (AST), Alanine Transaminase (ALT), y-glutamyl transferase (GGT) and Alkaline Phosphatase (AP) are suggested as first line examinations to detect liver or bone metastases. In particular AST, ALT, GGT and AP may represent markers for liver metastases with true positive data ranging from 32% to 95% and an AP increase is related to bone metastases in more than 60% of cases.[7,14]

According to the most common sites of metastases, non-invasive radiological tests routinely employed in the staging workup for breast cancer have included Liver Ultrasonography (LUS), Chest Radiography (CXR) and Bone Scan. However, the yield of these tests has gradually scaled down after several studies reporting their inappropriateness, especially in determinate subgroups of patients, such as those with small tumours and absent or minimal involvement of the axillary nodes.[6] In fact, the use of these radiological tests in all breast cancer patients is unnecessarily expensive and time consuming. In addition, false positive results of the tests that require additional confirmatory examinations like Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Positron emission tomography may cause anxiety in patients and increase costs. The present study analyses the available data in patients reporting for the first time to surgical OPD with clinical suspicion of carcinoma breast.

AIMS AND OBJECTIVES

The Main Aim of the Study was

- To find out the percentage of Early breast cancer (stages I and II) cases without any systemic symptoms and signs of metastasis, which are upgraded to metastatic breast cancer with the detection of findings in routinely done chest radiography and Liver Ultrasonography.

The Objectives of the Study were

- To find out the prevalence of metastasis in different stages of newly diagnosed breast cancer cases with the help of Chest radiography and Liver Ultrasonography.
- To find out the stages of breast cancer in which the detectable metastatic disease is high enough to justify the use of Chest radiography and Liver Ultrasonography routinely in all those patients.
- To find out the number of other confirmatory investigations done in cases with suspicious metastatic findings on Chest radiography and Liver Ultrasonography and the yield of those tests.

MATERIALS AND METHODS

This was a retrospective analytical study conducted in the Department of General Surgery, Government Medical College, Kozhikode from January 2011. The study sample was selected from 1112 patients with invasive breast cancer who received a diagnosis from or was referred to the Surgery Outpatient Department of Medical College Hospital, Kozhikode between January 2008 and June 2011. Breast Clinic Register from the Department of General Surgery was utilised to collect the necessary details about patients and tumour characteristics like Age, Sex, Duration of Symptoms, Side of the Lesion, Menopausal status, Stage of the Disease (based on The Current AJCC TNM Breast Cancer Staging System), staging tests (Chest radiography and Liver ultrasonography) and confirmatory investigations (CT chest, CT abdomen, Bone scan).

Breast cancer cases already undergoing treatment, in situ breast cancer, recurrent breast cancer and cystosarcoma phyllodes were excluded from the study. Patients in whom an accurate stage could not be defined due to insufficient information and patients with symptoms, signs or abnormal blood work indicative of metastatic disease were excluded from the data analysis. As an accurate investigation history could not always be reliably obtained, patients that did not

receive their primary diagnosis of breast cancer at this institution were also excluded. The final exclusion criteria included patients whose breast cancer was diagnosed on the basis of co-incidental abnormal imaging results that suggested metastases and the search for a primary cancer ensued; 909 out of 1112 cases met the inclusion criteria, out of which 505 cases were early breast cancer. A total of 1842 radiological investigations were performed in 909 patients, which included 909 Chest x-rays, 909 Liver ultrasonograms, 10 CT abdomen, 8 CT chest and 6 Bone scans.

A true-positive result was determined as being one that unequivocally confirmed metastatic disease on the basis of the respective imaging investigation or one that was proven by subsequent imaging or histology. A false-positive result was taken as being any staging investigation that was initially reported as being either abnormal or indeterminate, but upon subsequent investigation was proven to be negative. For each staging procedure, the 'prevalence' defined as the number of patients with diagnosis of metastatic disease after an imaging technique divided by the total number of patients tested was analysed.

OBSERVATIONS

Patient Characteristics

Out of the 909 cases which met the eligibility criteria, 6 were male patients. Most of the cases belonged to the age group of more than 45 years, almost half of the cases were having left-sided lesions with only 2 cases presenting as bilateral lesions; 58 percent of cases belonged to the post-menopausal group. Majority of the cases presented with less than 6 months duration of symptoms.

Patient Characteristics	Observations (%)
Age	<45 yrs. – 309 (34) >45 yrs. – 600 (66)
Sex	Females – 903 Males – 6
Side of lesion	Left – 463 (51) Right – 444 (48.8) Bilateral – 2
Menopausal status	Pre-menopausal - 380 (42) Post-menopausal - 529 (58)
Duration of symptoms	<6 months – 698 (77) >6 months – 211 (23)

Table 1: Showing the Patient Characteristics and Disease Presentation (n=909)

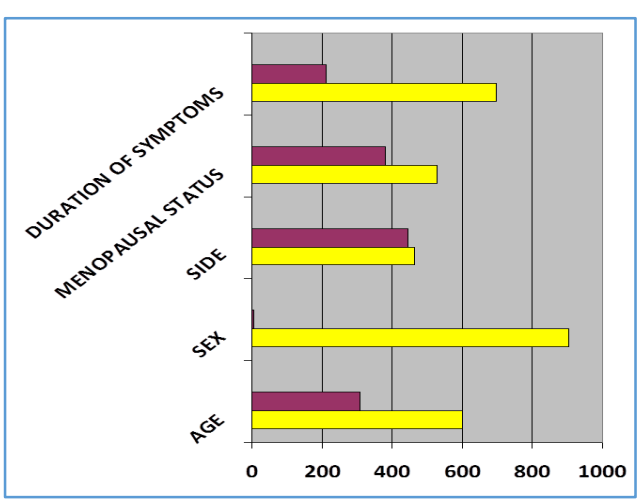

Fig. 1: Patient Characteristics

Tumour Characteristics

Majority of the cases had histology of Invasive Ductal Carcinoma (96%). After initial clinical staging it was found that only 15 (1.65%) out of 909 cases had Stage I disease, while 54.45% cases had Stage II and 43.9% had Stage III breast cancer.

35 out of 909 patients had metastasis detected either in the lung or liver with the help of CXR and LUS; 4 out of 35 cases had early stage breast cancer, while the rest belonged to the group of locally advanced breast cancer.

Stage	Mets
I	0
II	4
III	31

Table 2: Showing the Distribution of Metastases

Histology	No.
Invasive Ductal Carcinoma	874
Invasive Lobular Carcinoma	28
Other Histology	7

Table 3: Showing the HPE Distribution (n=909)

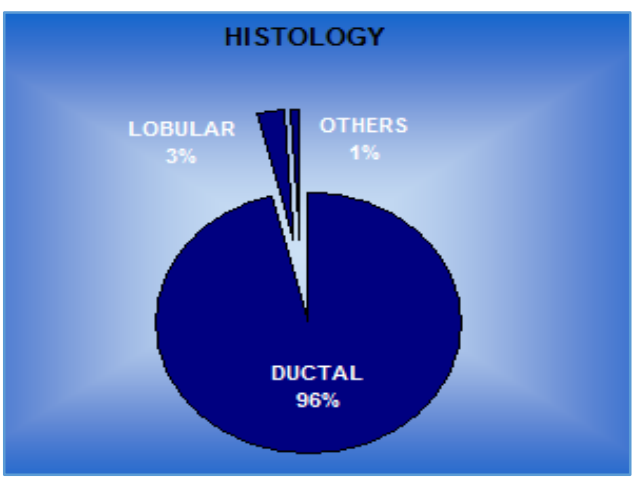

Fig. 2: Histology

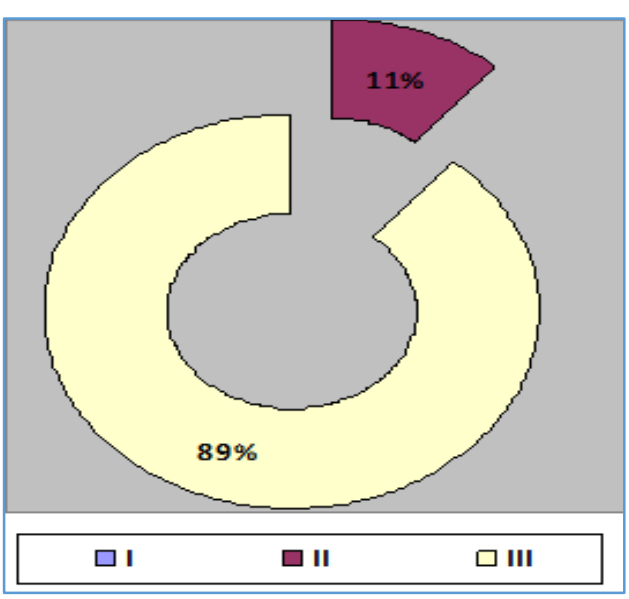

Fig. 3: Metastasis Distribution

Stages	Metastasis Liver Lung 0PP AX			Total Metastasis	Patients
I	0	0	0	0	15
IIA	1	0	0	1	171
IIB	1	2	0	3	324
IIIA	2	0	1	3	183
IIIB	13	8	0	21	167
IIIC	4	4	0	7	49

Table 4: Showing the Prevalence of Metastatic Disease by CXR and LUS (n=909)

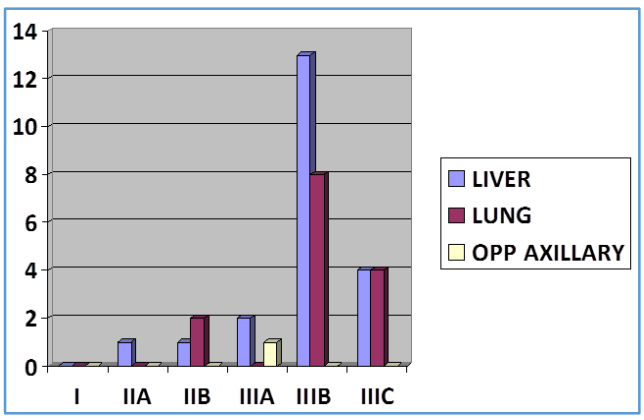

Fig. 4: Prevalence of Metastatic Disease by CXR and LUS

Investigations

CXR Findings	Total Findings	True Positives
Lung Secondaries	9	9
Suspicious	4	
Pleural Effusion	3	1
Hydropneumothorax	1	1
Vertebral Mets	2	2
Rib Mets	1	1
Opacities	3	
Bronchiectasis	1	
Mediastinal Mass	1	
Total	**25**	**14**

Table 5: Showing the X-Ray Findings (n=909)

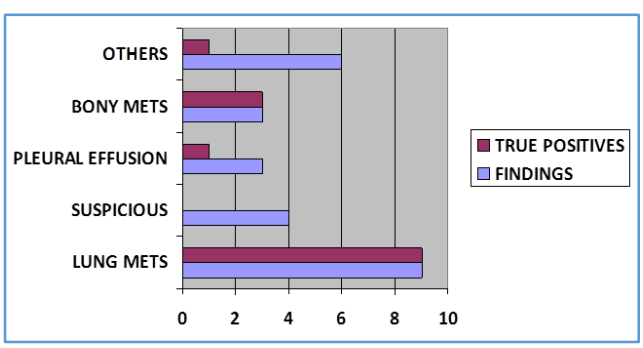

Fig. 5: Chest X-Ray Findings

Liver USG Findings	Total Findings	True Positives
Liver Secondaries	18	18
Suspicious	6	2
Ascites	2	1
Uterine Myoma	35	
Fatty Liver	38	
Renal Calculi/Cysts	10	
Adrenal Mass/Cysts	2	
Ovarian Mass/Cysts	13	
Cholelithiasis	4	
Hydronephrosis	1	
Haemangioma	3	
Liver Cysts	2	
Total	**93**	**21**

Table 6: Liver USG Findings

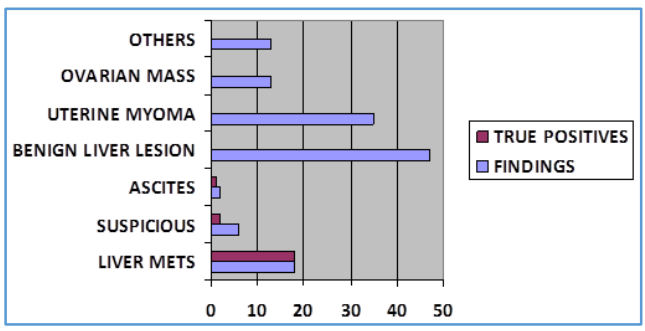

Fig. 6: Liver USG Findings

Stage	CXR – True Positives	LUS – True Positives	FP (CXR)	FP (LUS)
I	0/15	0/15	0	0
II	2/495 (0.4%)	2/495 (0.4%)	2	1
III	12 /399 (3%)	19 /399 (4.76%)	6	11
I-III	14/909 (1.54%)	21/909 (2.3%)	8	12

Table 7: Showing Diagnostic Accuracy of Staging Investigations (n=909)

Stage	CT Chest	CT Abdomen	Bone Scan	TP	FP
I	1	0	0	0	1
II	3	5	1	0	9
III	4	5	5	8	6
I-III	8	10	6	8	16

Table 8: Showing the Results of Confirmation on Different Diagnostic Studies (n=)

RESULTS

1842 radiological investigations were ordered for staging workup of 909 patients with breast cancer, which included 909 Chest x-rays (CXR), 909 Liver ultrasonograms (LUS), 10 CT abdomens, 8 CT chest and 6 Bone scans. The low percentages of the investigations like CT chest, CT abdomen and Bone scans are due to the fact that they are not routinely done for the staging workup of breast cancer patients who are otherwise asymptomatic; 510 (56%) out of 909 cases were staged as early breast cancer, (Stages I and II) while the remaining belonged to the locally advanced breast cancer (Stage III) after initial clinical assessment. After the initial staging investigations, 35 patients were diagnosed as having metastatic disease. LUS detected liver metastases in 21 (2.3%) patients and CXR detected lung metastases in 14 (1.5%) patients and one patient had secondaries in the opposite side axillary group of lymph nodes confirmed by histopathology after excision biopsy. Only 4 out of 510 early breast cancer patients were upstaged to Stage IV after the initial radiological investigations.

None of the 15 patients belonging to Stage I had metastatic disease; 4 out of 495 patients with Stage II breast cancer had metastasis, of which 2 (0.4%) had lung secondaries detected by CXR and 2 (0.4%) cases had Liver secondaries detected on LUS; 12 (3%) out of 399 Stage III disease patients were found to have lung metastasis on CXR, while 19 (4.7%) cases had liver metastasis on LUS; 8 out of 909 and 12 out of 909 cases gave false positive results for CXR and LUS respectively. Majority of the false positive results for both the CXR and LUS were for Stage III cases than for early breast cancer. Confirmatory investigations were done only for suspicious findings detected on CXR and LUS; 3 out of 8 CT chests reported lung metastasis, while only 3 out of 10 and 2 out of 6 cases demonstrated secondaries in CT abdomen and bone scans respectively. All the positive findings (10/24) of the confirmatory investigations were for the cases belonging to locally advanced (Stage III) breast cancer patients. None of the early breast cancer patients had any metastasis detected by confirmatory investigations.

DISCUSSION

At present, there is no clear evidence supporting the use of the traditionally employed radiological investigations like Bone Scan, Liver Ultrasonography and Chest radiography to carry out baseline staging of breast cancer patients. On the contrary, several studies reported a limited value of breast cancer baseline staging, suggesting that complete diagnostic workup should be limited to patients with higher pre-test probability of distant metastases.[6,15,16] In particular, it has been shown that the prevalence of detectable metastatic disease in newly diagnosed breast cancer patients is exceedingly low and increases from stage I to stage III.[15,16] LUS detected liver metastasis very rarely in pathological stage I-II disease and approximately 2-3% in stage III disease.[17,18] Chest x-ray has the lowest detection rate of all staging investigations. Occult metastasis in lungs was detected at a rate of 0.1-2% with chest x-ray.[9,13] Also it has been observed that there is an increase in psychological distress in cancer patients undergoing radiological investigations to assess the extent of disease.[6] In early stage breast cancer patients, this distress may be completely avoidable. In addition, further secondary investigations like CT chest, CT abdomen and Bone scan which may be required to verify benign findings may even lead to increased anxiety, exposure to radiation, increase the costs and avoidable risks associated with biopsy of benign lesions.[19]

A large number of studies about the staging of breast cancer can be found in the literature, many of which analyse the value of pre-operative staging investigations in this particular setting. One of the earliest studies by Ciatto et al[20] in 1985, on 1,017 consecutive breast cancer cases without symptomatic metastases staged by means of chest x-ray (CXR), and bone scintigraphy reported a detection rate of 0.29% for lung and 0.59% for bone occult metastasis. The detection rate was correlated with clinical stage: 0.36% for stage I, 0.20% for stage II, 0.26% for stages I and II, and 2.77% for stage III cases. A very low detection rates in stage I and II cancers do not advise such a routine procedure, but a higher detection rate of occult metastasis suggest adoption of the routine staging procedure in stage III cancers. A multicentre study by Ciatto et al[9] in 1988 on a consecutive series of 3627 breast cancer patients undergoing preoperative staging by chest x-ray (CXR), bone scintigraphy (BS) and liver ultrasonography (LUS) reported a very low detection rate of around 0.3% for CXR, 0.9% for BS and 0.24% for LUS which questioned the value of routine pre-operative staging policy. In 1989 and 1990 Vestergaard and Logager reviewed the records of 263 and 280 patients with stage I and II breast cancer, reporting an extremely low detection rate for chest x-ray.[11,12] A retrospective analyses by Bruneton et al[14] in 1996 of 6,649 patients with operable breast cancer reported an extremely low detection rate of 0.51% for true positives with liver ultrasonography.

These authors concluded that liver metastases at the time of diagnosis of operable breast cancer were a rare event that could not justify a routine use of liver ultrasonography. In a retrospective analysis of 250 patients with operable breast cancer, Samant et al[10] in 1999 observed that it was rare to find metastatic disease at the time of diagnosis in symptom-free patients with low disease staging (pT1-2, N0-1). Ravaioli et al[21] in 1998, in a case series of 406 breast cancer patients reported a low detection rate of 1.5% and 1% for CXR and LUS respectively and concluded that there is no need for routine use of these staging procedures, especially in Early stage breast cancers. Dillman et al[22] in 2000, retrospectively studied the routine usage of radiological tests in 1167 breast cancer patients who were classified as having stage IIA, stage IIB or stage III disease on the basis of TN criteria yielding 1.2%, 6.8% and 17% true positive results respectively and concluded that these tests are overused in patients with newly diagnosed, early-stage breast cancer. They are unnecessary in patients who have a tumour of size ≤ 5 cm without axillary lymphadenopathy on physical examination, normal results on blood chemistry tests and no symptoms or physical findings of metastatic disease.

In a retrospective analysis of 1218 consecutive breast cancer patients by Ravaioli et al[15] in 2002, a very low detection rate of 0.7% for CXR and 0.8% for LUS was observed, which lead to the conclusion that a more selective approach to decide which patients should undergo instrumental analysis because of the low incidence of distant metastases at the onset of disease is very essential. Schneider et al[23] in 2003 reported a low detection rate of 0.4% pulmonary and 1% liver metastases and suggested that chest x-ray and liver ultrasonography can be omitted in the staging of asymptomatic early breast cancer patients. In 2003, Samur et al[24] prospectively evaluated and followed up 100 breast cancer patients reporting an overall detection rate of 3% (3/100), out of which 2 cases belonged to Stage III disease and recommended routine staging for patients with T4 or N1, (N > 3) or N2 disease, while advising against staging for patients with T1N0-1, (N ≤ 3) positive nodes.

Decision about staging of the patients with T2-3N0-1, N ≤3 diseases should be individualised according to patient-doctor preferences and economic resources. Puglisi et al[6] in 2004 reviewed 516 cases of newly diagnosed breast cancer to get a low detection rate of 0.72% and 0.93% true positive results for liver and lung metastasis on LUS and CXR respectively and concluded that a complete diagnostic workup to detect metastases is unnecessary in the majority of patients with newly diagnosed breast cancer, whereas it may be indicated for specific patient categories such as those with stage III disease. A retrospective study at Kuwait Cancer Control Centre in 2007 by Abuzallouf et al[25] reported an incidence of 0.6% liver metastases and 0.8% pulmonary metastases at the time

of primary diagnosis in asymptomatic breast cancer patients and an overall incidence of 0.7% metastasis in patients with clinical stage I and II disease compared with 16.2% of patients with clinical stage III disease. Dolly et al[19] in 2011 conducted a retrospective analysis of 250 newly diagnosed breast cancer patients, which reported a low detection rate of 0% for CXR and 0.72% for LUS with no distant metastasis detected in Stage I and II breast cancer patients. Those cases with liver metastasis on LUS belonged to Stage III breast cancer. The review of literature showed a number of studies conducted since 1985, which analyse the value of pre-operative staging investigations in early breast cancer.

Almost all the studies show a very low detection rate of metastatic disease (< 1%) with the routine use of Liver Ultrasonography and Chest x-ray in staging workup of early breast cancer patients. Our study reports a very low detection rate (0.4%) of subclinical metastases in early stages (stage I and II) of breast cancer, as only 4 patients were found to have metastases with no clinical or biochemical abnormalities. The significance of such low value may be lowered further since there is no clinical evidence of improved prognosis with early treatment of asymptomatic metastases compared to treatment after the onset of symptoms. Studies conducted by Puglisi et al,[6] Ravaioli et al,[15] Dolly et al,[19] Schneider et al[23] and Abuzallouf et al[25] all show similar results, which clearly demonstrate that these routinely done staging investigations are unnecessary in workup of early breast cancer patients. Moreover, the confirmatory investigations done in cases of suspicious findings in the initial workup in early breast cancer did not reveal any metastasis at all. Out of 10 cases of suspicious metastasis, 4 needed CT Chest, 5 needed CT abdomen and 1 needed bone scan to rule out the possibility of metastasis. But all of them were negative. From this study and others, it is clear that staging workup for metastasis is not beneficial for Stage I and II breast cancer patients.

Although, a positive psychological effect with negative staging investigations cause a relief which is familiar for all clinicians who take care of breast cancer patients, might be speculated to justify staging of all patients, but concerning the very low detection rate along with the high costs of confirmatory investigations required in suspicious cases, they are really unwanted. Although, many anaesthetists traditionally require CXR before general anaesthesia, there is no strong medical indication for routine preoperative CXR in asymptomatic, otherwise healthy breast cancer patients.[17] Furthermore, CXR has never been shown to improve outcome in the care of patients with clinical stage I or II breast cancer. Our data support the view that CXR may be eliminated in the routine staging for asymptomatic patients with stage I or II breast cancer. In our opinion in patients with locally advanced breast cancer, metastasis detection rate is relatively high and in this group metastatic workup must be standard.

Study	Design	N (Cases)	Frequency (%)		True Positives in Early Breast Cancer	
			CXR	LUS	CXR	LUS
Present	Retrospective	909	100	100	0.4	0.4
Puglisi et al[6]	Retrospective	516	80	83	0.93	0.72
Ravaioli et al[15]	Retrospective	1218	99	99	0.7	0.8
Dolly et al[19]	Retrospective	231	81	60	0	0.72
Schneider et al[23]	Retrospective	497	Routine CXR and LUS		0.4	1
Abuzallouf et al[25]	Retrospective	823	Routine CXR and LUS		0.8	0.6

Table 9: Showing the Comparison Between the Present and Other Studies

CONCLUSIONS

A careful review of the available literature shows that the procedures used in the staging of breast cancer have been widely discussed and criticised in the last two decades with a move towards a more selective approach to decide which patients should undergo instrumental analysis because of the low incidence of metastases at the onset of disease. In our institution around 350 new breast cancer cases are diagnosed and treated annually, of which more than 50 percent cases belong to early breast cancer group. We routinely employ metastatic workup of all newly diagnosed cases after the initial clinical staging according to the institution protocol. The costs of these routine staging investigations are subsidised in our institution, as it is under the state government control. A single Chest x-ray costs around Rupees 100 and a single Ultrasound abdomen costs around 400 rupees in private sector. Even though the expenditure from the patient's point of view is less in our institution compared to the private sector, the expenditure incurred by the government is almost similar. Moreover, because of the high patient turnover in our institution, the time lag for getting these investigations done is unjustifiable. The cost of over staging in early breast cancer population can compromise access to radiological investigations for patients with symptoms or metastases. In conclusion, our study strengthens the recommendation to limit baseline staging tests, especially LUS and CXR to patients at higher risk of distant metastases (Stage III). If the recommendations given above are followed, there are advantages as detailed below.

1. It can avoid undue and unjustifiable anxiety in patients who are diagnosed as early breast cancer clinically.
2. It can reduce hospital expenditure for the government by reducing the number of unnecessary CXRs and LUS examinations.
3. Patients in clinical Stage III breast cancer can have their metastatic workup done early.
4. Patients in Stage III breast cancer can have their respective treatments according to their final staging after the metastatic workup without further delay.

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