

Relationship between breast arterial calcification detected on mammography and carotid intima media thickness as a marker for subclinical atherosclerosis

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Abstract

Introduction:

Breast arterial calcification (BAC) is an incidental finding on mammography that represents medial arterial calcification. Recent evidence suggests that BAC may reflect systemic vascular calcification and may be associated with cardiovascular risk factors. Carotid intima–media thickness (CIMT), measured by B-mode ultrasonography, is a well-established marker of subclinical atherosclerosis and a predictor of cardiovascular events. This study aimed to evaluate the relationship between BAC detected on mammography and CIMT.

Objectives

To assess the association between BAC on mammography and CIMT measured by ultrasonography.

Materials and methods

This hospital-based cross-sectional study included 120 women aged 40–70 years undergoing mammographic evaluation. Participants were categorized into BAC-present and BAC-absent groups, with 60 women in each group. CIMT was measured using B-mode ultrasonography with a high-resolution linear transducer (5–12 MHz). Clinical variables including age, diabetes, hypertension, and menopausal status were recorded. Statistical analysis included independent *t*-test, ANOVA, chi-square test, and Spearman correlation analysis.

Results

Women with BAC were significantly older than those without BAC (54.98 ± 6.28 vs 49.43 ± 5.75 years, $p < 0.05$). Mean CIMT was significantly higher in the BAC group (0.815 ± 0.10 mm) than in the non-BAC group (0.493 ± 0.065 mm) ($p < 0.05$). CIMT increased with higher BAC grades and showed a strong positive correlation with BAC grade ($r = 0.697$, $p < 0.05$).

Conclusion

BAC on mammography is significantly associated with increased CIMT, suggesting its potential role as an opportunistic marker for early detection of subclinical atherosclerosis.

Introduction

Breast cancer screening through mammography has become an integral component of women's preventive healthcare worldwide. Women who routinely undergo mammographic screening generally fall within the age range that is also at an increased risk for developing atherosclerotic cardiovascular disease (ASCVD) [1, 2]. Breast arterial calcifications (BAC) have gained increasing research interest due to their potential association with cardiovascular risk, particularly in women. Recent research suggests that BAC may correlate with an elevated risk of coronary artery disease (CAD) and other cardiovascular outcomes, thereby serving as an imaging biomarker for subclinical atherosclerosis [3, 4].

BAC represents medial arterial calcification (Mönckeberg-type calcification) involving the muscular layer of small- to medium-sized arteries, which differs pathologically from intimal atherosclerotic plaque formation. BAC typically manifests mammographically as amorphous or linear calcifications arranged in parallel lines, creating a characteristic "tram-track" appearance corresponding to calcification within the media of small to medium-sized breast arteries. While BAC is uncommon in younger women, its prevalence increases significantly with advancing age [5, 6].

Increased CIMT has been associated with higher cardiovascular risk, future coronary events, and progression of systemic atherosclerotic disease. Given the accessibility and widespread use of mammography, utilizing BAC as a parallel imaging marker could significantly enhance early detection of subclinical atherosclerosis in women [7, 8]. Research has indicated that the presence of BAC could be an expression of generalized vascular aging and have identical risk factors with systemic arteriosclerosis such as hypertension, diabetes mellitus, chronic kidney disease, and menopause [9, 10].

Although BAC has been associated with cardiovascular risk factors and cardiovascular events, limited data are available regarding its relationship with carotid intima-media thickness, particularly in women undergoing routine mammographic evaluation. Therefore, this study aimed to evaluate whether BAC presence and severity are associated with CIMT, an established marker of subclinical vascular disease.

Despite growing interest in BAC as a cardiovascular biomarker, studies specifically examining the relationship between BAC and CIMT remain scarce. If an increased CIMT is consistently observed in women with BAC, these findings could support the use of BAC as a simple, cost-free, opportunistic marker for early atherosclerosis especially valuable in settings where specialized cardiovascular imaging may not be readily available.

Materials and Methods

The study was hospital based cross-sectional observational study. Institutional Ethics Committee approval was obtained (SRMIEC-ST0224-1026; dated 14/05/2024) in the Department of Radiodiagnosis, SRM medical college hospital and research centre. Inclusion Criteria was women aged 40–70 years undergoing mammography, including those with and without breast arterial calcification, patients without BAC who served as controls. Exclusion Criteria was women who were unwilling to undergo carotid ultrasonography, incomplete or technically inadequate mammographic or ultrasound studies. Written informed consent was obtained from every woman. A total of 120 women aged 40–70 years

undergoing screening or diagnostic mammography were divided into two groups: 60 women with BAC and 60 women without BAC who served as controls. BAC on mammography is characterized by two parallel linear calcific densities producing a rail-road track appearance. BAC was graded into three categories based on mammographic appearance:

- **Grade 1:** Breast vessel wall faintly outlined by calcium
- **Grade 2:** Breast vessel wall predominantly outlined by calcium
- **Grade 3:** Breast vessel wall markedly outlined with dense calcification [8].

Relevant clinical data including age, history of diabetes mellitus, hypertension, menopausal status, and surgical history were collected.

Carotid ultrasonography was performed using a PHILIPS Affiniti 70G ultrasound system with a 5–12 MHz linear probe. The patient was positioned supine with a pillow under the shoulders to gently hyperextend the neck. The head was rotated approximately 45° away from the side being examined. A high-frequency linear transducer was placed along the longitudinal axis of the common carotid artery. B-mode ultrasound was used to identify the intima (echogenic line) and media (hypoechoic layer), both of which were included in the measurement. CIMT was measured at four predefined sites: At the proximal & distal portions within 1.0 cm length from the origin and proximal to the bifurcation in bilateral carotid arteries. The mean value of these 4 measurements was recorded as the final CIMT for each participant. Measurements were obtained during end-diastole, avoiding areas with focal plaque. CIMT was measured as the distance between the lumen-intima interface and media-adventitia interface. The average of bilateral measurements was used for analysis.

Statistical analysis

All collected data were entered into a Microsoft Excel spreadsheet and subsequently analyzed using the latest version of IBM SPSS Statistics (Somers, NY, USA). Comparisons between groups were performed using appropriate statistical tests (e.g., independent t-test, ANOVA, chi-square test), depending on the nature of variables. A p-value of < 0.05 was considered statistically significant.

Results

This hospital-based cross-sectional observational study was conducted to evaluate the association between BAC detected on mammography and CIMT. The study was carried out in the Department of Radiodiagnosis, SRM Medical College Hospital & Research Centre, Kattankulathur, from March 2024 to September 2025.

Women with BAC were significantly older than those without BAC. The mean age in the BAC-present group was 54.98 ± 6.28 years compared to 49.43 ± 5.75 years in the BAC-absent group ($p < 0.05$). A statistically significant association was observed between age group and BAC status ($p < 0.05$), with higher prevalence of BAC in the 50–59 and 60–70-year age groups [Table 1].

Table 1
Distribution of Study Participants by Age Group in Relation to Presence or Absence of Breast Arterial Calcification (BAC)

Age Group (Years)	BAC Present (n = 60)	BAC Absent (n = 60)	Type of statistical test	p-value
40–49	16 (26.7%)	36 (60%)	Chi-square test	0.0007
50–59	26 (43.3%)	17 (28.33%)		
60–70	18 (30%)	7 (11.67%)		
Total	60 (100%)	60 (100%)		
MEAN ± SD	54.98 ± 6.28	49.43 ± 5.75	Independent t test	< 0.05

Menopausal status demonstrated a strong association with BAC. Postmenopausal women constituted 85% of the BAC-present group compared to 50% in the BAC-absent group, and this association was highly significant ($\chi^2 = 16.75$, $p < 0.05$). Diabetes mellitus was significantly more prevalent in the BAC-present group (58.33%) than in the BAC-absent group (25%), showing a strong association with BAC ($\chi^2 = 12.38$, $p = 0.0002$). Hypertension, however, did not show a statistically significant association with BAC ($p = 0.12$). Carotid plaque was observed exclusively in the BAC-present group (10%), with a statistically significant association ($\chi^2 = 4.386$, $p = 0.03$) [Table 2].

Table 2
Association of Clinical Variable with Presence of Breast Arterial Calcification (BAC)

Parameters	Category	BAC Present (n = 60)	BAC Absent (n = 60)	Chi-square Value	p-value
Menopausal Status	Premenopausal	9 (15%)	30 (50%)	16.75	< 0.05
	Postmenopausal	51 (85%)	30 (50%)		
Diabetes Mellitus	Yes	35 (58.33%)	15 (25%)	12.38	0.0002
	No	25 (41.67%)	45 (75%)		
Hypertension	Yes	9 (15%)	15 (25%)	1.302	0.12
	No	51 (85%)	45 (75%)		
Carotid Plaque	Yes	6 (10%)	0 (0%)	4.386	0.03
	No	54 (90%)	60 (100%)		

With respect to carotid artery disease, significant carotid artery stenosis (> 70%) was detected in 3.33% of women with BAC and in none of the women without BAC; however, this difference was not statistically significant (Fisher's exact test, $p = 0.49$). In the current study, a history of surgery was present in 3.33% of women with BAC (2 out of 60), while none of the women without BAC reported previous surgery.

Although surgical history appears only in the BAC-present group, the numbers are very small, and the difference does not suggest any meaningful clinical association [Table 3].

Table 3
Association of Breast Arterial Calcification (BAC) with Carotid Artery Stenosis and Previous Surgical History

Parameters	Category	BAC Present (n = 60)	BAC Absent (n = 60)	Statistical Test	p-value
Significant Carotid Artery Stenosis (> 70%)	Yes	2 (3.33%)	0 (0%)	Fisher's Exact Test (0.5)	0.49
	No	58 (96.67%)	60 (100%)		
Previous Surgical History	Yes	2 (3.33%)	0 (0%)	Fisher's Exact Test (1.302)	0.12
	No	58 (96.67%)	60 (100%)		

CIMT was significantly higher in women with BAC. The mean CIMT in the BAC-present group was 0.815 ± 0.10 mm compared to 0.493 ± 0.065 mm in the BAC-absent group ($t = 20.91$, $p < 0.05$) [Table 4]. Mean CIMT increased progressively with higher grades of BAC, measuring 0.70 ± 0.098 mm in Grade 1, 0.86 ± 0.10 mm in Grade 2, and 0.918 ± 0.10 mm in Grade 3, with a highly significant ANOVA result ($p < 0.05$). A strong positive correlation was observed between BAC grade and CIMT ($r = 0.697$, $p < 0.05$). [Tables 5 and 6].

Table 4
Comparison of Mean Carotid Intima-Media Thickness (CIMT) Between BAC Present and BAC absent Groups

Group	Mean CIMT (mm)	Standard Deviation	Unpaired t test/ Independent t test	p-value
BAC Present (n = 60)	0.815 mm	0.1	20.91	< 0.05
BAC Absent (n = 60)	0.493 mm	0.065		

Table 5
Distribution of Breast Arterial Calcification (BAC) Grades among Participants with Breast Arterial Calcification

BAC Grading in BAC (+) Group	No. of Patients	Percentage
Grade 1	23	38.33%
Grade 2	21	35%
Grade 3	16	26.67%
Total	60	100%

Table 6
Comparison of Mean CIMT across Different Grades of Breast Arterial Calcification

BAC Grading in BAC (+) Group	Mean $\pm$ SD CIMT (mm)	ANOVA Value	p-value
Grade 1	0.7 $\pm$ 0.098	26.22	< 0.05
Grade 2	0.86 $\pm$ 0.1		
Grade 3	0.918 $\pm$ 0.1		

Strong positive correlation was observed between BAC grade and CIMT, with a correlation coefficient (r) of 0.697 and a highly significant p-value (< 0.05).

This finding indicates that as the grade of BAC increases, CIMT tends to increase proportionally. The strength of the correlation underscores the potential of BAC grading to function as a quantitative indicator of systemic vascular calcification and subclinical atherosclerosis.

Discussion

BAC is a common and usually incidental radiologic discovery on screening mammography. BAC is almost exclusively a medial calcification. Deposition of hydroxyapatite occurs along fragmented elastic fibers in the tunica media and internal elastic lamina with relative sparing of the intima in pure cases. On mammography this produces the characteristic “tram-track” or ring-like calcifications and results in arterial stiffening without significant luminal obstruction [12, 13]. At the same time, CIMT by means of B-mode ultrasonography has been identified as an appropriate surrogate biomarker for subclinical atherosclerosis and a good predictor for cardiovascular and cerebrovascular events, such as stroke and coronary artery disease [14–16]. This study was undertaken to assess the association between mammographically identified BAC and CIMT, controlled for known cardiovascular risk factors, and comment on implications for clinical reporting guidelines and preventive cardiology among women [Figure 1].

In present study, Women in the BAC-present group were predominantly older, with the highest representation in the 50–59 and 60–70 age groups, whereas most women without BAC were in the younger 40–49 age range. The mean age in the BAC-present group was 54.98 ± 6.28 years compared to 49.43 ± 5.75 years in the BAC-absent group ($p < 0.05$) [Table 1]. These findings confirm that BAC prevalence increases with advancing age. The findings of the present study are consistent with those reported [17], who observed that participants with BAC were significantly older than those without BAC (59.18 ± 8.59 years vs 50.70 ± 7.93 years; $p < 0.001$). This finding indicates a strong association between advancing age and the presence of BAC, supporting the concept that BAC is an age-related vascular change. In a study reported [18], participants aged > 50 years had a substantially higher prevalence of BAC (32.9%) compared to those aged < 50 years (5.4%). The unadjusted odds ratio of 1.41 (95% CI: 1.2–1.5) indicates that individuals older than 50 years had significantly higher odds of BAC. This association was statistically significant, suggesting that increasing age is an important factor associated with the

presence of BAC. In a study reported [19], Age ≥ 50 years showed a strong association with the presence of BAC. Among women with BAC, a large majority (82.6%) were aged 50 years and above, whereas less than half (47.0%) of women without BAC belonged to this age group. Conversely, women younger than 50 years were much more common in the non-BAC group (53.0%) compared to the BAC group (17.4%). This difference was statistically highly significant ($p < 0.001$), indicating that increasing age is strongly associated with the presence of BAC [Figure 2].

In present study, a large majority of women with BAC were postmenopausal (85%), whereas the BAC absent group had an equal distribution of premenopausal (50%) and postmenopausal (50%) women. The chi-square test showed a highly significant association ($p < 0.05$), indicating that menopausal status is a major contributor to the development of BAC [Table 2]. This finding aligns with known pathophysiological mechanisms linking hormonal decline, vascular wall changes, and arterial calcification in postmenopausal women. In a study reported [19], post-menopausal status was also significantly associated with BAC. In the BAC group, 84.4% of women were post-menopausal, compared to only 50.4% in the non-BAC group. Premenopausal women constituted a much smaller proportion in the BAC group (15.6%) than in the non-BAC group (49.6%). The association between post-menopausal status and BAC was statistically significant ($p < 0.001$), suggesting that hormonal and age-related changes after menopause may play an important role in the development of BAC. In a study reported [20], Postmenopausal status showed a strong and statistically significant association with BAC. A vast majority of BAC-positive women were postmenopausal (94%), compared to 66% in the BAC-negative group. Postmenopausal women had markedly higher odds of BAC (Odd Ratio 8.35; 95% CI: 2.84–24.56; $p < 0.001$), emphasizing the influence of age-related and hormonal changes on vascular calcification. In a study reported [20], A significantly higher proportion of BAC-positive participants were postmenopausal compared to BAC-negative participants (88% vs 50%; $p < 0.001$). This strong association highlights menopause as an important factor related to BAC, possibly reflecting hormonal influences on vascular calcification [Figure 3].

In present study, Diabetes mellitus was significantly more common in the BAC-present group (58.33%) compared to the BAC-absent group (25%), with a highly significant chi-square value ($p = 0.0002$) [Table 2]. In a study done reported [19], Diabetes mellitus was markedly more prevalent among women with BAC. Nearly three-fifths (59.3%) of patients in the BAC group had diabetes, whereas only 17.8% of patients without BAC were diabetic. In contrast, non-diabetic individuals were predominantly seen in the non-BAC group (82.2%) compared to the BAC group (40.7%). This difference was statistically significant ($p < 0.001$), indicating a strong association between diabetes and the presence of BAC. In a study reported [21], Diabetes mellitus was significantly more prevalent among subjects with BAC compared to those without BAC (25% vs 16%, $p = 0.03$). This statistically significant association suggests that diabetes may play an important role in the development of BAC. The observed correlation supports the hypothesis that BAC may serve as a marker of systemic metabolic derangement and vascular calcification associated with diabetes, thereby reinforcing its potential role as an imaging surrogate for cardiometabolic risk.

In present study, Hypertension was present in 15% of women with BAC (9 out of 60) and in 25% of women without BAC (15 out of 60). Conversely, 85% of the BAC-present group and 75% of the BAC-absent group had no hypertension [Table 2]. Although hypertension appeared slightly more common in women without BAC, this difference does not indicate a meaningful association based on the presented data. In a study reported [21], although hypertension was more frequently observed in the BAC-positive group (72%) than in the BAC-negative group (53%), this difference did not reach statistical significance ($p = 0.1$). This suggests that while hypertension may coexist with BAC, it may not independently predict the presence of BAC in this study population.

In present study carotid plaque was observed only in participants with BAC (10%) and was completely absent in the BAC-absent group. This association reached borderline statistical significance ($p = 0.05$), with a chi-square value of 4.386 [Table 2]. This further supports the idea that BAC detected on mammography is associated with early carotid atherosclerotic changes, reinforcing its potential role as a non-invasive marker for subclinical cardiovascular disease. In a study reported [20], Carotid plaque was present in nearly half of BAC-positive women (46%) compared to only 12.6% among BAC-negative subjects. The presence of plaque was strongly associated with BAC, with an odds ratio of 5.83 (95% CI: 2.85–11.95; $p < 0.001$). This supports the hypothesis that BAC reflects systemic atherosclerosis rather than localized vascular calcification.

Association Between Breast Arterial Calcification (BAC) and Significant Carotid Artery stenosis (> 70% stenosis), In the current study, the relationship between BAC and the presence of significant carotid artery stenosis. Among women with BAC, 3.33% had significant carotid stenosis, whereas none of the women without BAC showed stenosis. However, Fisher's exact test yielded a value of 0.51 with a p-value of 0.49, indicating that this difference is not statistically significant [Table 3].

In present study shows a highly significant difference in mean CIMT between women with and without BAC. The BAC-present group demonstrated a markedly higher mean CIMT (0.815 ± 0.1 mm) compared to the BAC-absent group (0.493 ± 0.065 mm), with an independent t-test value of 20.91 and $p < 0.05$ [Table 4]. This substantial difference indicates a strong association between BAC and increased carotid atherosclerotic burden, supporting the hypothesis that BAC may serve as a surrogate marker for subclinical systemic atherosclerosis. In a study reported [22], the mean CIMT was significantly higher in the case group (0.90 ± 0.112 mm) compared to the control group (0.470 ± 0.415 mm). This difference was statistically very highly significant ($t = 36.21$, $p < 0.001$). In a study reported [17], Mean CIMT was significantly higher in BAC-positive participants compared to BAC-negative participants (0.86 ± 0.21 mm vs 0.71 ± 0.12 mm; $p < 0.001$). This finding indicates a greater burden of subclinical atherosclerosis among individuals with BAC, reinforcing the role of BAC as a potential surrogate marker for systemic atherosclerosis.

In present study, mean CIMT progressively increases with higher grades of BAC, demonstrating a dose-response relationship. Mean CIMT values rose from 0.7 mm in Grade 1 to 0.86 mm in Grade 2 and 0.918 mm in Grade 3. The ANOVA test showed a highly significant difference among the three groups ($p <$

0.05), suggesting that the severity of BAC is directly correlated with the degree of carotid arterial thickening. This reinforces the clinical relevance of BAC grading as a potential predictor of vascular disease severity. In a study reported [20], the mean CIMT values were comparable across BAC grades II, III, and IV. Participants with BAC grade II ($n = 43$) had a mean CIMT of 0.78 ± 0.12 mm, while those with grade III ($n = 22$) showed a slightly higher mean CIMT of 0.79 ± 0.14 mm. Subjects with the highest BAC grade IV ($n = 5$) demonstrated a mean CIMT of 0.78 ± 0.13 mm. Overall, there was no clear incremental increase in CIMT with increasing BAC grade, suggesting that while the presence of BAC may be associated with increased carotid atherosclerosis, the severity of BAC does not appear to correlate with further increases in CIMT in this cohort.

Routine reporting of BAC on mammography may therefore provide valuable additional information for cardiovascular risk stratification and facilitate early preventive interventions in women, particularly those who are older, postmenopausal, or have metabolic risk factors.

Limitations

This study has several limitations. First, the study population consisted of women undergoing mammography at a single tertiary care hospital, which may limit the generalizability of the findings to the broader community population, including asymptomatic women undergoing routine screening. Second, BAC was graded visually into three categories; although this approach is commonly used, there is currently no universally accepted and validated BAC scoring system comparable to coronary artery calcium scoring, which may influence interobserver reproducibility. Third, the cross-sectional design of the study precludes establishing a temporal or causal relationship between BAC and increased CIMT. Additionally, long-term follow-up was not performed; therefore, the association between BAC and future cardiovascular events such as myocardial infarction or stroke could not be evaluated. Finally, although relevant clinical risk factors were assessed, comprehensive adjustment for potential confounding variables, including age and metabolic risk factors, was limited.

Strengths

The strengths of this study include prospective data collection, standardized mammographic evaluation of BAC, and quantitative assessment of CIMT using B-mode ultrasonography. Furthermore, the study evaluated the relationship between the severity of BAC and CIMT, providing additional insight into the potential role of mammographic vascular calcification as an imaging marker associated with subclinical vascular changes.

Conclusion

Breast arterial calcification detected on mammography was significantly associated with increased carotid intima–media thickness, suggesting a relationship between mammographically identified

vascular calcification and subclinical vascular alterations. Moreover, increasing grades of BAC demonstrated progressively higher CIMT values, indicating a possible association between the extent of BAC and vascular risk burden.

Given the widespread use of mammography for breast cancer screening, recognition of BAC may provide an opportunity to identify women who could benefit from cardiovascular risk assessment. However, BAC should not currently be considered an independent diagnostic marker of atherosclerosis based on the findings of this cross-sectional study. Future large-scale, multicenter prospective studies incorporating standardized BAC scoring systems, comprehensive cardiovascular risk adjustment, and long-term clinical follow-up are required to determine the incremental value of BAC in cardiovascular risk prediction and preventive strategies.

Abbreviations

BAC – Breast arterial calcification

CIMT – Carotid intima–media thickness

ASCVD – Atherosclerotic cardiovascular disease

CAD – Coronary artery disease

B-mode – Brightness mode ultrasonography

USG – Ultrasonography

CT – Computed tomography

MLO – Mediolateral oblique

CC – Craniocaudal

BMI – Body mass index

DM – Diabetes mellitus

HTN – Hypertension

CVD – Cardiovascular disease

SD – Standard deviation

SPSS – Statistical Package for the Social Sciences

ANOVA – Analysis of variance

OR – Odds ratio

CI – Confidence interval

p-value – Probability value

Declarations

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of Interest

The authors declare that they have no conflict of interest.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was conducted in accordance with ethical standards and was approved by the Institutional Ethics Committee (Approval No.: SRMIEC-ST0224-1026; dated 14/05/2024). Written informed consent was obtained from all the participants.

Consent to participate

Informed consent was obtained from all individual participants included in the study.

Written consent for Publication

The authors confirm that this manuscript has not been published previously and is not under consideration for publication elsewhere.

Availability of data and material

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Code availability

Not applicable. The study did not involve the development of custom code. Data analysis was performed using IBM SPSS Statistics version 26.

Authors' Contributions

Sangavi Jeyaraj: Correspondence, Conceptualization, methodology, data collection, formal analysis, and manuscript drafting.

R. Sundara Raja Perumal: Study design, supervision, data interpretation, and critical revision of the manuscript.

Senthil kumar Aiyappan: Overall supervision, manuscript review, and final approval of the submitted version.

All authors read and approved the final manuscript.

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Figures

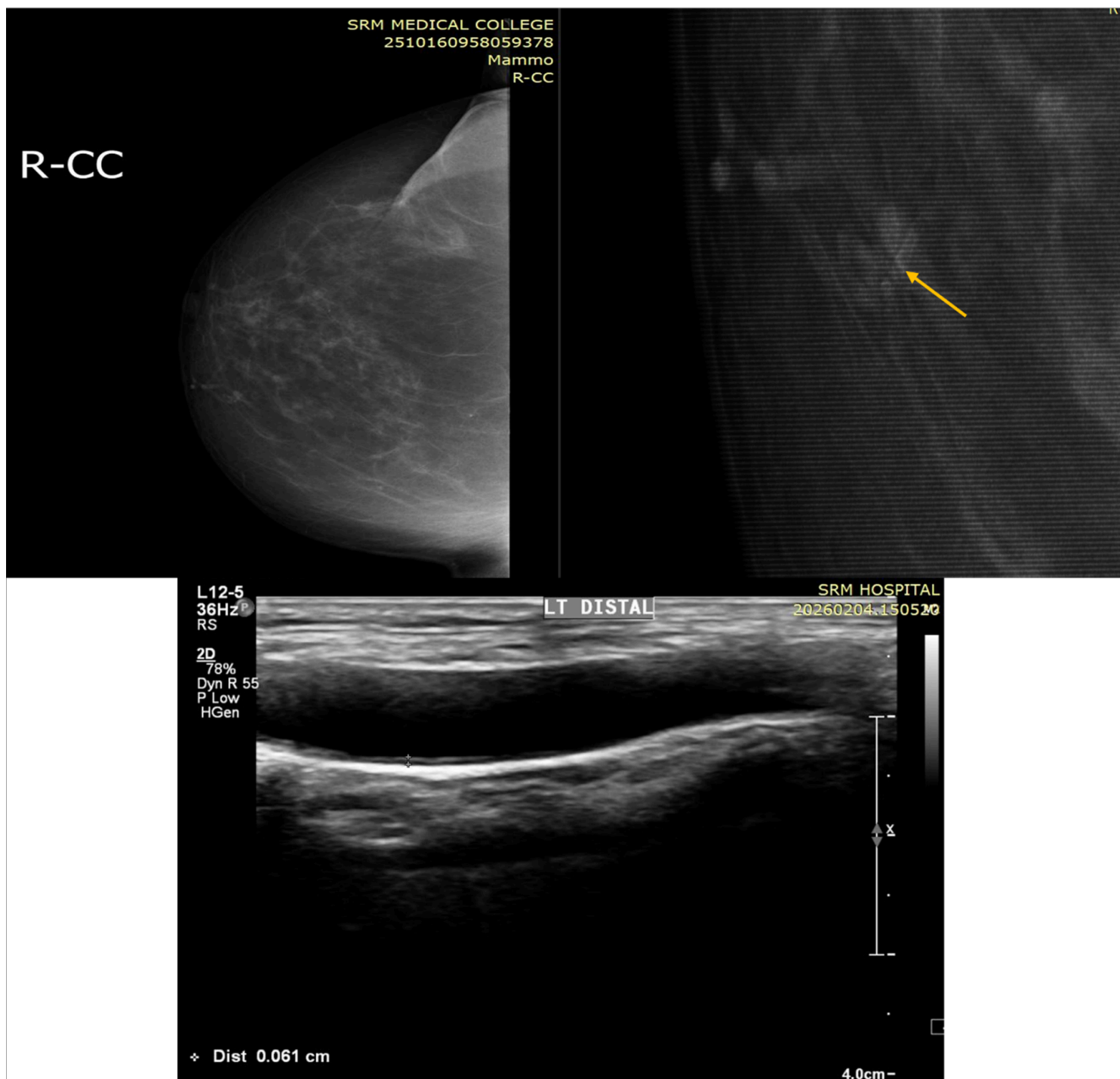


Figure 1

Mammogram CC view of right breast of 45-year-old female shows grade 1 breast arterial calcifications (yellow arrow in zoomed image) and normal CIMT (blue arrow).

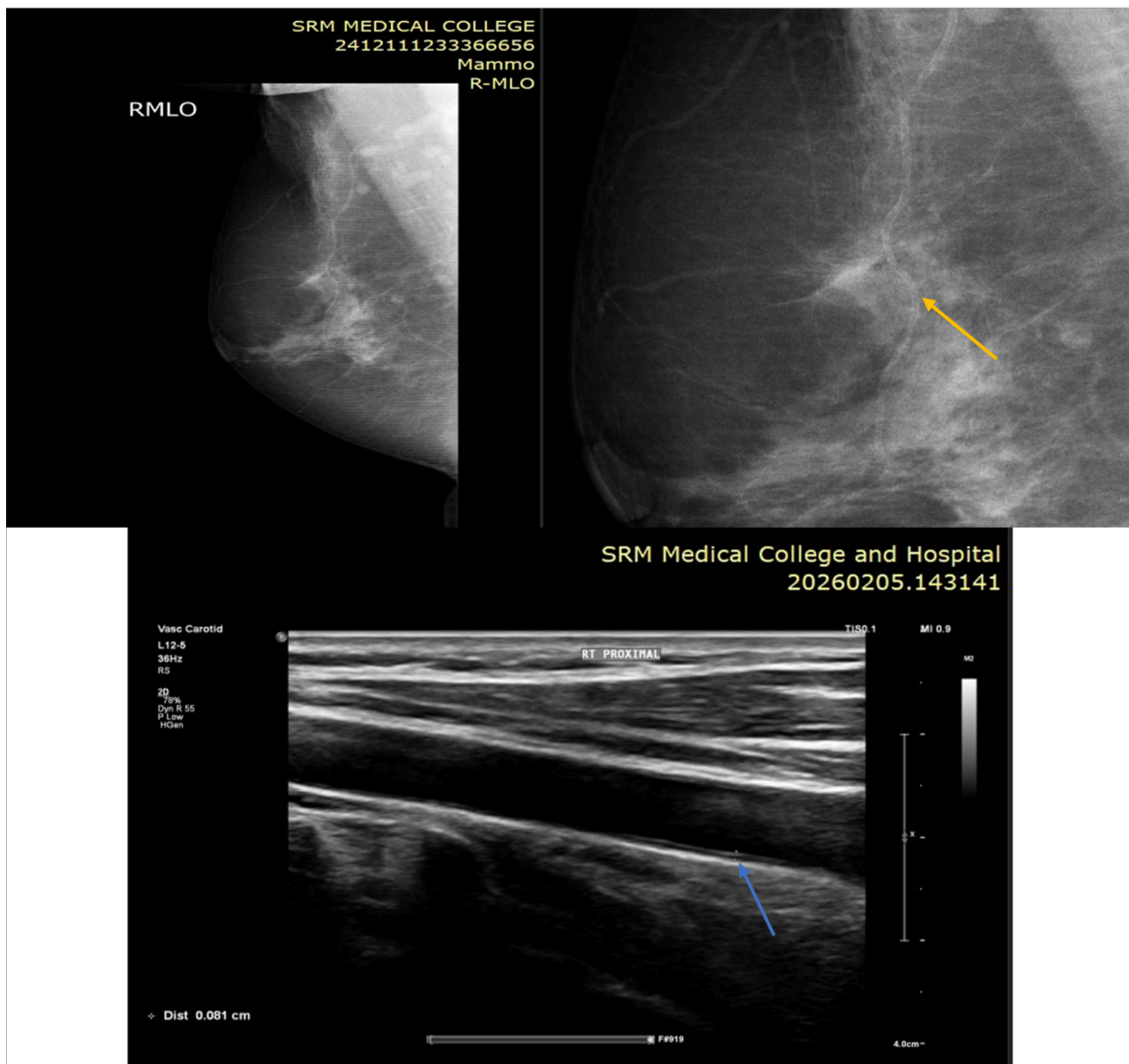


Figure 2

Mammogram MLO view of right breast of 52-year-old post-menopausal female shows grade 2 breast arterial calcifications (yellow arrow in zoomed image) and mildly increased CIMT (blue arrow).

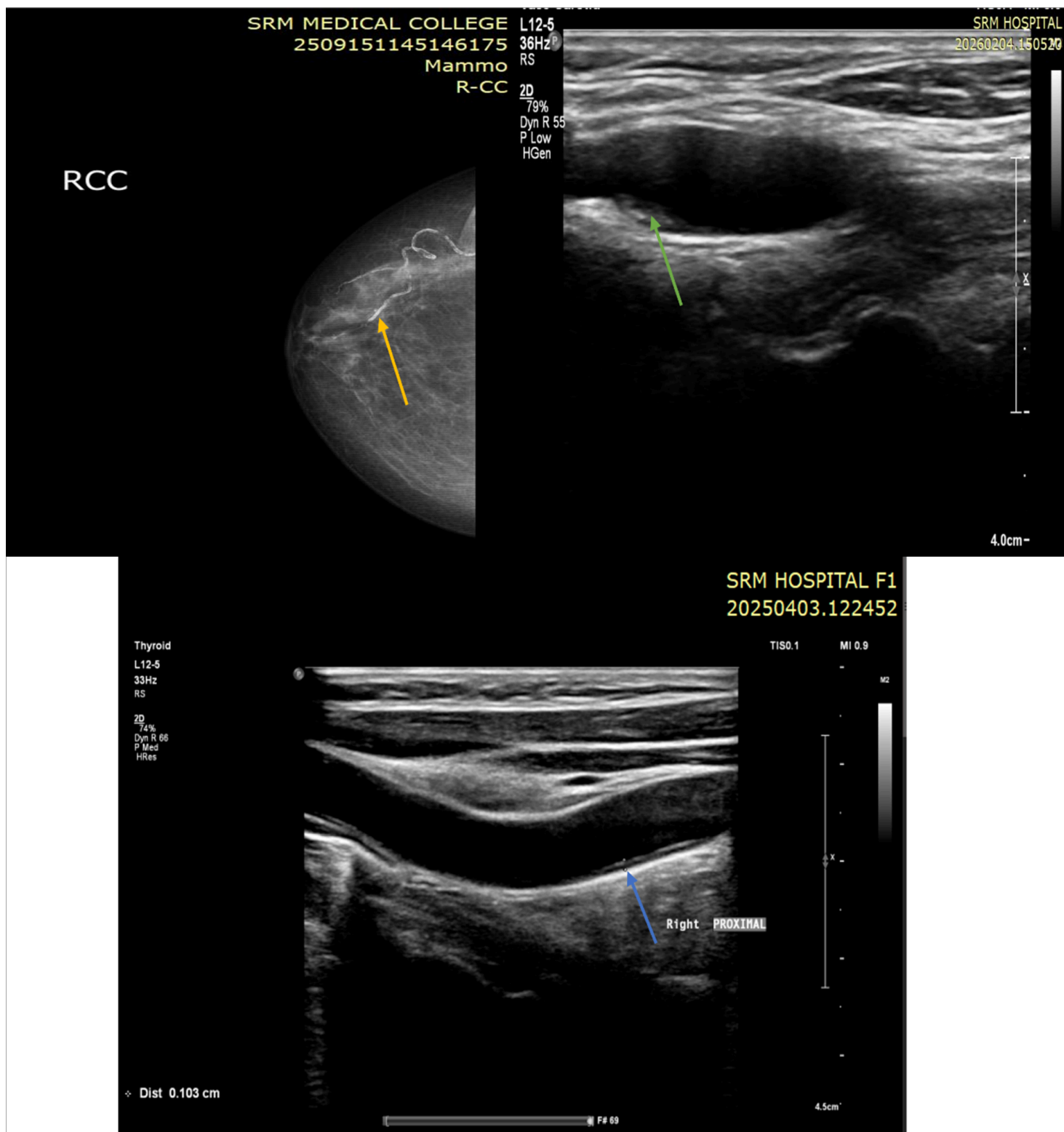


Figure 3

Mammogram CC view of right breast of 63-year-old post-menopausal female with diabetes mellitus shows grade 3 breast arterial calcifications (yellow arrow), non-obstructive carotid plaque in the right carotid bulb (green arrow) and increased CIMT (blue arrow).