8 Artefacts in CEDM

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An artefact is typically defined as any feature in an image or sequence that misrepresents the object in the field of view. Artefact manifestations include an additional unexpected signal on the image or sequence, a lack of signal or image distortion.

As with any imaging modality, artefacts in contrast-enhanced digital mammography (CEDM) can interfere with image quality, and their effects can vary from negligible to severe, possibly leading to unnecessary procedures or hiding underlying abnormalities. Although some of these artefacts are similar to those observed with full-field digital mammography (FFDM), many are unique to CEDM.

It is critical for radiologists and technologists to be familiar with the various CEDM artefacts and to understand their causes to minimize or eliminate potential negative effects on image interpretation. This strategy not only improves image quality but also reduces imaging time, which can improve both the workflow and patient experience.

To date, there is limited published literature available reviewing the artefacts related to CEDM [1, 2]. We have categorized the artefacts observed in CEDM into four categories, namely, FFDM-related factors, contrast-related factors, CEDM-related factors, and quality-control (QC)-related artefacts.

In this chapter, we survey examples of artefacts and other factors that interfere with image acquisition observed with CEDM in our clinical practices at Careggi University Hospital and Kuala Lumpur Hospital (KLH), and we highlight the necessary steps to reduce and eliminate these artefacts.

8.1 FFDM-Related Factors

The low-energy (LE) image obtained in CEDM resembles a full-field digital mammogram (FFDM) even though iodinated contrast media is already present within the breast [3]. Therefore, it is necessary to address some of the artefacts that have been described for FFDM that are commonly observed in our CEDM experience. Ayyala et al. [4] exhaustively illustrated many of the artefacts related to FFDM and divided them into three different categories:

- Patient-related factors (motion artefacts, hair artefacts, antiperspirant artefacts, and air artefacts).
- Hardware-related factors (field inhomogeneity, detector-associated artefacts, collimator misalignment, grid lines, grid misplacements, underexposure, and vibration artefacts).

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- Software processing artefacts ("breast-within-a-breast" artefacts, vertical processing bars, loss of edge, and high-density artefacts).

We highlight the artefacts that are common to CEDM.

8.1.1 Motion

As with any imaging modality, patient motion can affect image quality [4–9]. The risk of motion artefacts is greater in CEDM than that in other techniques because CEDM involves sequential acquisition of low-energy (LE) and high-energy (HE) images, thereby increasing the time of exposure and resulting in an increased likelihood of patient motion [2].

Patient motion degrades image quality, resulting in blurring of radiopaque structures present in the breast as well as lesion margins. Patient motion between the LE and HE images adversely affects the subtraction process, which relies on accurate registration between the two images, and results in imperfect parenchymal suppression with greater anatomical noise.

These artefacts are commonly observed in clinical practice. To minimize the patient motion, which is the most common cause of blurring (Fig. 8.1), the technologist should apply adequate compression during the examination and remind patients to remain still during image acquisition.

Adequate compression is essential for mammography and has many benefits, including decreasing motion artefacts, reducing scatter, improving X-ray penetration, and reducing dose [10].

8.1.2 Hair Artefacts

Similar to the case of analogue studies, patients can create image artefacts related to their clothing, hairstyle, or jewellery. To avoid unnecessary added image acquisitions and radiation exposure, it is important to ensure that the patient's

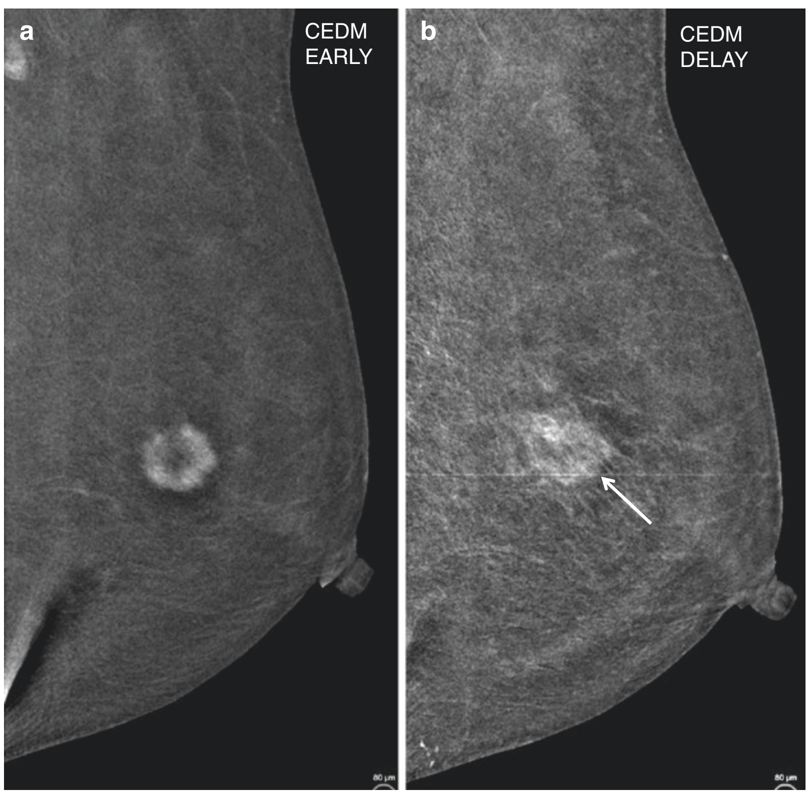

Fig. 8.1 **Motion artefact:** A 49-year-old woman with biopsy-proven invasive ductal carcinoma in the left breast underwent CEDM as part of a staging workup. (**a**) CEDM-recombined image in MLO view demonstrates an intensely enhancing well-demarcated round mass in the upper quadrant of the left breast. (**b**) CEDM delay was performed to assess the enhancement kinetics, but due to motion artefacts, the margins of the mass are blurred. *CEDM* contrast-enhanced digital mammography, *MLO* mediolateral oblique

hair is pulled back, as hair overlying the breast is represented in the image and may potentially obscure important abnormalities (Fig. 8.2). Other subject-related factors to note and remove prior to image acquisition are pieces of clothing, glasses, and any accessories that the patient is wearing that can project on the image. It is important to position the patient suitably to ensure that her chin or shoulders are out of the imaging field of view [9].

8.1.3 Antiperspirant Artefacts

Antiperspirant artefacts are important to recognize since their appearance can be mistaken for unusual lesions or calcifications in the axillary region of the breast, possibly leading to unnecessary testing and procedures (Fig. 8.3). It is important for technologists to recognize this artefact and to ask the patient to clean the axilla or skinfolds before the subsequent image acquisition is performed [4, 11].

Reminding patients to clean their breast and axilla before imaging is crucial to minimize these common artefacts. A patient fact card that can be given to the patient upon scheduling the CEDM appointment, informing them of all the necessary precautions to be taken prior to the examination day, is helpful to avoid such artefacts from occurring. An example of such a patient fact card is shown in Fig. 7.1 of Chapter 7.

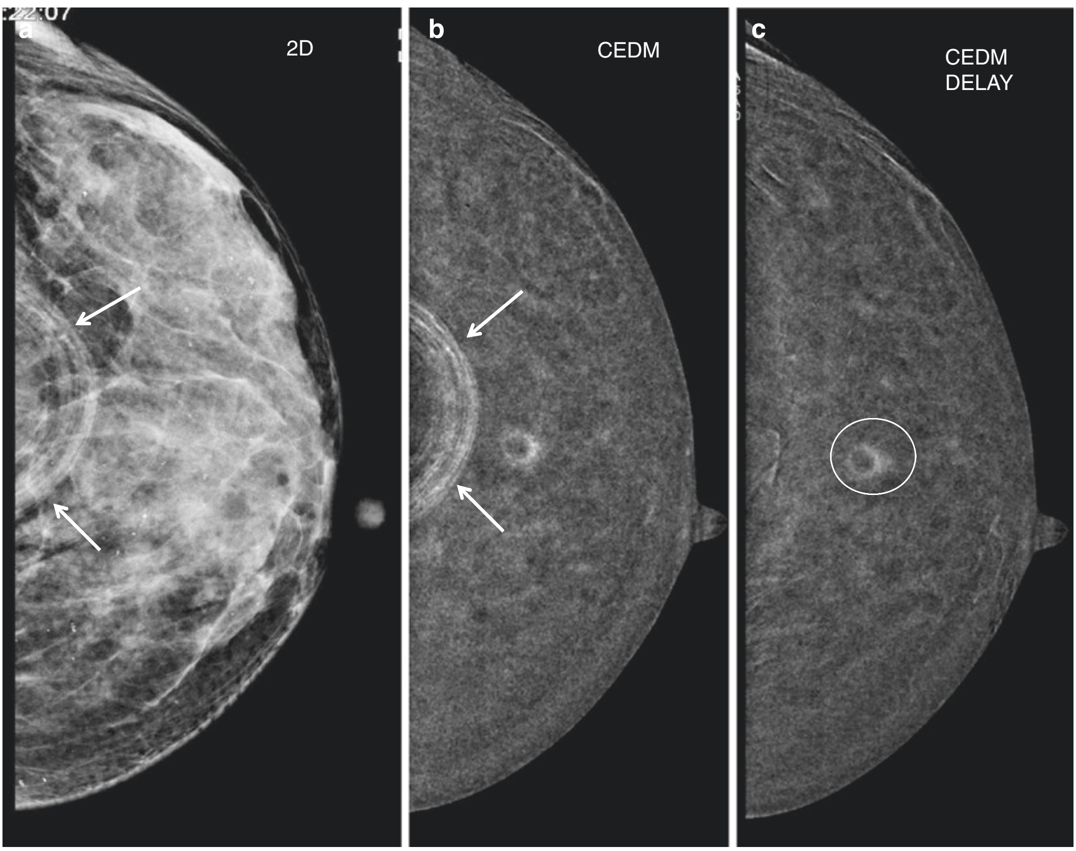

Fig. 8.2 Hair artefact: CC views of a 46-year-old woman with biopsy-proven invasive ductal carcinoma in the left breast underwent CEDM as part of a staging workup. (**a**) LE image shows a well-defined opacity (*arrows*) in the left posterior central quadrant. (**b**) The opacity which was related to the patient's hair is seen to appear more pronounced in the early recombined CEDM images. (**c**) We subsequently instructed the patient to tie her hair back before proceeding with a delay CEDM acquisition, thus eliminating the opacity. A post-biopsy rim artefact (*circle*) is also present in these images. *CEDM* contrast-enhanced digital mammography, *LE* low energy, *CC* craniocaudal

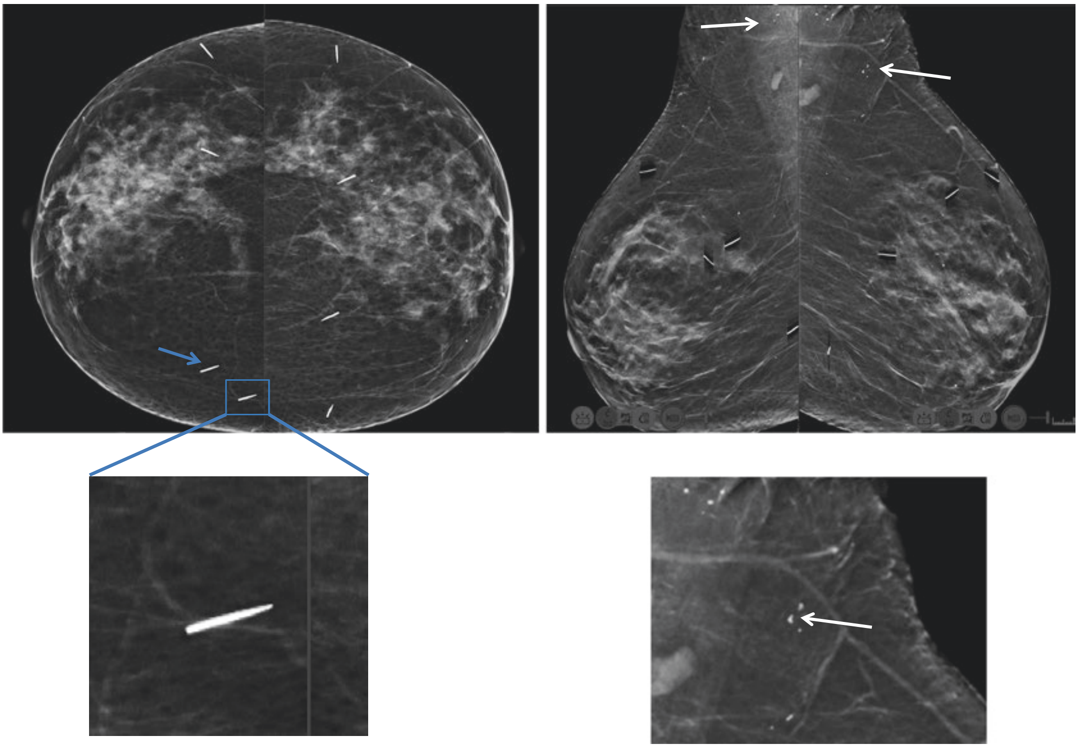

Fig. 8.3 **Antiperspirant artefact:** Bilateral mammograms in CC and MLO views show small, faint radiopaque densities in the axilla region on the MLO view caused by antiperspirant (*white arrows*). The artefact was eliminated through removal of the antiperspirant. Also observed in this mammogram are multiple linear metallic densities (*blue arrow and blue box*) projected over both breasts, measuring approximately 5 mm, in keeping with charm needles. These charm needles can be identified by their fine needle shape with a broader base and a pointed tapering tip (*magnified view*). Charm needles or "susuk" are needles made of gold or other precious metals that are inserted subcutaneously in various parts of the body to act as talismans. The practice of inserting susuk is an indisputably cultural and superstitious traditional belief common in the Southeast Asian region, particularly in Malay culture, and is typically observed in the people of Malaysia, Thailand, Singapore, Indonesia, and Brunei. Their insertion is presumed to bring beauty, and for this reason, they are most commonly identified in the craniofacial regions and breasts of women. Most susuk wearers are secretive about their hidden talismans, but these gold or silver needles are being discovered with increasing frequency now that radiographs are used more widely. An understanding of this practice and an awareness of its existence are important to avoid misdiagnosis and mismanagement of these patients. *MLO* mediolateral oblique, *CC* craniocaudal

8.1.4 Air Gap and Other High-Attenuation Artefacts

In our experience with CEDM, the air gap is the most common artefact. This artefact is caused by partial contact between the skin and the detector or compression paddle, which creates a dark artefact in the configuration of the area of incomplete contact, possibly hiding underlying abnormalities [12]. Imperfect contact may also be the result from improper compression or skinfolds and is commonly observed at the skinfolds of the axilla (Fig. 8.4).

Placing markers after breast biopsy is common. These highly attenuating objects can show a variable appearance depending on a demetal function, which has been turned off by default in the current systems [12]. We have noticed a dark halo appearance around high-attenuation items, such as post-biopsy markers, mole markers, scar markers, pacemakers, and chest ports, which is caused by image processing filters. The manufac-

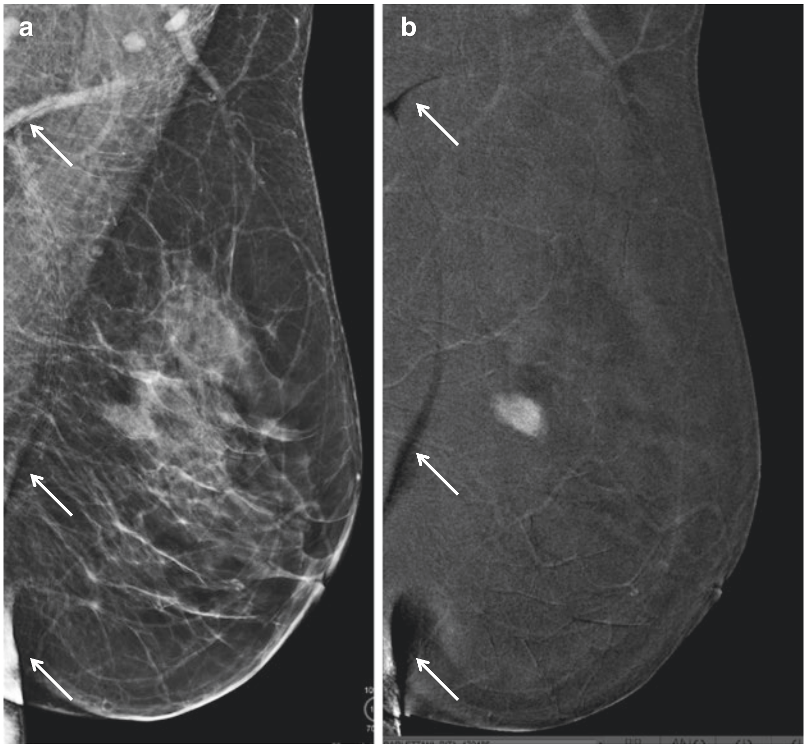

Fig. 8.4 Air artefact: A 51-year-old woman with biopsy-proven invasive ductal carcinoma in the left breast underwent CEDM as part of a staging workup. (**a**) LE image in MLO projection. (**b**) CEDM-recombined image in MLO projection. The vertically oriented black lines (*white arrows*) in the superior and inferior aspect of the left breast posteriorly arise from air trapped in the axillary and inframammary folds. *CEDM* contrast-enhanced digital mammography, *MLO* mediolateral oblique, *LE* low energy

turer's latest software release has a demetal algorithm to remove these dense markers and prevent this artefact.

In our clinical setting, we place bowtie titanium markers during vacuum-assisted biopsy procedures and barbell non-metallic markers during US-guided procedures. The barbell marker, despite being non-metallic, is still sufficiently dense to create an artefact (Fig. 8.5).

8.2 Contrast-Related Factors

Several contrast-related factors can affect the image quality in CEDM, such as the delivery rate of the contrast agent, the correct timing of the administration relative to breast compression, and the image acquisition. Similar to the case of MRI, physiological processes, such as the menstrual cycle phase, may also contribute to the degree of background parenchymal enhancement in CEDM [13].

8.2.1 Contrast Splatter

In a CEDM examination, it is critical to pay close attention to the technique during contrast administration to prevent contrast contamination. The contrast is administered via a power injector to the venous access in the patient's arm through a connecting tube. While disconnecting the tubing, small droplets of contrast may splatter onto the adjacent equipment and give the appearance of small white dots, specifically on the recombined images, sometimes simulating the appearance of calcifications (Fig. 8.6), which may lead to unnecessary procedures. Therefore, it is important to carefully analyse the rest of the images to avoid mistakenly classifying splatter artefacts as true calcifications. Taking precautions, such as disconnecting the injector at an appropriate distance from the mammography unit and wiping the imaging surfaces of the unit between patients, reduces the possibility of such artefacts from occurring.

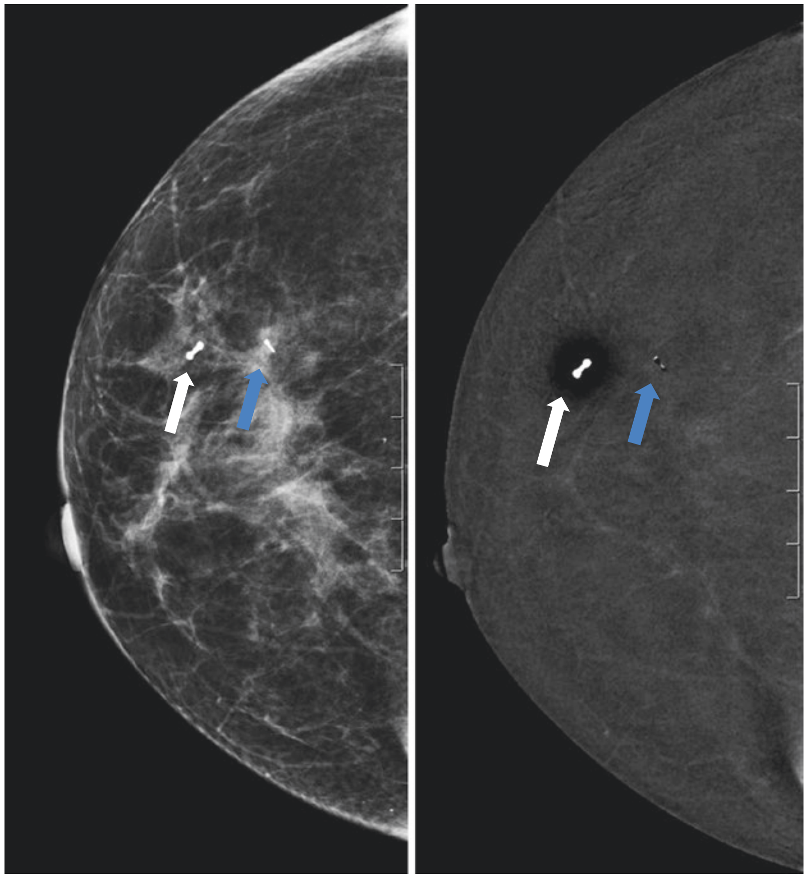

Fig. 8.5 High-attenuation artefact: An example of two markers with differences in artefact appearance. The posteriorly located marker (*blue arrow*) is a bowtie marker that we use for vacuum-assisted breast biopsy (VABB) procedures consisting of a titanium marker, while the anteriorly located (*white arrow*) marker is a non-metallic barbell marker consisting of natural minerals and carbon-coated zirconium oxide. The anteriorly located marker closer to the skin demonstrates a surrounding dark halo that is not observed with the titanium marker. This is caused by image processing filters, which cause the marker to have a prominent dark halo surrounding it

A study by Gluskin et al. [14] suggested that if this finding is encountered in clinical practice, several circumstances may suggest that this finding is only an artefact:

- If a non-mass enhancement is observed on only one view and does not persist on additional or repeat imaging after cleaning the breast.
- If the suspicious calcifications do not persist on magnification views.
- If the suspicious non-mass enhancement does not persist on repeated contrast-enhanced studies, such as CEDM or MRI [2, 14].

We also observed that when the intravenous (IV) line is still in place at the patient's antecubital fossa and the patient is positioned with her arm resting on the side of the detector for the mediolateral oblique (MLO) projection, contrast contamination commonly occurs due to the close proximity of the patient's arm to the detector. This contamination is typically resolved by cleaning the patient's breast and the detector prior to subsequent imaging.

An important point to note is that while calcifications are white on FFDM and LE CEDM, they appear black on CEDM-recombined images. Therefore, anything that resembles calcifications on recombined images should raise the suspicion of an artefact and the patient's breast and detector should be cleaned prior to further imaging.

8.2.2 Abnormal Timing of the Contrast Bolus

In CEDM, image acquisition starts 2 minutes after the beginning of the contrast administration, and all the images are acquired within 8–10 minutes from the time of injection [15].

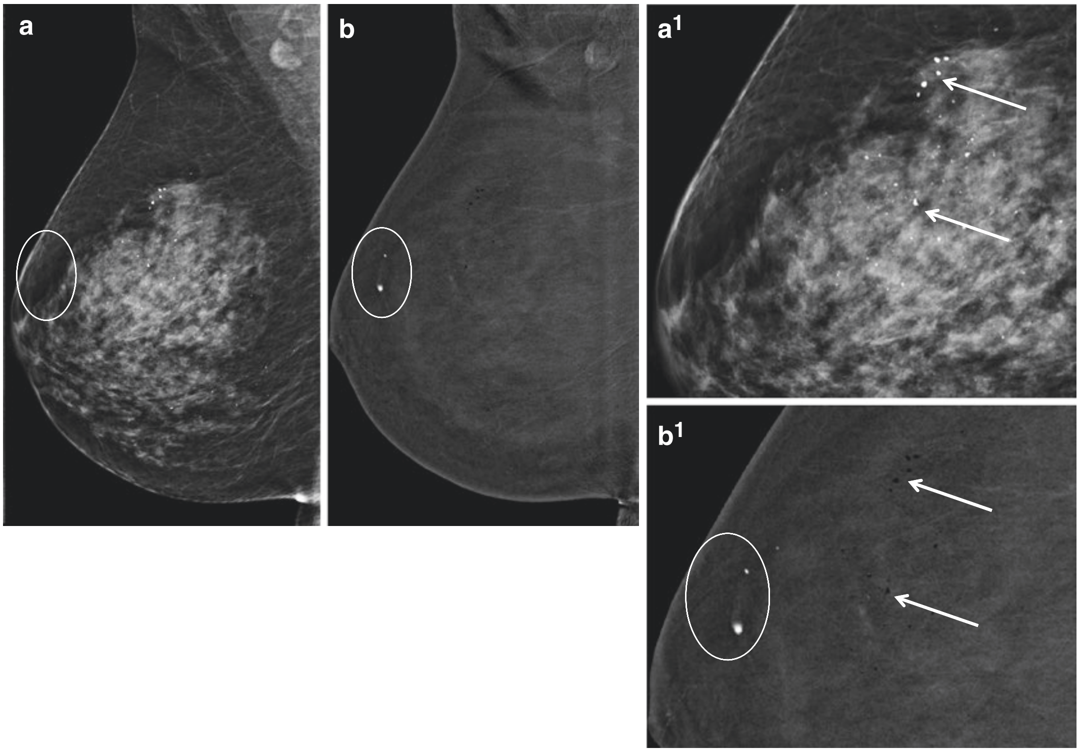

Fig. 8.6 Contrast splatter: A 55-year-old woman underwent a CEDM examination for inconclusive findings on mammogram. (**a**, **a**^{1}) LE and (**b**, **b**^{1}) recombined CEDM images of the right breast in the MLO projection, showing small droplets of contrast splattered on the detector plate before starting the CEDM examination. Splattered droplets of contrast are detected on the recombined images as small white dots, simulating the appearance of calcifications (*circle*); no correlating abnormality is detected at the same level on the LE image (*circle*). Note that although calcifications appear white on FFDM and LE CEDM (*arrows*), they appear black on CEDM-recombined images (*arrows*). *CC* craniocaudal, *CEDM* contrast-enhanced digital mammography, *FFDM* full-field digital mammography, *LE* low energy

Therefore, an incorrect timing of contrast bolus or image acquisition can result in suboptimal image quality and false-negative examination [2]. Any image obtained prior to 2 minutes post-contrast administration results in retained contrast outside the breast, as the contrast media cannot reach the breast due to premature compression. Images taken after the 8-minute timeline result in a false-negative result as the contrast has dispersed from the breast by that point.

8.2.3 Transient Retention of Contrast in the Vein

A mild retention of contrast in the veins is common in clinical practice but is frequently transient and unilateral (Fig. 8.7). This artefact is probably related to breast compression but offers no limitation to image interpretation. This phenomenon typically disappears by the time the ipsilateral MLO projection is obtained. However, if it is related to central venous occlusion, the retention of contrast in the veins is prolonged and observed bilaterally [2].

8.3 CEDM-Related Factors

CEDM-related factors include the following: negative contrast enhancement, halo artefact, ripple artefacts, misregistration artefact, skin-line enhancement, and enhancing skin lesion artefacts [1, 2]. Here, we discuss the various

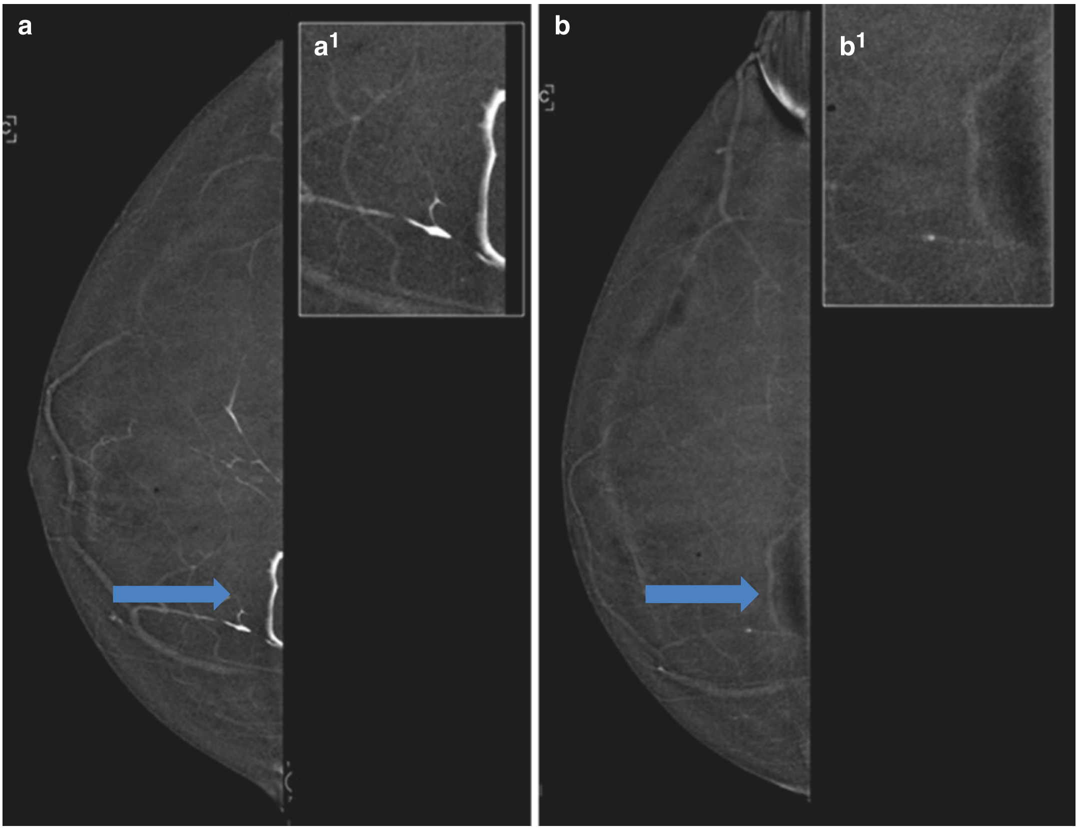

Fig. 8.7 **Transient retention of contrast in the vein:** A 63-year-old woman undergoing CEDM for the evaluation of an enhancing mass in the upper-central quadrant of the left breast (*not shown*). CEDM-recombined images of the right breast in CC projection. (**a**, **a**^{1}) Early phase of CEDM showing linear branching hyperdensities in the inner quadrants of the right breast (*blue arrows*), representing mild transient retention of intravenous contrast in the veins. (**b**, **b**^{1}) Shows that this phenomenon typically disappears by the time the same projection is acquired in the late phase. *CEDM* contrast-enhanced digital mammography, *CC* craniocaudal

CEDM-related artefacts that we have encountered in our clinical experience.

8.3.1 Negative Contrast Enhancement

Negative contrast enhancement cannot be considered a true artefact, as it is actually a natural consequence of the acquisition technique. When a cyst (Figs. 8.8 and 8.9) or a macrocalcification (Fig. 8.9) is not enhanced in the recombined image, a rim-enhancing hypodensity arises with respect to the background: a "negative contrast enhancement", also referred to as an "eclipse sign" as it resembles a full solar eclipse on the recombined images. Generally, this condition does not compromise image interpretation [2]. Based on our experience at Careggi University Hospital, in addition to cysts and calcifications, this type of artefact is also encountered in cases of post-biopsy haematoma (Fig. 8.10), characterized by a peripheral enhancement of the granulation tissue surrounding the non-enhancing haematinic collection.

8.3.2 Halo Artefact

This artefact, also known as the "breast-within-a-breast" artefact, tends to occur in women with thick breasts. The artefact occurs due to

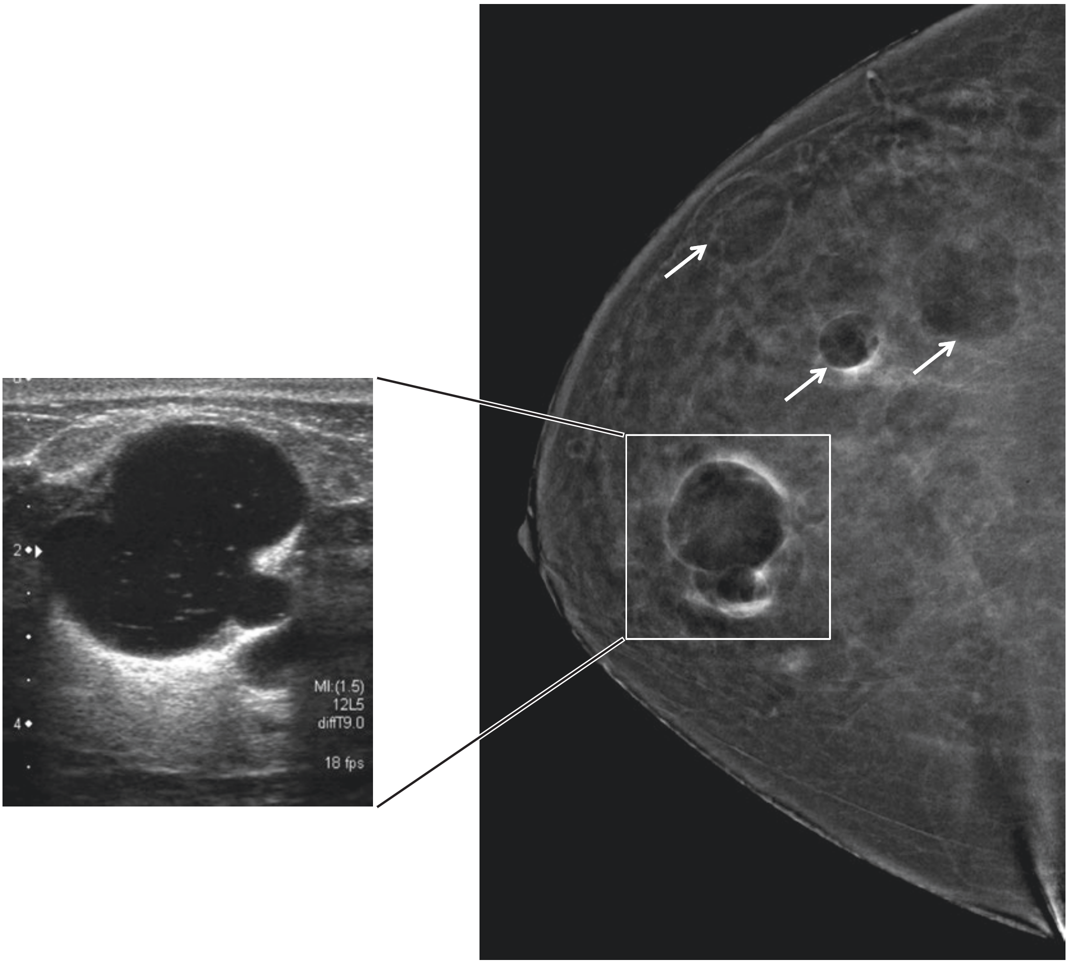

Fig. 8.8 Negative contrast enhancement: A 51-year-old female presented with a palpable right breast lump. CEDM of the right breast in CC projection displays several lesions (*arrows*) with a rim enhancement pattern and central non-enhancement on the recombined image; these lesions appear darker with respect to the background, a phenomenon often referred to as "negative contrast enhancement" or an "eclipse sign". One of these features (*box*) is characterized by a strong peripheral enhancement. An ultrasound confirmed the findings of a cyst with internal debris, suggestive of an infected benign cyst. *CEDM* contrast-enhanced digital mammography, *CC* craniocaudal

the rapid change in breast tissue thickness from the chest wall to the edge of the breast, causing the software processing algorithm to create a false exaggerated boundary. Technical factors caused by the presence of scatter radiation, which is non-uniform throughout the breast and has different characteristics between the LE and HE acquisitions, also play a role in this artefact, which is typically observed on the recombined images and appears as a thin curvilinear area of increased density paralleling the edge of the breast [2, 4, 16, 17]. However, this artefact does not interfere with diagnostic interpretation of the images. These software processing artefacts are vendor specific, and we have not encountered this artefact in our cases performed at Careggi University Hospital and KLH.

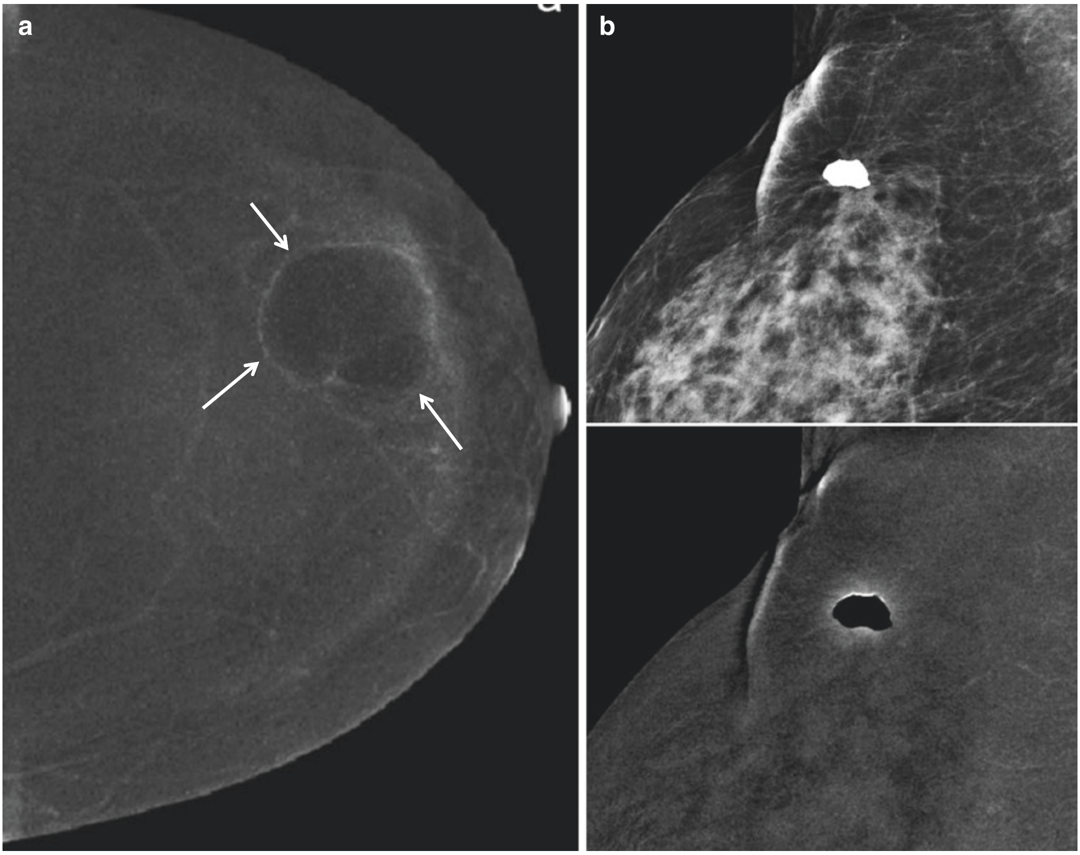

Fig. 8.9 **Negative contrast enhancement:** When a (**a**) cyst or (**b**) coarse calcification is imaged, it appears darker with respect to the background and is often referred to as "negative contrast enhancement" or the "eclipse sign" because it resembles a full solar eclipse on the recombined CEDM image

8.3.3 Ripple Artefact

The ripple artefact, which is commonly observed on the recombined images, consists of faint alternating black and white lines appearing on the mediolateral oblique (MLO) projections of both breasts in the recombined images (Fig. 8.11). Dromain et al. [17] attributed this artefact to patient motion, most likely caused by the short interval between the LE and HE exposures. The artefact is commonly observed on the inferior portion of the MLO view because the inferior parts of the breasts are typically less well compressed, as suggested by Hill et al. [18], resulting in a mismatch of the exposures and an incomplete suppression of anatomical noise on the recombined images.

As this artefact is most frequently observed in the inferior quadrant of the left MLO projection, Bhimani et al. [2] suggested that it arises from cardiac pulsations transmitted through the chest wall. The ripple artefact does not compromise the quality of the image, but it is possible to decrease its effect by reducing patient anxiety during the procedure.

Providing patients with information about the procedure is a suitable first step towards reducing their fears. Talking the patient through their experience also helps greatly. Six minutes is adequate time for the technologist to obtain the four

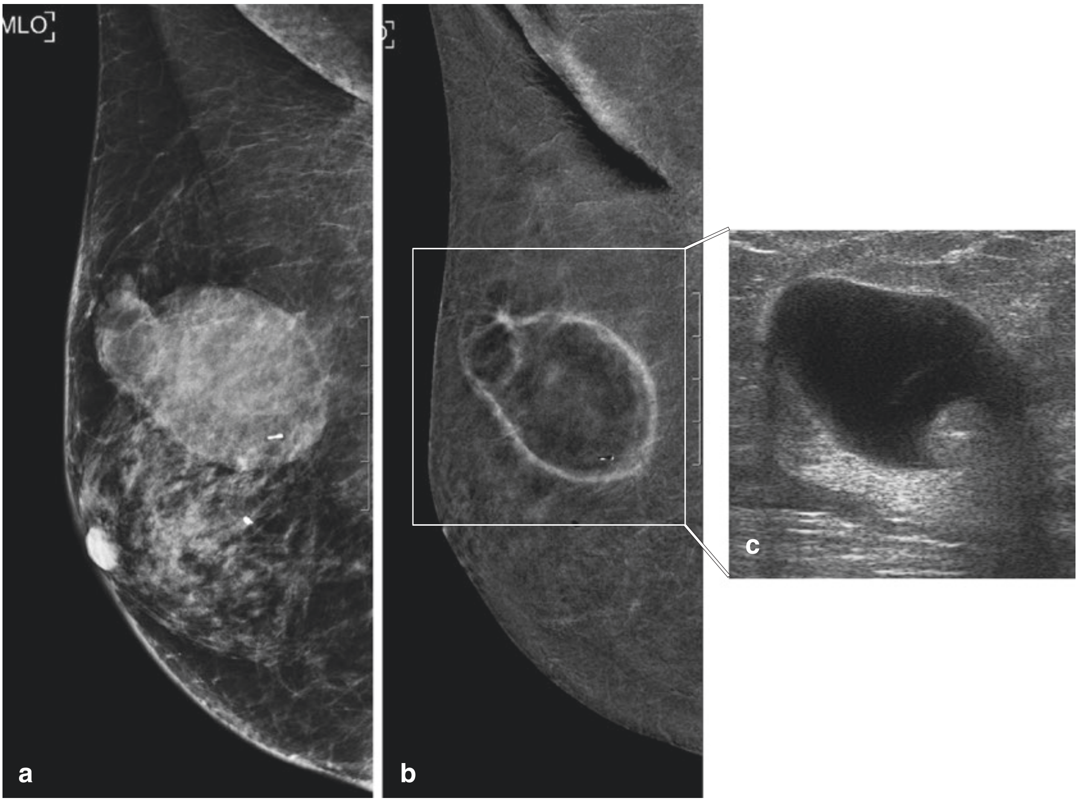

Fig. 8.10 **Negative contrast enhancement:** A 51-year-old patient, treated with a left breast carcinoma, presented with a new suspicious cluster of calcifications in the upper outer quadrant of the right breast. She was subjected to a vacuum-assisted breast biopsy (VABB). (**a**) LE in MLO projection shows a large lobulated area of increased density at the site of the VABB with a radiopaque marker within. (**b**) CEDM-recombined image in MLO projection shows a lobulated area of ring enhancement corresponding to the post-biopsy granulation tissue with central "negative contrast enhancement". (**c**) Ultrasound confirming the post-biopsy haematoma with a marker in situ. *CEDM* contrast-enhanced digital mammography, *LE* low energy, *MLO* mediolateral oblique

standard mammographic views; thus, to avoid increasing the patient's anxiety, operators need not rush through the procedure.

8.3.4 Skin-Line Enhancement Artefact and Enhancing Skin Lesions

The skin is predominately non-enhancing on CEDM but may show a thin line of enhancement known as the "skin-line enhancement artefact" or "skyline artefact". These features are commonly observed in the CC images relative to the MLO projection and are reported to be associated with the difference in skin thickness and scatter radiation, which is non-uniform throughout the breast (Fig. 8.12). Given the variable appearance of the skin on the recombined images, any findings of skin enhancement and thickening observed on the recombined images should be correlated with the low-energy image [1].

Vascular skin lesions such as cherry angiomas can appear as an enhancing intraparenchymal breast lesion on CEDM, mimicking a

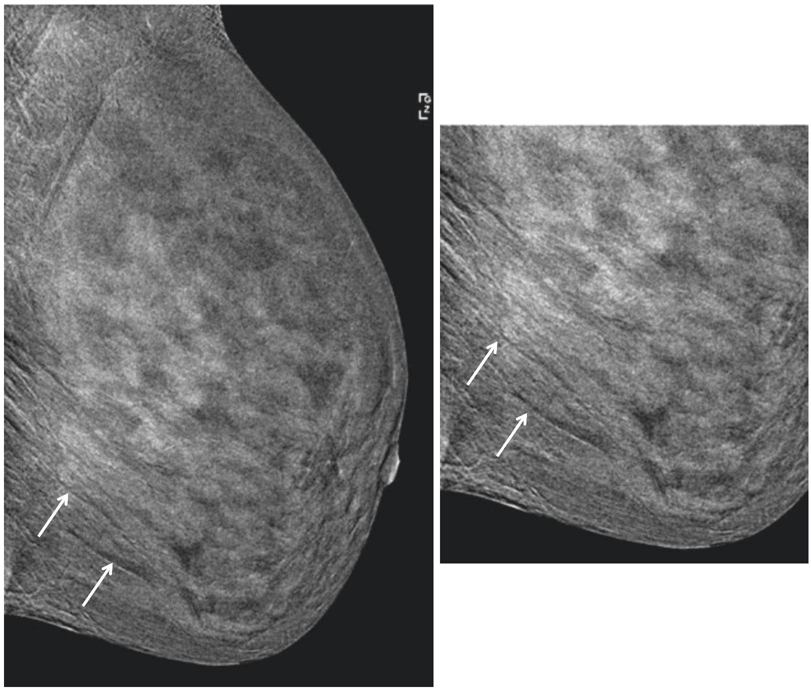

Fig. 8.11 **Ripple artefact:** A 65-year-old woman received CEDM due to abnormal findings in the right breast on screening mammography (*not shown*). The white arrows point to faint alternating fine black and white ripple-like lines layered upon the breast parenchyma on the "left" MLO-recombined image (better observed on the magnification view), which are possibly related to cardiac pulsations. *CEDM* contrast-enhanced digital mammography, *MLO* mediolateral oblique

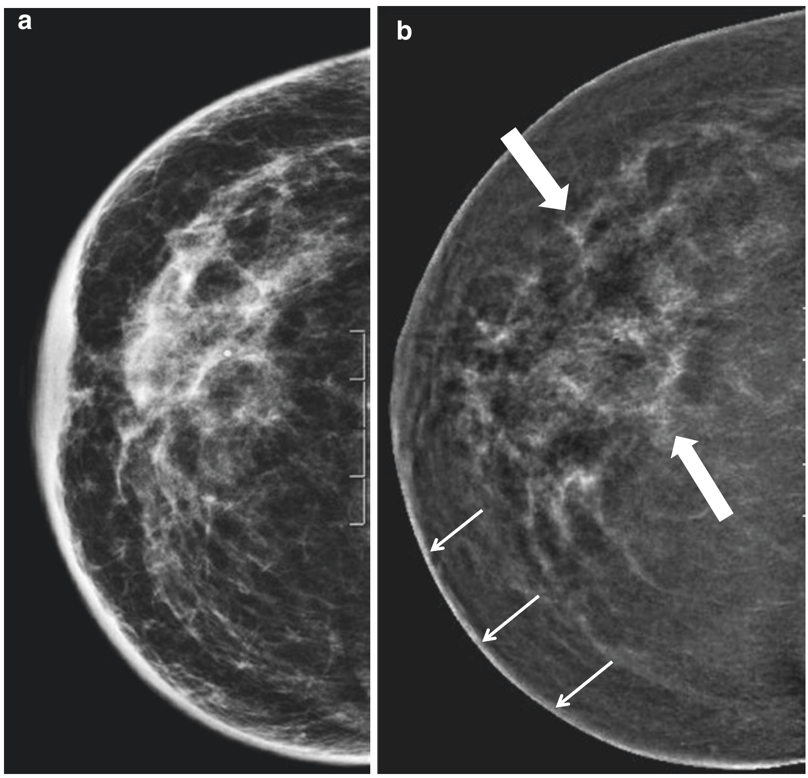

Fig. 8.12 **Skyline artefact:** A 53-year-old woman with biopsy-proven invasive carcinoma in the right breast underwent CEDM as part of a staging workup. (**a**) The LE image shows pathologic skin thickening, and (**b**) the recombined CC view shows areas of non-mass enhancement of a biopsy-proven breast carcinoma (*block arrows*); the recombined image is also seen to illustrate a thin line of skin enhancement (*arrows*) that illustrates a "skyline appearance". *LE* low energy, *CC* craniocaudal

suspicious lesion. We have encountered such enhancing lesions in our clinical practice with cherry angiomas and skin tags (Fig. 8.13). Therefore, the technologist must identify such lesions and place markers on any potentially enhancing skin lesion.

8.3.5 Misregistration Artefacts

A specific type of motion artefact observed exclusively on the recombined images is the misregistration artefact, which is the result of motion between the LE and HE images; even minimal motion causes misalignment of the images, resulting in imprecise subtraction. These signals are alternately additive and cancel each other out, resulting in an alternating bright and dark appearance, illustrating a "zebra artefact", which is secondary to motion-causing misregistration.

Misregistration is commonly observed in relation to surgical clips, vessels, and calcifications (Fig. 8.14).

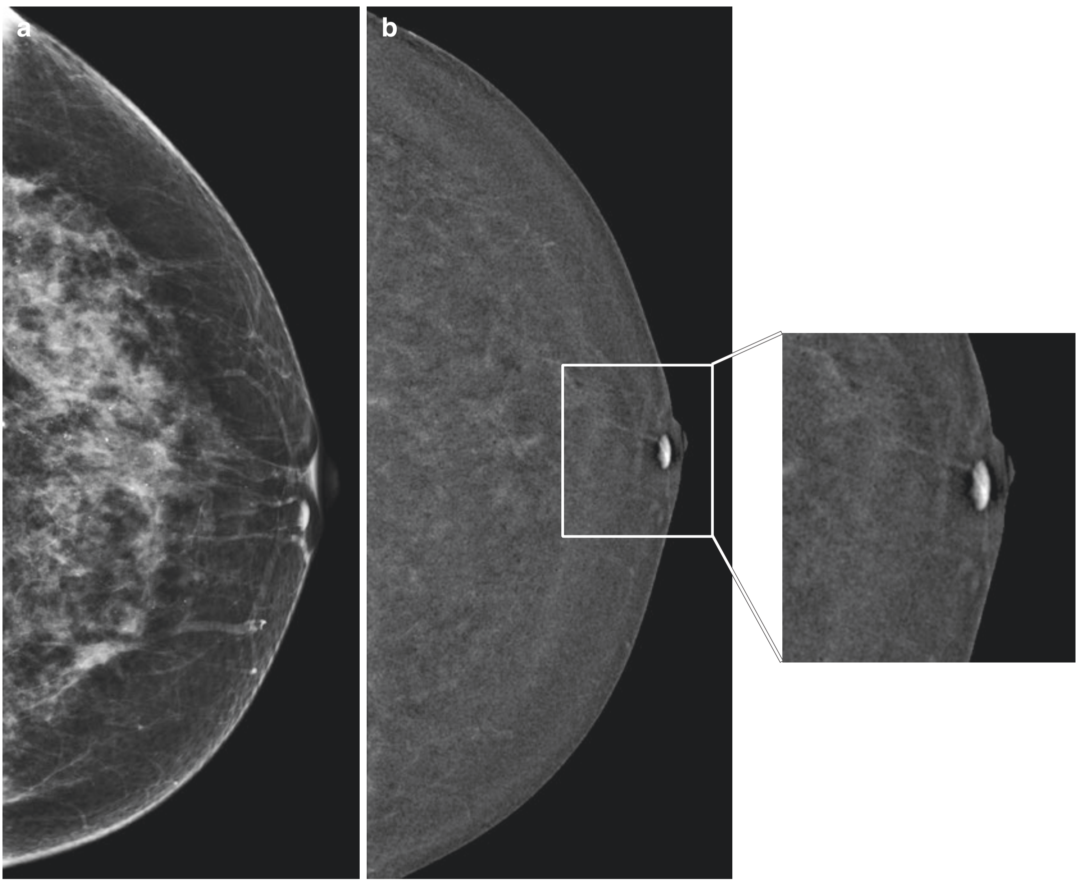

Fig. 8.13 **Cherry angioma:** A 45-year-old woman had a CEDM due to abnormal findings in the right breast (*not shown*) on screening mammography. (**a**) The left CC LE image shows an oval density in the subcutaneous tissue in the periareolar region suggestive of a skin lesion, and (**b**) the recombined image shows a small oval area of intense enhancement (*box*) in the periareolar region, mimicking an enhancing mass. On further clinical examination of the breast, the oval enhancing lesion was confirmed to be a cherry angioma. *LE* low energy, *CC* craniocaudal

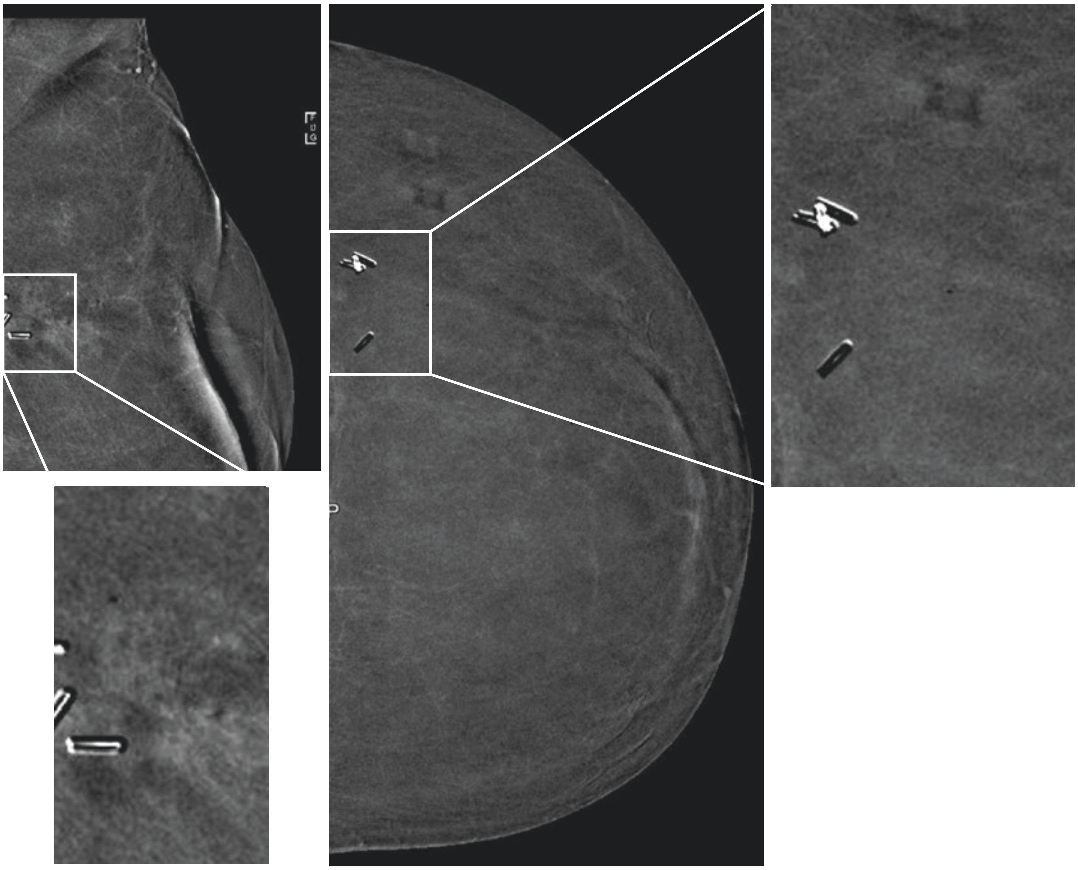

Fig. 8.14 Misregistration artefact: Recombined images from two patients, who had previous surgeries for breast cancer, show misregistration artefacts. Surgical clips observed on the magnified recombined images show side-by-side bright and dark lines, often described as "zebra artefacts" from the misregistration

8.4 Artefacts Related to the Quality-Control (QC) Process

According to the U.S. Mammography Quality Standards Act (MQSA), every U.S. facility must adhere to the recommended protocols for QC of mammographic equipment to ensure optimal image quality. While not a requirement outside the USA, understanding and following the vendor-dependent QC processes, recognizing artefacts that can occur during various steps, and having fundamental knowledge to correct these artefacts that may result in a suboptimal image are critical to ensure optimal image quality.

Working together, a qualified physicist, technologist, and radiologist are all responsible for meeting the MQSA requirements, ensuring that the images produced by the equipment meet regulatory standards, thereby ensuring optimal images for interpretation and maximizing the detection of early malignancies.

It is important to train all technologists and arrange specific times for the daily QC processes and specific days for the weekly QC processes. The weekly QC step should be performed at the end of the week after the last scheduled patient listed for that week or early at the beginning of the week before the scheduled patients are seen. Figure 8.15 shows an artefact encountered when a gain calibration QC, which did not complete

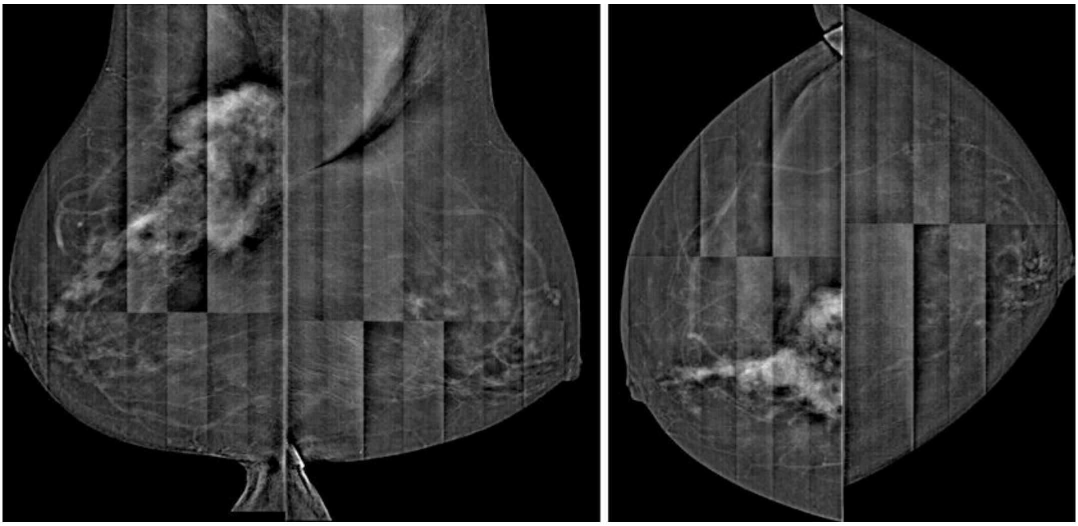

Fig. 8.15 Gain calibration artefact: A 51-year-old woman presented with a palpable abnormality in her right breast. The CEDM examination revealed these grossly pixelated artefacts only on the recombined images of all four mammographic views. We then determined that the gain calibration QC step was performed just prior to our CEDM schedule. Therefore, this artefact is the result of an incomplete gain calibration QC step superimposed in this CEDM examination. Thus, it is important not to perform the QC step before a CEDM schedule, and if this step has been done, to ensure that the system is tested on a phantom prior to scanning a patient, as such artefacts severely degrade the images. *CEDM* contrast-enhanced digital mammography, *QC* quality control

properly, was performed prior to a CEDM procedure. The artefact has severely degraded the image quality, compromising the image interpretation.

Therefore, to avoid such situations from occurring, if a QC step has been performed prior to a scheduled list of patients, it is important to test the system on a phantom prior to performing a CEDM procedure, as once the contrast has been injected, obtaining optimal images within the CEDM time limit is crucial. In fact, it is a good practice to always follow a QC calibration with a phantom image prior to any patient imaging, not just CEDM imaging, to ensure that the calibration was executed properly.

8.4.1 Ghosting Artefact

A ghosting artefact results when a latent image from a prior exposure is superimposed on a newly acquired image. The rapid acquisition of images in CEDM can cause the lingering latent signal from one exposure to project on the subsequent exposures, resulting in an apparent incomplete erasure of the previous image, which is known as the image lag (Fig. 8.16).

Recalibrating the machine to remove the memory of the previous image and acquiring a test image to ensure that the artefact is no longer present can rectify this complication. However, this is not possible due to the limited timeline for imaging in CEDM; therefore, this effect can be reduced by a longer delay between the four image acquisitions. This artefact is not usually seen under normal conditions.

Detector saturation in the skin region due to a high detector signal causes the skin artefact observed in the diseased right breast in Fig. 8.16. This artefact is predominantly observed in the right breast, as this was the larger breast with the underlying pathology which could not be optimally compressed.

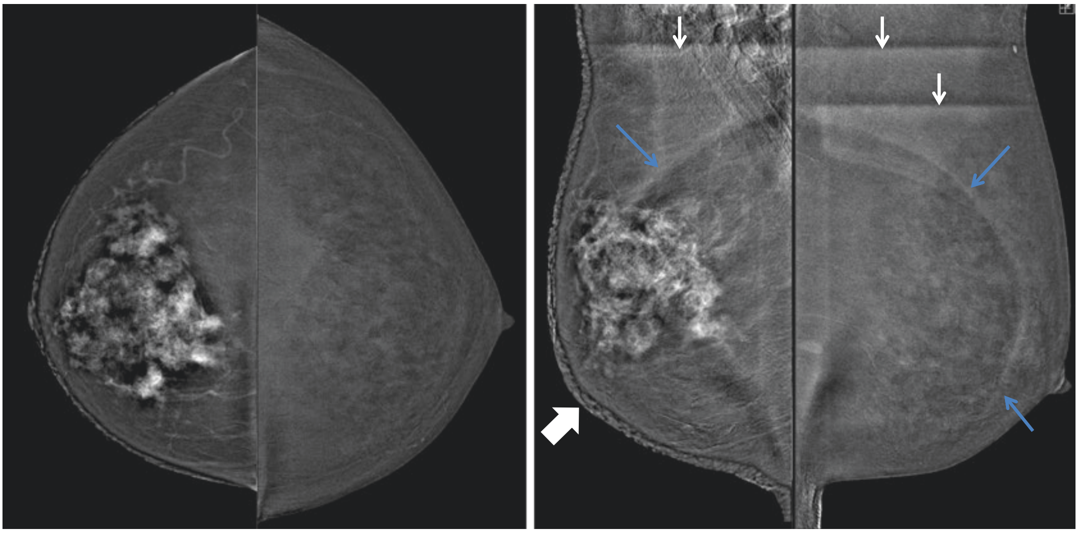

Fig. 8.16 Ghosting artefact: A 62-year-old woman presented with a right breast lump. The CEDM recombined images in this examination were acquired in the following sequence: right CC, left CC, right MLO, and left MLO. A single right axillary line (*white arrows*) was observed in the right MLO, and a double left axillary line (*white arrows*) was observed in the left MLO. These lines represent ghosting from shifting of the paddle in the three positions, i.e., CC, right MLO, and left MLO. Ghosting of the CC view (*blue arrows*) of the previously imaged breast projected within the MLO images is also evident. The skin artefact observed in the diseased right breast (*block arrow*) is caused by detector saturation in the skin region due to a high detector signal

Conclusion

Both patient and technical factors may lead to unwanted artefacts at CEDM, and as the use of CEDM in clinical practice is rapidly gaining popularity, there is a greater need for radiologists and technologists to be aware of the artefacts associated with this relatively new technology.

Although some of these artefacts are similar to those observed in mammography, many artefacts are unique to CEDM, specifically artefacts due to software processing errors or contrast administration issues. In addition, CEDM also depends on combining images acquired with various X-ray energy spectra resulting in CEDM-specific artefacts.

It is important that the technologist, radiologist, and physicist become familiar with the spectrum of CEDM artefacts and pay careful attention to QC procedures to ensure optimal image quality. Recognizing and understanding the cause of patient-related and technical artefacts allow the CEDM imaging technologist and radiologist to work together to optimize the image quality and avoid interpretive pitfalls.

This chapter presents the commonly encountered patient-related and technical artefacts that may result in reduced image quality and ways to recognize and reduce them. We have also included a detailed pictorial of some of the common artefacts that we have encountered in our clinical practice in Careggi University Hospital, Italy, and Kuala Lumpur Hospital, Malaysia.

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