Chulalongkorn Medical Journal

Volume 54
Issue 4 *July 2010*

Article 1

7-1-2010

Mammographic parenchymal patterns of 1,666 Thai women : A mammographic screening evaluation

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Chula Med J Vol. 54 No. 4 July - August 2010

Mammographic parenchymal patterns of 1,666 Thai women : A mammographic screening evaluation

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Boonjunwetwat D, Thakhulee A. Prueksadee J. Mammographic parenchymal patterns of 1,666 Thai women : A mammographic screening evaluation. Chula Med J 2010 Jul - Aug; 54(4): 303 - 12

Introduction : *Breast density, a measure of the extent of radiodense fibroglandular tissue in the breast, has a potentiality to be used as a predictor for breast cancer. We assessed breast density in Thai women using Wolfe's parenchymal patterns which is one of the most reliable methods for the evaluation.*

Objective : *To assess breast parenchymal patterns of Thai women.*

Setting : *King Chulalongkorn Memorial Hospital.*

Research design : *Retrospective study.*

Patients : *Women who underwent mammogram screening from July to December 2002 at King Chulalongkorn Memorial Hospital (KCMH).*

Methods : *Normal mammograms of the screening women were reviewed for breast parenchymal patterns according to Wolfe's classification.*

Result : *The breast parenchymal patterns, according to age groups, were as follows: 35 - 44 years old (total 395 cases) had N1 feature 3 cases (0.8%), P1 feature 25 cases (6.3%), P2 114 cases (28.9%) and DY feature 253 cases (64.1%); 45-54 years old (total 786 cases) had N1 feature 22 cases (2.8%), P1 feature 85 cases (10.8%), P2 feature*

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324 cases (41.1%) and DY feature 355 cases (45.2%); 55 - 64 years old (total 394 cases) had N1 feature 34 cases (8.6%), P1 feature 74 cases (18.8%), P2 feature 183 cases (46.5%) and DY feature 103 cases (26.2%); and, 65 -74 years old (total 91 cases) had N1 feature 23 cases (25.3%), P1 feature 34 cases (37.4%), P2 feature 28 cases (30.8%) and DY feature 6 cases (6.6%).

Conclusion : *Type P2 and DY which represent dense breasts were the most prevalent among Thai women who underwent screening mammography.*

Keywords : *Mammogram, Parenchymal pattern, Wolfe's classification.*

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Received for publication. June 11, 2009.

ดรุณี บุญยืนเวทวัฒน์, อนุชา ทาชุลี, เจนจีรา ปรึกษาดี. ลักษณะของเนื้อเต้านมจากภาพถ่ายแมมโมแกรมในผู้หญิงไทยจำนวน 1,666 คน. จุฬาลงกรณ์เวชสาร 2553 ก.ค. – ส.ค.; 54(4): 303 – 12

บทนำ : *การตรวจแมมโมแกรมสามารถบอกลักษณะของเนื้อเต้านมในผู้หญิง ซึ่งสามารถทำนายโอกาสการเป็นมะเร็งของเต้านมได้โดยใช้ Wolfe's classification*

วัตถุประสงค์ : *เพื่อประเมินลักษณะของเนื้อเต้านมในผู้หญิงไทย*

สถานที่ที่ทำการศึกษา : *โรงพยาบาลจุฬาลงกรณ์*

รูปแบบการวิจัย : *การศึกษาแบบย้อนหลัง*

ผู้ป่วยที่ได้ทำการศึกษา : *ผู้หญิงที่มารับการตรวจแมมโมแกรมในโรงพยาบาลจุฬาลงกรณ์ ในช่วงเดือนกรฎาคมถึงธันวาคม ปี 2002*

วิธีการศึกษา : *ภาพถ่ายแมมโมแกรมที่ปกติ ได้รับการทบทวนโดยรังสีแพทย์ผู้เชี่ยวชาญ โดยใช้ Wolfe's classification*

ผลการศึกษา : *ลักษณะเนื้อเต้านมในผู้หญิงไทยแบ่งตามอายุพบดังนี้ กลุ่มอายุ 35 - 44 ปี จำนวน 395 คน พบ 3 คน (0.8%) ให้ลักษณะ N1, 25 คน (6.3%) ให้ลักษณะ P1, 114 คน (28.9%) ให้ลักษณะ P2 และ 253 คน (64.1%) ให้ลักษณะ DY, กลุ่มอายุ 45 - 54 ปี จำนวน 786 คน พบ 22 คน (2.8%) ให้ลักษณะ N1, พบ 85 คน (10.8%) ให้ลักษณะ P1, พบ 324 คน (41.1%) ให้ลักษณะ P2 และ 355 คน (45.2%) ให้ลักษณะ DY, กลุ่มอายุ 55 - 64 ปี จำนวน 394 คน พบ 34 คน (8.6%)ให้ลักษณะ N1, พบ 74 cases (18.8%) ให้ลักษณะ P1, พบ 183 คน (46.5%) ให้ลักษณะ P2 และ พบ 103 คน (26.2%) ให้ลักษณะ DY, กลุ่มอายุ 65 - 74 years จำนวน 91 คน พบ 23 คน (25.3%) ให้ลักษณะ N1 , พบ 34 คน (37.4%) ให้ลักษณะP1, พบ 28 คน (30.8%) ให้ลักษณะ P2 และ พบ 6 cases (6.6%)ให้ลักษณะ DY.*

วิจารณ์และสรุป : *ลักษณะเนื้อเต้านมในผู้หญิงไทยในช่วงอายุ 35 - 74 ปี ส่วนใหญ่พบเป็นแบบ P2 และ DY*

คำสำคัญ : *ภาพถ่ายแมมโมแกรม, เนื้อเต้านม, Wolfe's classification.*

Breast parenchymal density refers to the proportion of fibroglandular tissue in the breast as it appears on mammogram. Many studies have emphasized that breast density is an important underlying factor that reveals the development and risk of breast cancer. [1-3]

It is generally agreed that most breast cancer arise from the epithelial linings of the ducts or lobular glands of the breast. On the other hand, denser tissue can decrease mammographic sensitivity by obscuring the lesions. [4]

Wolfe was the first who studied patterns of breast tissues observed in mammography and their association with breast cancer. The four classification categories, namely: *N1, P1, P2* and *DY,* are used as indications of risk for developing breast cancer. In *N1*, the breast consists mostly of fatty tissue with no visible duct. This category represents essentially a normal breast and is considered low risk. *P1* category represents a fatty breast, with predominant ducts in the anterior portion occupying up to a quarter of the breast area. It is also considered low risk. *P2*, a breast that is involuted, with prominent duct pattern of moderate to severe degree, occupying more than a quarter of the breast. The visible duct pattern may occupy the entire breast. *P2* is considered a high risk category. *DY* means breast parenchyma that is dense and usually denotes connective tissue hyperplasia, the pattern of highest risk. This type may appear homogeneous due to an overall increased density. The prominent duct pattern cannot be seen. More recently, other classifications have become popular, partly due to changes in the mammographic practice. For example, the American College of Radiology (ACR) proposes a modified version of the Wolfe patterns for BI-RADS classification scheme. [5]

I. The breast is almost entirely fat.

II. There are scattered fibroglandular densities.

III. The breast is heterogeneous dense. This may lower the sensitivity of mammography.

IV. The breast tissue is extremely dense, which could obscure a lesion in mammography.

The main merit in mammography has been focused on its value as a screening method. However, the population –screening trials conducted over the past 35 years have generated data on the relation of mammographic features and the future risk of breast cancer in the normal population. [6 - 8]

Mammographic parenchymal pattern classification can assist clinical studies in defining the roles of mammographic appearances that signify breast cancer risk.

Material and Methods

Between July and December 2002, Thai women who underwent mammographic screening at the Breast Unit, King Chulalongkorn Memorial Hospital were recruited into the study. All images that were identified as "normal" mammogram by a skilled breast radiologist were reviewed. A digital mammography (GE senographe 2000) was used to expose two standard views including mediolateral (MLO, figure 1A) and craniocaudal view (CC, figure 1B) of bilateral breasts. Breast parenchymal patterns were classified according to Wolfe's classification.

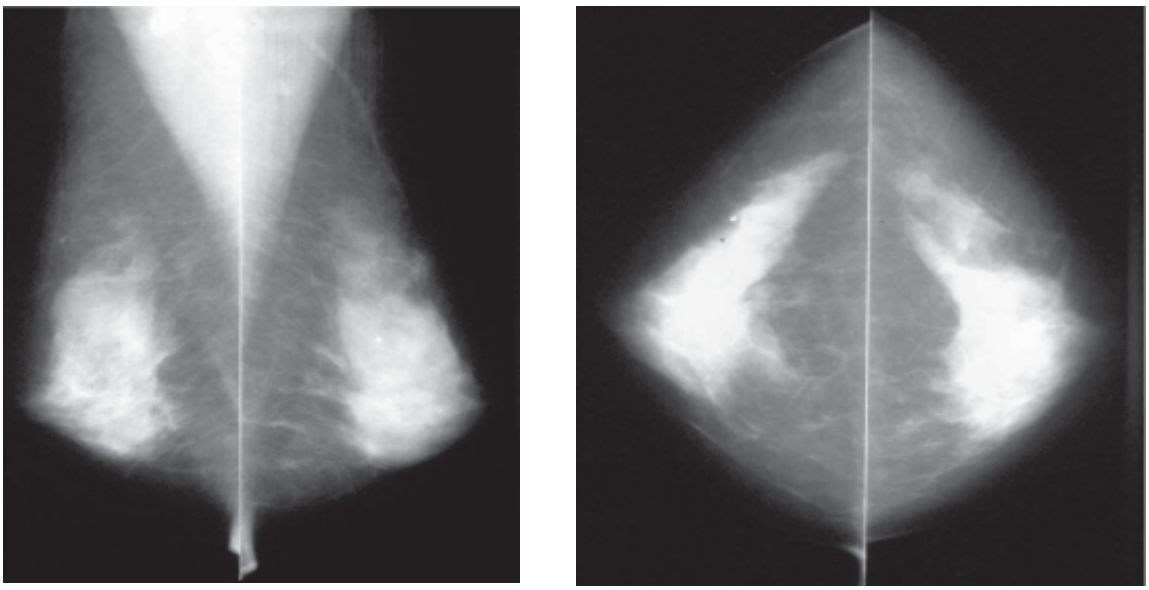
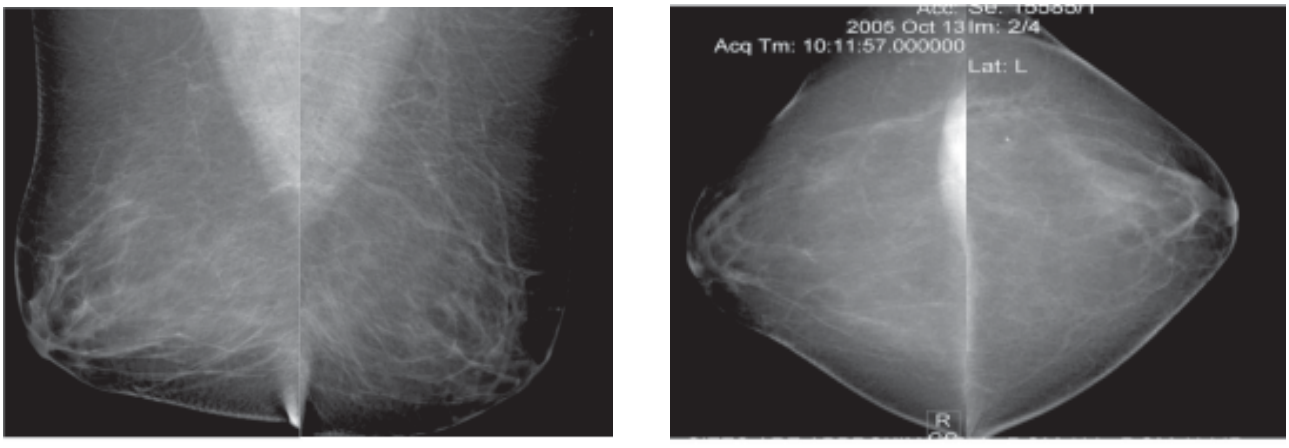


Figure 1. 1A). Mediolateral oblique view (MLO). 1B). Craniocaudal view (CC).

Results

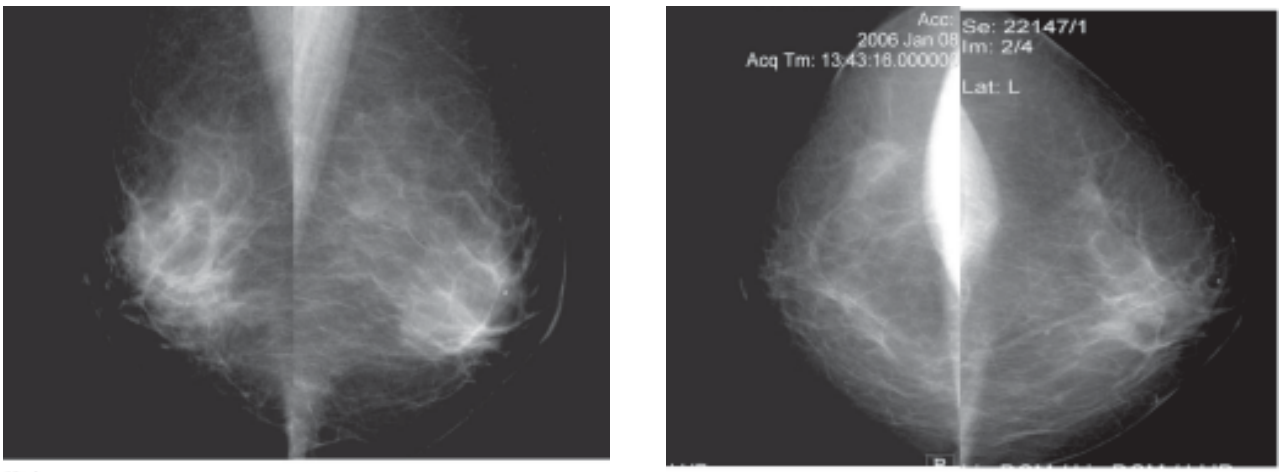
The breast parenchymal patterns of 1,666 screening mammograms were reported according to Wolfe's classification; 82 cases were classified into type *N1* (4.9%, figure 2.); 218 cases were classified into type *P1* (13.1%, figure 3); 649 cases were classified into type *P2* (39%, figure 4.) and 717 cases were classified into type *DY* (43%, figure 5.) (table 1).

The most frequent *DY* feature was found in two age groups: 35 - 44 years old (64.1%) and 45-54 years old (45.2%). The second most frequent feature, *P2,* was found in 55 - 64 years old (46.5%). The third most frequent feature, *P1,* was found in 65 - 74 years old (37.4%) and the least frequent feature, *N1,* was found in 65-74 years old (25.3%).



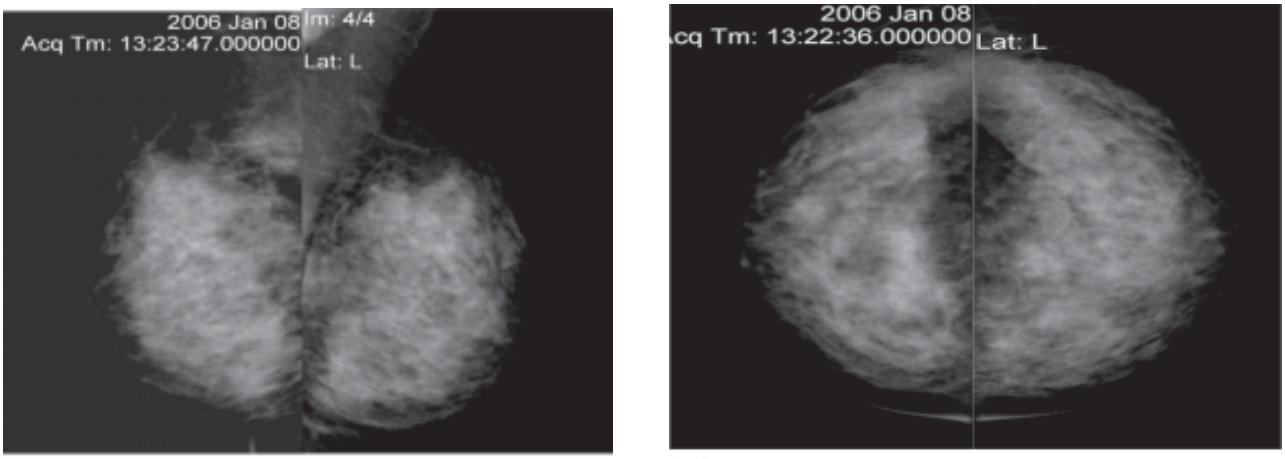
(2a) (2b)

Figure 2. N1 feature; (a) mediolateral oblique view and (b) craniocaudal view: The breast consists of mostly fatty tissue with no visible duct.



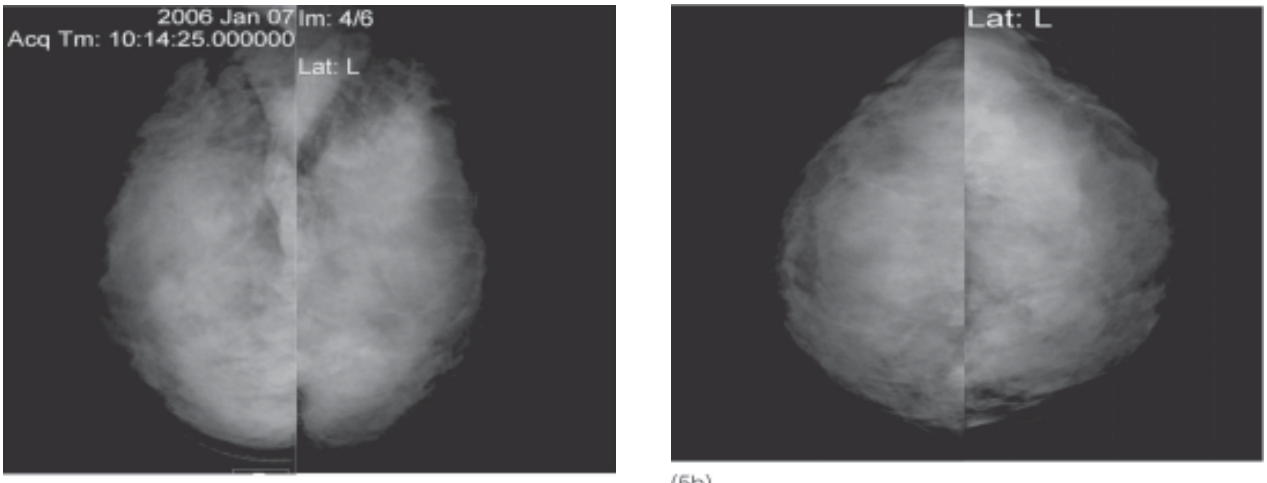
(3a) (3b)

Figure 3. P1 feature; (a) mediolateral oblique view and (b) craniocaudal view : Fatty breast with predominant ducts in the anterior portion occupying up to a quarter of the breast area.



(4a) (4b)

Figure 4. P2 feature; (a) mediolateral oblique view and (b) craniocaudal view : the breast is involuted with prominent duct pattern of moderate to severe degree, occupying more than a quarter of the breast.



(5a) (5b)

Figure 5. DY feature; (a) mediolateral oblique view and (b)craniocaudal view : extremely dense breast parenchyma.

Table 1. Mammographic parenchymal patterns of Thai women.

Age (years)	N1 (%)	P1 (%)	P2 (%)	DY (%)	Total (%)
35 - 44	3 (0.8)	25 (6.3)	114 (28.9)	253 (64.1)	395 (23.7)
45 - 54	22 (2.8)	85 (10.8)	324 (41.1)	355 (45.2)	786 (47.2)
55 - 64	34 (8.6)	74 (18.8)	183 (46.5)	103 (26.2)	394 (23.6)
65 - 74	23 (25.3)	34 (37.4)	28 (30.8)	6 (6.6)	91 (5.4)
Total	82 (4.9)	218 (13.1)	649 (38.9)	717 (43.0)	1,666 (100)

Of the 1,666 screening mammograms, there are different breast parenchymal patterns in each age groups as follows: 35 - 44 years old (total 395 cases, diagram 1) had *N1* feature 3 cases (0.8%), *P1* feature 25 cases (6.3%), *P2* 114 cases (28.9%) and *DY* feature 253 cases (64.1%); 45 - 54 years old (total 786 cases, diagram 2) had *N1* feature 22 cases (2.8%), *P1* feature 85 cases (10.8%), *P2* feature 324 cases (41.1%) and *DY* feature 355 cases (45.2%); 55 - 64 years old (total 394 cases, diagram 3) had *N1* feature 34 cases (8.6%), *P1* feature 74 cases (18.8%), *P2* feature 183 cases (46.5%) and *DY* feature 103 cases (26.2%); and, 65-74 years old (total 91 cases, diagram 4) had *N1* feature 23 cases (25.3%), *P1* feature 34 cases (37.4%), *P2* feature 28 cases (30.8%) and *DY* feature 6 cases (6.6%).

Diagram 1. Breast parenchymal patterns (percentile) in women 35-44 years old.

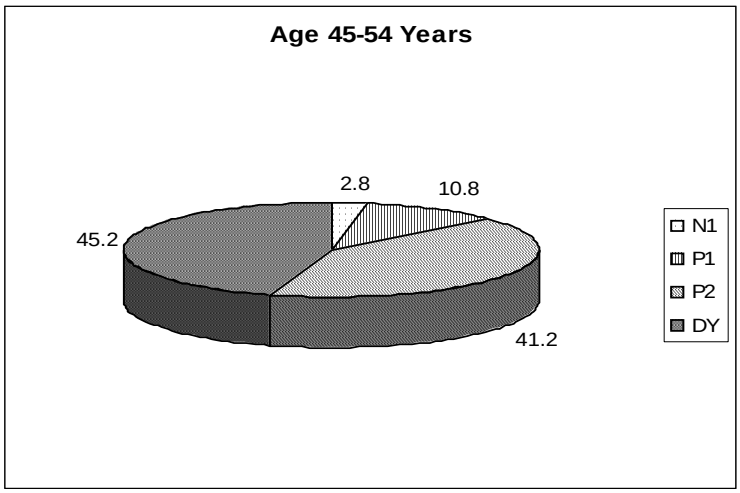


Diagram 2. Breast parenchymal patterns (percentile) in women 45-54 years old.

Diagram 3. Breast parenchymal patterns (percentile) in women 55-64 years old.

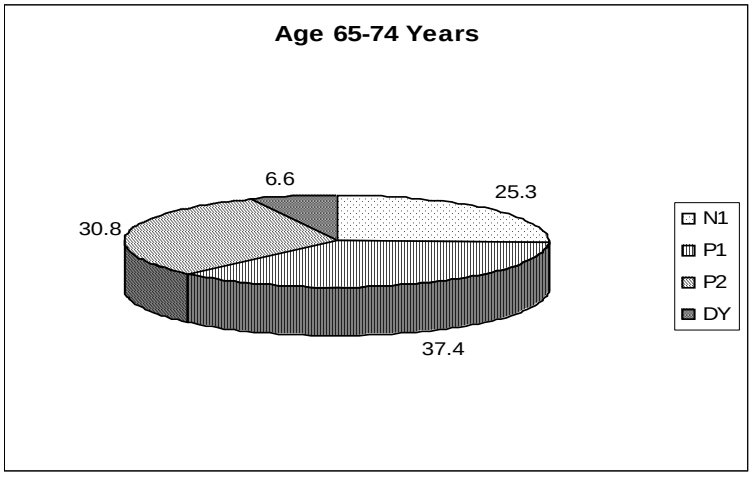


Diagram 4. Breast parenchymal patterns (percentile) in women 65-74 years old.

Discussion

The proposed method of breast parenchymal density classification is simple and robust. [9] We chose the Wolfe's method to classify breast parenchymal patterns because it seems to be more specific in evaluation of parenchymal densities when compared to ACR BIRADS.[10] Wolfe's P2 and DY patterns may correspond to the heterogeneously dense and extremely dense patterns of ACR BIRADS. Wolfe's study also emphasized that the breast parenchymal patterns can predict the risk of breast cancer. P2 and DY patterns take more cancer risk when compared to the fatty and P1 patterns. [11] There is a promise to study in the future in our series whether the cancer risk will go along with the breast parenchymal patterns or not. This might be helpful to look after those women who have dense breasts with high risk. [12, 13] Our study showed that Thai women have dense breasts. Most women in age range of 35 - 74 years old were classified as P2 and DY patterns as follows: 35 - 44 yrs (P2 = 28.9%, DY = 64.1%), 45 – 54 yrs (P2 = 41.2%, DY = 26.2%), 55 – 64 (P2 = 46.5%, DY = 26.2%), 65 -74 yrs (P2 = 37.4%, DY = 30.8%). The breast parenchymal patterns in Thai women may represent Asian women who have potentially dense breasts compared to those in Europe and the USA whose breast parenchymal patterns are less dense and more fatty. In addition, the age is an indicator in changing of breast patterns as shown in table1. The percentage of N1 and P1 patterns increase in the older age groups and P2 and DY patterns increase in the younger age groups. This is agree with the results of Morimoto et al found that the DY pattern decreased significantly in women 50 years or more and increased in women under 50 years. [6] In this study, we gained a statistical significant norm for breast parenchymal patterns in Thai women that might represent Asian women. Basically, dense breasts on mammograms are difficult to be depicted for a lesion and mistake in reporting can be common. Supplement breast ultrasonography plays an important role to reduce the missing rate.

Conclusion

Thai women have dense parenchymal breast patterns, P2 and DY, in all age groups, ranged 35 - 74 years old.

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