Clinical Parameters Predicting Malignancy for Incidental Breast Lesions on PET-CT and CT

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PURPOSE

In the era of readily available PET-CT and CT scans, patients being referred to breast surgeons for asymptomatic incidental findings of breast lesions is growing inevitably. The aim of this study is to identify which clinical parameters predict malignancy in this vast group of patients, with the goal of earlier detection and treatment of breast cancer.

METHOD

From January 2020 to December 2023, all new cases referred to our breast clinic were reviewed retrospectively. Patients referred for incidental finding of breast lesions on PET-CT or CT were included. Demographic data and radiological characteristics of lesions were recorded. All statistics including univariate analysis were performed with SPSSv29.

RESULTS

A total of 235 patients were referred for incidental findings of breast lesion on either PET-CT or CT from January 2020 to December 2023. 32 patients who defaulted follow-up, refused workup or had missing data were excluded. Total of 223 patients were included in the study, 63 had PET-CT and 140 had CT done. For the PET-CT group, 43 (68.3%) had benign breast lesions while 20 (31.7%) had malignant lesions. Clinical parameters predicting malignancy were SUV>2 (p=0.048) and lymph node involvement (p=0.000). For the CT group, 110 (78.6%) had benign lesions while 30 (21.4%) had malignant breast lesions. The parameters predicting malignancy in the CT group were age > 45 years old (p=0.013), lesion enhancement (p=0.009) and size >1cm (p=0.008).

Table 1 - Clinical parameters predicting malignancy in PET-CT patient group

	Benign (43)	Malignant (20)	p-value
Demographics			
Age > 45	88.4% (38)	95% (19)	0.655
History of cancer	60.5% (26)	50% (10)	0.285
History of breast cancer	0% (0)	10% (2)	0.097
Active malignancy	23.3% (10)	20% (4)	0.448
Early menarche	37.2% (16)	40% (8)	0.598
Late menopause	4.6% (2)	5% (1)	1.0
History of parity	74.4% (32)	90% (18)	0.196
History of breastfeeding >6months	20.9% (9)	25% (5)	0.752
History of hormonal treatment >5years	0% (0)	5% (1)	0.317
Family history of breast cancer	6.98% (3)	0% (0)	0.545
Family history of CA ovary	2.33% (1)	5% (1)	0.538
PET-CT characteristics			
Irregular/ asymmetrical	2.33% (1)	5% (1)	0.538
Lymph node involvement	9.3% (4)	55% (11)	**0.000**
Lesion size > 1cm	37.2% (16)	60% (12)	0.148
SUV > 2	30.2 % (13)	10% (2)	**0.048**

Table 2 - Clinical parameters predicting malignancy in CT patient group

	Benign (110)	Malignant (30)	p-value
Demographics			
Age > 45	83.6% (92)	100% (30)	**0.013**
History of cancer	26.3% (29)	20% (6)	0.476
History of breast cancer	3.64% (4)	3.33% (1)	1.000
Active malignancy	13.6% (15)	3.33% (1)	0.193
Early menarche	30.9% (34)	20% (6)	0.220
Late menopause	9.09% (10)	3.33% (1)	0.290
History of parity	73.6% (81)	80% (24)	0.770
History of breastfeeding >6months	25.5% (28)	20% (6)	0.505
History of hormonal treatment >5years	3.64% (4)	6.67% (2)	0.609
Family history of breast cancer	8.18% (9)	13.3% (4)	0.476
Family history of CA ovary	0% (0)	3.33% (1)	0.214
CT characteristics			
Irregular/ asymmetrical	3.64% (4)	13.3% (4)	0.043
Enhancement	33.6% (37)	60% (18)	**0.009**
Calcifications	10.9% (12)	10% (3)	1.000
Nipple invasion	1.82% (2)	0% (0)	1.000
Skin invasion	0.90% (1)	3.33% (1)	0.384
Muscle invasion	0% (0)	3.33% (1)	0.214
Lymph node involvement	2.73% (3)	10% (3)	0.113
Lesion size > 1cm	35.6% (39)	20% (6)	**0.008**

CONCLUSION

In patients referred for incidental breast lesion on PET-CT, SUV>2 and presence of lymph node involvement were significant factors determining if the lesion was malignant. Meanwhile in the CT group, age>45 years old, size >1cm and lesion enhancement were positive predictors of malignancy. These parameters can help guide clinicians to better triage their patients and advise for earlier workup.