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Epidemio-Clinical, Anatomopathological, Computed Tomography Aspects from Breast Cancer to Imaging and Medical Oncology Departments at Chu – Mother-Child "Luxembourg"

Cisse, B. S[1*], Agaly, H[2], Diarra, L[1], Traore, M[1], Dao, A[1], Kone, A[1], Sangare, H[3], Ly, M[3], Kouma, A[1], Diallo, M[1]

[1]Radiology and Medical Imaging Department, CHU-MOTHER-CHILD "Luxembourg", Bamako, Mali
[2]Neurosurgery Department, GABRIEL TOURE University Hospital, Ave Al Quds, Bamako, Mali
[3]Medical Oncology Department, CHU-MOTHER-CHILD "Luxembourg", Bamako, Mali

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***Corresponding author:** Cisse, B. S
Radiology and Medical Imaging Department, CHU-MOTHER-CHILD "Luxembourg", Bamako, Mali

Abstract

Introduction: Cancer results from an anarchic proliferation of abnormal cells of the mammary gland and is the most common cancer in women in developed countries with 50,000 new cases in 2008. ***Objectives:*** The aim of our work was to describe the sociodemographic characteristics of patients, to determine the different sites and the frequency of metastases; and to describe the CT and histological aspects in the diagnosis of extension, therapy and assessment. ***Methods:*** Our study was retrospective descriptive over a period of 12 months from January 2020 to December 2020 in the radiology and medical oncology department of CHUME Luxembourg. It concerned all patients with histologically confirmed cancer who had undergone a scan before, during treatment or during therapeutic monitoring. The examinations were carried out with a HITACHI SUPRIA 16 BARRETTES CT scanner installed in 2015. ***Results:*** During the period of our study, the frequency of breast cancer was 10.7% (130 cases) out of 1204 scans carried out with a female predominance of 98%, an average age of 52 years and extremes of 12 to 90 years. The main metastases were: pulmonary (59%), followed by lymph node metastases (66%), bone (51%), liver (29%) and brain (2%). The association of pulmonary, lymph node, liver and bone metastasis represented 27% of the most frequent associations. As for the histological aspect, non-specific invasive carcinoma grade II SBR and TNM was the most frequent.

Keywords: Profile, imaging, histology, metastasis, localization, breast cancer.

I. INTRODUCTION

Breast cancer results from an anarchic malignant proliferation of abnormal cells of the mammary gland consisting of lobules and galactophores ducts and those originating from the secretory apparatus (malignant phyllodes and lymphomas) [1, 2].

A secondary localization or metastasis is the formation of secondary tumor foci, linked to the capacity of tumor cells to detach from the primary lesion, to implant themselves in a nearby or distant organ and to proliferate, thus forming new tumor foci [3].

Breast cancer is a public health problem in both developed and developing countries [4].

Breast cancer is the most common cancer in women in developed countries with an estimated 50,000 new cases in 2008 [1].

In Africa and developing countries, breast cancer is the second most common cancer after cervical cancer [5]. Since the last estimates in 2008, its incidence has increased by more than 20% [6, 7]. Its frequency is estimated at: 2.3% in Mozambique, 9.5% in Uganda and 11.8% in Senegal [8].

In Mali its frequency is increasing, estimated from 5.7% in 2008 to 7.6% in 2001 of all cancers according to the national institute for public health research INRSP [9]. It remains a serious condition responsible for 15 to 20% of all cancer deaths and 2 to 5% of deaths in developed countries with a severe prognosis of 35% survival at 5 years [10].

The vast majority of deaths related to breast cancer are due to delayed diagnosis and to pulmonary, hepatic, cerebral and bone metastases [6, 7]. Death from breast cancer is mainly due to damage caused by

metastases. This is why it is important to diagnose early, before dissemination in the body [11].

Despite well-conducted treatment according to the recommendations, 20-40% of breast cancers will have metastatic progression [12]. Breast cancer metastases are more frequent in large tumors and high-grade tumors (grade III and above), hence the need for diagnostic and therapeutic management [1].

Imaging plays an important role in diagnostic and therapeutic management, especially the bilateral mammography-ultrasound pair in the case of ACR 4 ACR5 lesions [9]. In addition, other imaging examinations may be necessary: CT scan in particular, scintigraphy and even MRI [9].

The seriousness of breast cancer and the high percentage of metastases of this pathology justify this study, the objective of which is to study the epidemioclinical, computed tomographic and histological aspects of breast cancer at the Luxembourg Mother and Child University Hospital.

II. METHODOLOGY

Our study was carried out in the radiology department of the Luxembourg Mother and Child University Hospital.

This was a descriptive retrospective study from January 1, 2020 to December 31, 2020, a period of 12 months.

Included in our study were any patient referred to the radiology department for chest pain or palpation of a breast mass presenting with breast cancer confirmed by histology, or having had a scan before treatment, during treatment or during therapeutic follow-up at the Luxembourg Mother-Child University Hospital,

Non-inclusion concerned a lesion not confirmed by anatomopathology.

Data collection was carried out on an individual survey form and concerned sociodemographic data (age, sex, origin, ethnicity, marital status, level of education, profession), clinical parameters (circumstances of discovery, clinical information), anatomo-pathological and computed tomography data (tumor: location, nature, number, size, contours, limits and infiltration).

The examinations were carried out using a HITACHI SUPRIA 16 BARRETTES CT scanner equipped with a CARESTREAM DRY VIEW 5950 printer, respecting the confidentiality of patient professional secrecy.

Data entry and analysis were on Microsoft World 2010 and analyzed by Epi Infos version 7 and Excel software without conflict of interest.

III. RESULTS

During the period of our study, 130 patients were collected on 1204 CT scans performed, i.e. a frequency of 10.7% with a female predominance of 98%, an average age of 51.5 years and extremes of 12 to 90 years. Adults aged 50 and over were more represented with 36.2% followed by young adults aged 31 to 40 (16.2%). The majority of patients were city dwellers (94.6%) followed by rural dwellers and those of other nationalities. As for the profile of the patients, the uneducated were more numerous 81% against 49% of the educated with 80% married and a predominance of the Bambara ethnic group followed by the Peulhs respectively 33.8% and 28.5%. The circumstances of discovery were dominated by swelling (42.5%) followed by breast induration (16.9%), Graph I.

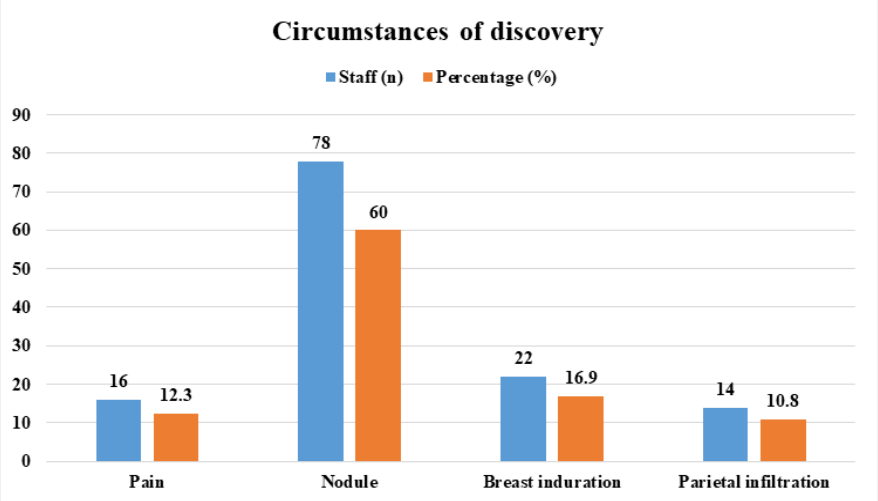

Chart I: Distribution of patients according to the circumstances of discovery

The notion of family history of breast cancer was unknown in 98.5% and the suggestive signs were dominated by the orange peel appearance 48.5% followed by edema of the upper limb 25.4% and the cauliflower appearance 16.2%, Table I.

Table I: Distribution according to clinic

Clinical signs	Staff (n)	Percentage (%)
Orange peel appearance	63	48.5
Cauliflower appearance	21	16.2
Serosanguinous discharge	3	2.3
Necrotic ulceration	2	1.5
Retracted	7	5.4
Upper limb edema	33	25.4
Mastectomy scar	1	0.8
Total	**130**	**100.0**

Based on the data of the circumstance of discovery and those of the clinic, a biopsy was requested to determine the histological type which showed the predominance of infiltrating carcinoma of non-specific type at 68.5% followed by infiltrating lobular carcinoma 10.8% and phyllodes tumor 2.3% of cases (Table II).

Table II: Distribution of patients according to the result of histology

Histology type	Staff (n)	Percentage (%)
Ductal carcinoma in situ	11	8.4
Non-specific invasive carcinoma: CINS	89	68.5
Lobular carcinoma in situ	13	10.0
Infiltrating lobular carcinoma	14	10.8
Phyllodes tumor	3	2.3
Total	**130**	**100.0**

Which led the clinician to request a radiological scan to search for secondary locations related to the histological type.

Thus, the scanner revealed the presence of one or more secondary localizations in 79.2% of our patients, including lymph node, pulmonary, bone, abdominal, and cerebral localizations respectively (66.2%, 59.2%, 50.7% and 43.1%, 2%) of cases and most patients benefited from chemotherapy in 85.4% of cases (Graph II, III, Figure 1,2,3,4,5).

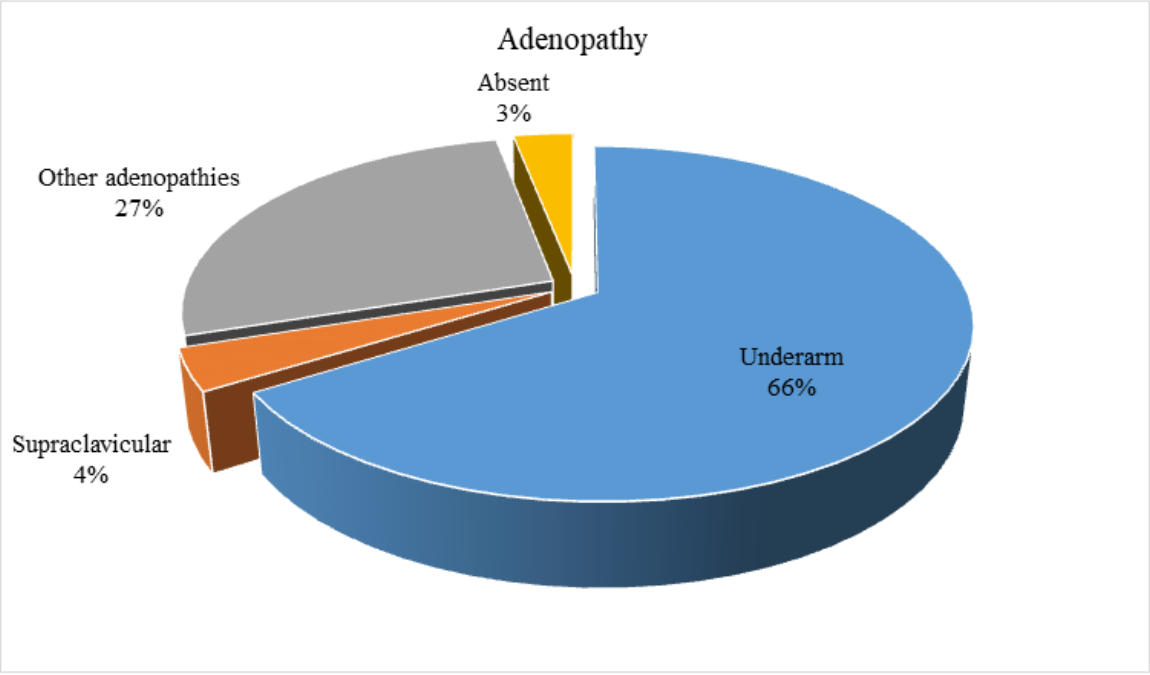

Chart II: Distribution of patients according to the presence of adenopathy

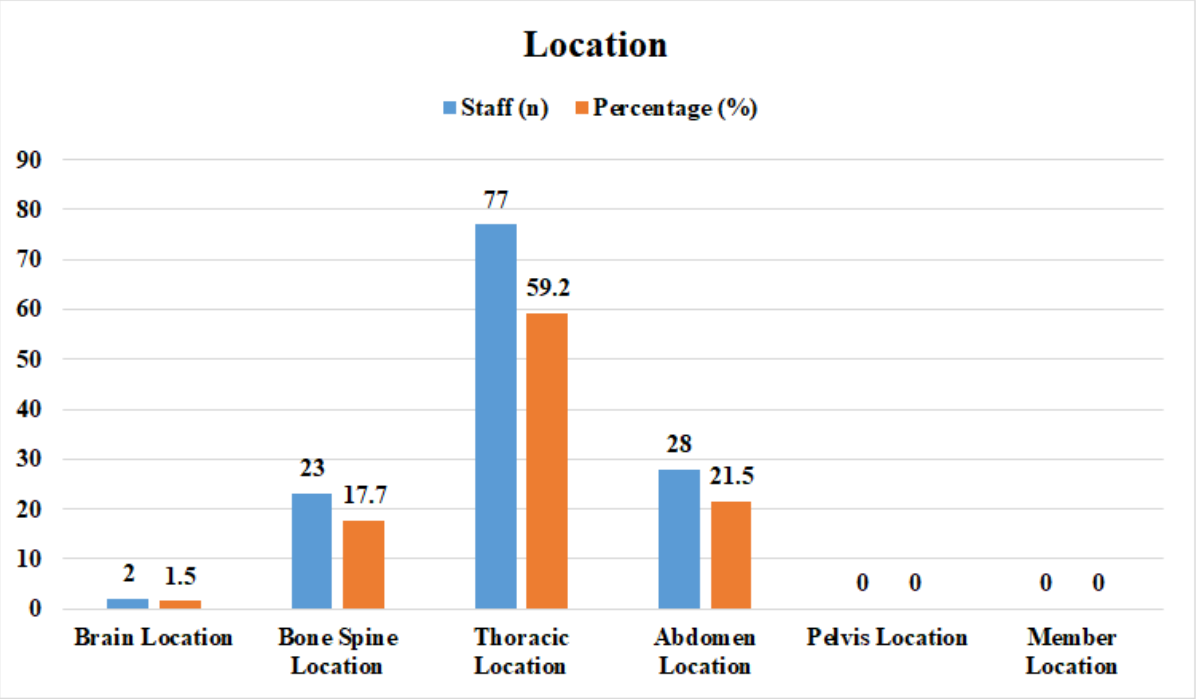

Chart III: Distribution of patients according to the presence of secondary locations

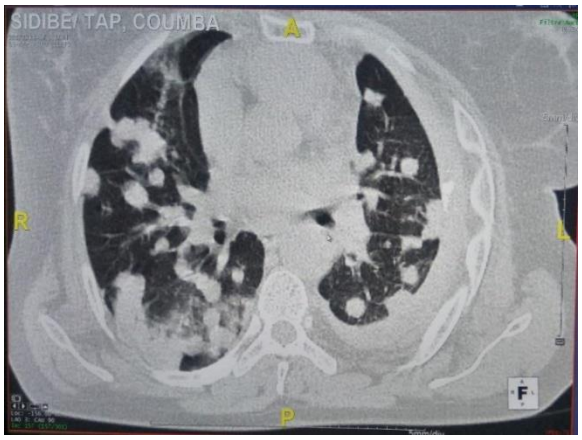

Figure 1: Thoracic CT scan in axial section and parenchymal window (a): after injection of contrast product, highlights bilateral parenchymal and subpleural nodules with balloon release and pleurisy

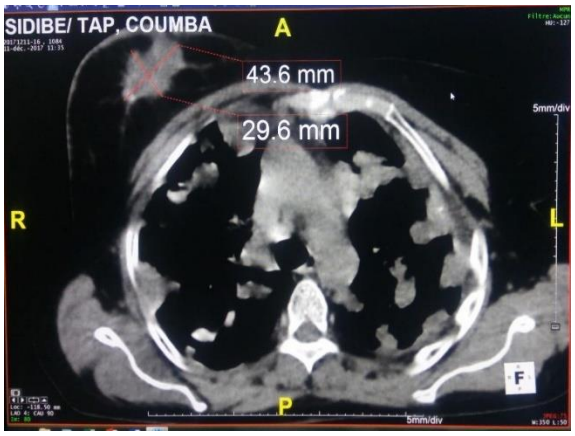

Figure 2: Thoracic CT scan in axial section and mediastinal window (b): after injection of contrast product, highlights balloon releases of a right breast mass in a 45-year-old woman

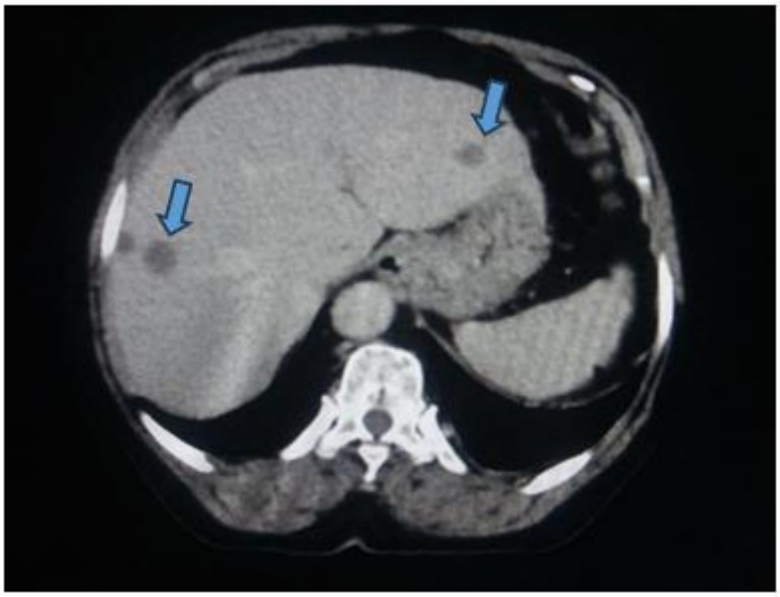

Figure 1: Abdominal CT scanin axial section without injection of contrast product and (c) after injection of contrast product in the portal phase, highlights hepatic nodules in a 50-year-old woman

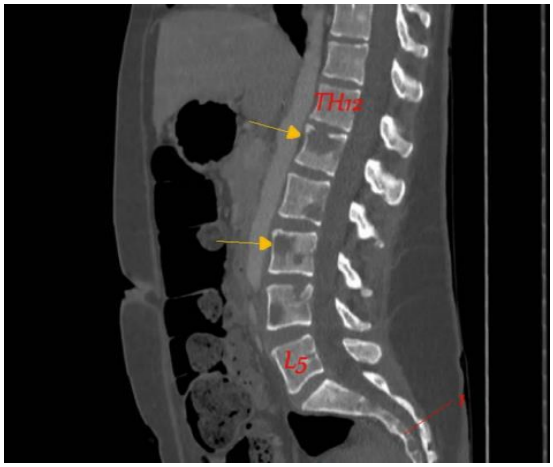

Figure 2: Abdominal CT scan in axial and sagittal section (d), in bone window without injection of contrast product, highlights multiple osteolyses on the lumbar spine (yellow arrow) in a 55-year-old woman

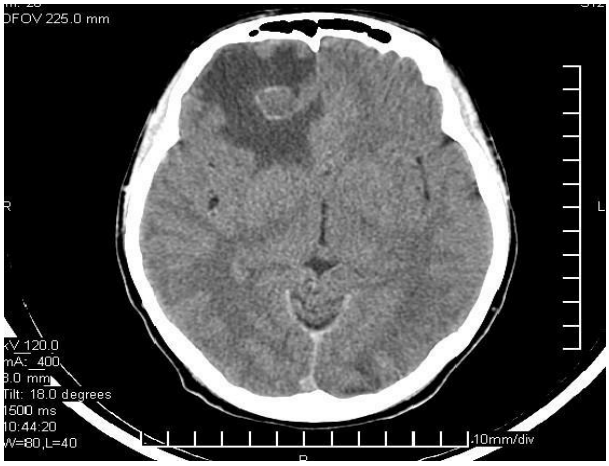

Figure 5: Axial CT scan of the brain with parenchymal window, with injection of contrast product, reveals a left frontal hypodense lesion surrounded by perilesional edema in a 65-year-old woman (yellow arrow)

The CT scan extension assessment to search for distant metastases led in our study to the TNM classification which showed the majority stage 2 which corresponded to the histological type of non-specific

infiltrating carcinoma encountered during the anatomopathological examination with 53.1% of cases (Table III).

Table III: Distribution of patients according to TNM classification

TNM classification	Staff (n)	Percentage (%)
Stage 1: single, small tumor: T1N0M0	10	7.7
Stage 2: large local tumor volume T2N0M0	69	53.1
Stage 3: invasion of lymph nodes and local tissues: T3N0M0	33	25.4
Stage 4: wide extension or metastasis: T4N0M0	18	13.8
Total	**130**	**100.0**

IV. DISCUSSION

Sociodemographic Data

In our series the overall frequency of breast cancer was 10.7% of cases with a female predominance of 98% of cases. The low frequency of male sex (2%) observed in the population is consistent with most authors who note that breast cancer is more common in women than in men who represented 1% of cases [12]. Sano D *et al*., [13], found 4.16% of male breast cancer in three years.

The average age was 50 years plus or minus 7 with extremes which were 12 and 90 years slightly higher than that found by Traoré B [14] and Keita M [15] who obtained respectively 47 and 48 years.

On the other hand, Kemeny in the United Kingdom [16] and Margaret [17] in California in the United States report an average age of 55 and 60 years respectively. This result could be explained by the young age of our populations.

In our study, cancer was found in men aged 63 and 64, which is also described by Sano D *et al*., [13] who found an average age of 61 years in male patients.

In our series 94.6% of our patients resided in cities and 5.4% in rural regions and municipalities requiring enormous efforts in communication and awareness raising but also in literacy. Housewives represented 59.2% in our study. This same observation has been found in other studies.

In literature 2,16,17 this is due to illiteracy, lack of information and communication.

Clinical Data

Edema with orange peel appearance was the main revealing sign with 48.5%. This result is found by most authors Wélé A [19] and Thiam D [20] who respectively found 65% and 60% of cases. On the other hand Traoré B (14) found 44%.

In our study, 1.5% of women had a family history of breast cancer and in 98.5% this history was unknown. Traore B [14] found 8% of familial cancers. The occurrence of breast cancer does not seem to be particularly linked to family factors.

In the literature, 5% of breast cancers are familial [19].

43.1% of breast tumors involved the right breast versus 36.9% of cases for the left breast and bilateral localization concerned 20%. In the literature, the two breasts can be affected differently from one study to another [19, 20].

This predominance of cancer in one breast over the other could be explained by breastfeeding habits [19].

Regarding the anatomopathological results, non-specific infiltrating carcinoma was the most frequent histological aspect in 90% of cases. Infiltrating carcinoma is the most frequent histological type in the literature with eight percent of cases [21].

The extension assessment was the most represented clinical information with 56.9% of cases. This would be explained by good management once the clinical and histological diagnosis has been established in order to assess locoregional and distant locations.

In our series 103 had one or more secondary localizations or 79.2% and we found 66.2% of lymph node metastases distributed in different parts of the body or 86 cases. In the literature lymph node metastases are found in more than two thirds of patients with advanced cancer Taourel P [7].

38% had multi-visceral metastases. The association of pulmonary, hepatic, bone and lymph node metastasis was the most frequent multi-visceral involvement in 35% of cases. Bone metastasis represented 50.7% which is slightly higher than that found in the study of Taourel P [7] 48% of cases.

This multi-visceral involvement could be explained by the late diagnosis of breast cancer due to lack of awareness or poor compliance with treatment by patients.

Pulmonary metastases of breast cancer occur via hematogenous and lymphatic routes. We noted 77 cases of pulmonary metastases, i.e. 59%, much higher than the study by Taourel P [7] which found a frequency of 26%.

Parenchymal pulmonary nodules predominated in our study with multiple locations in balloon release. We noted ground glass, pleural thickening, scissural thickening and laterotracheal mediastinal adenopathies, i.e. 24% of cases. These lesions were found in the study of Casey JJ *et al*., [24] and Zidi *et al*., [25].

Abdominal metastases affected 38 of our patients, or 29% of cases. The lesions were of a tissue nature, hypodense, of variable size, located mainly on the right lobe of the liver (43.1%). Taourel P *et al*., [7] and Sheafor DH *et al*., [23]? found 30% and 26% respectively in series of 784 and 300 patients with breast cancer.

Bone metastases affected 66 of our patients, or 50.7% of cases. They were osteolytic and osteocondensing in nature. Multifocal involvement affected the spine and pelvis in 7% of cases.

These data are comparable to those in the literature [7, 8]. The multifocal localization could be explained by the delay in diagnosis of our patients at an advanced stage.

We found two cases of brain metastasis. The lesion was of a tissue nature, unique, with rounded contours, spontaneously hypodense, enhanced after injection of contrast product and surrounded by perilesional edema.

This semiological aspect similar to our study, was reported by Théra A [23] and Taourel P [7]. We note an increase in brain metastases in patients undergoing Herceptin® chemotherapy due to the non-crossing of the blood-brain barrier by this molecule.

V. CONCLUSION

CT scan is the standard imaging examination in the management of this condition. It has highlighted the frequency of breast cancer, i.e. 107% in our series, and metastases in 74% of patients with a predominance of pulmonary, lymph node and bone metastases, respectively (59%, 66%, 51%).

Histologically, non-specific infiltrating carcinoma was the most common. Thus, CT scan and anatomopathology are of capital importance in the diagnosis and search for secondary locations for good management of breast neoplasms.

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