

Identification of mammography image artefact: a random assortment of low density blemishes

A Sweetlove
MMedSc;

CP Herbst
PhD;

***C Markgraaff**
MMed DRad;

***I Nel**
DipRad Diag

Departments of Biophysics and *Radiology,
University of the Orange Free State

Abstract

Following identification of an image artefact on a newly commissioned mammography system, the grid was initially not suspected as the cause as grid artefacts are generally associated with lines. A reference phantom image taken at an accredited centre was used to resolve the problem. It is therefore felt to be essential for institutions not subject to peer evaluation to use phantoms.

Introduction

After a mammography system was commissioned in an academic hospital, we decided to follow the guidelines set out by the American College of Radiology in their Mammography Quality Control Manual (Revised Edition 1994) as no accreditation programme is available in South Africa. Standard processor quality assurance was already in place, and it was therefore only necessary to acquire an accreditation phantom.

Method

Images of the accreditation phantom were acquired routinely. The images obtained with the mammography unit were unsatisfactory because of a random assortment of low density blemishes of unknown origin (Figure 1). All processor, film and cassette parameters including processing techniques were optimised and monitored, and yet the blemishes

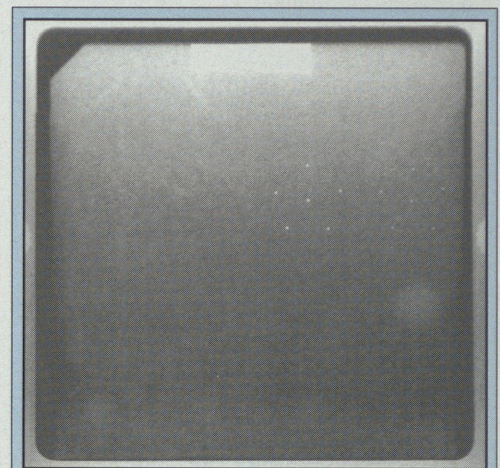


Figure 1: Image of American College of Radiology accreditation phantom acquired on mammography system soon after commissioning. Distinct random assortment of low density blemishes are visible.

remained. Possible processor errors were excluded by developing phantom films from the new equipment simultaneously with films obtained from another mammography practice.

We were able to obtain an image of a similar phantom acquired on an American College of Radiology accredited mammography system. In comparison with this image, the random assortment of low density blemishes were clearly evident. Images were then acquired without the entire cassette assembly. The test images were now free of the random assortment of blemishes for the first time. The grid was then imaged separate from the remainder of the cassette and the blemishes were found to be inherent to the grid. After replacement of the entire cassette assembly, the problematic random assortment of low density blemishes were no longer present (Figure 2).

Identification of mammography image artefact: a random assortment of low density blemishes

from page 10

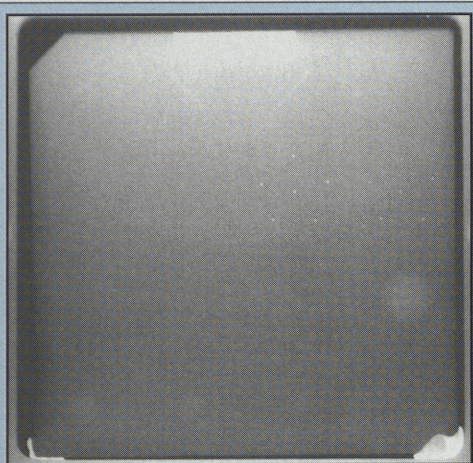


Figure 2: Image of American College of Radiology accreditation phantom acquired on mammography system after replacement of the entire cassette assembly. No evidence of previously seen random assortment of low density blemishes can be observed - the background is more uniform and even.

Conclusion

Our experience has shown that strict adherence to a Quality Assurance programme alone will not always

ensure optimal mammography images. The results must be compared with reference information. An accredited phantom with a reference image from an accredited mammography unit is therefore essential for institutions not subject to peer evaluation.

In summary we believe that notwithstanding the existence of an in-house Quality Assurance programme :

- A phantom is essential. Clinical images are definitely improved after phantom evaluation and corrective action
- A reference image or gold standard is needed
- The assistance of an imaging expert is very beneficial

Only after fulfilling these requirements did we discover that although grid lines are typically associated with

a grid fault¹, a grid manufacturing fault may also cause a random assortment of low density blemishes such as those seen in Figure 1 where grid lines are not visible.

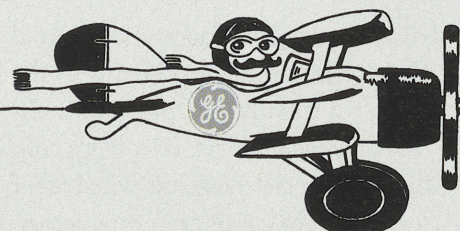
Reference

1. American College of Radiology. Committee on Quality Assurance in Mammography. *Mammography Quality Control Manual*. Revised Edition 1994. 43-52



GE South Africa
Medical Systems

WE HAVE MOVED!!!



GE Medical Systems have
relocated to their new offices:

Physical Address:
Office B20, Lone Creek Development
Waterfall Park, Midrand

Postal Address:
Private Bag X 124
Halfway House, 1685

Tel: (011) 315-6625 Fax: (011) 315-6091