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Lobular Carcinoma In Situ Incidentally Detected by Dual-Energy Computed Tomography

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A 44-year-old woman was admitted to the emergency department with thoracic trauma. To evaluate possible thoracic injury, she underwent contrast-enhanced computed tomography (CT) in a dual-energy CT scanner, which is the main tomography appliance for all patients with trauma who presented to our emergency radiology department. Through virtual monoenergetic imaging, a solid lesion in the right breast was detected on 40 keV monochromatic axial images, whereas the mass was barely noticeable at 190 keV. As for Z-mapping images, the solid mass was almost invisible in the iodine-subtracted images, whereas the mass became much more prominent in the opposite case (Figure 1). Accordingly, a biopsy was performed, and the mass was diagnosed as lobular carcinoma in-situ.

Basically, dual-energy images are acquired from CT at two keV settings so that the extent to which the tissue or lesion retains the iodine contrast can be visualized. Using the raw data provided by the dual-energy CT, monoenergetic mapping at the desired voltage between 40 and 190 keV can be "virtually" created using the appropriate software, which is referred to as virtual monoenergetic mapping.[1]

With the help of 40 keV monochromatic imaging obtained by dual-energy CT, breast cancer can be easily detected, apart from a much more comprehensive assessment of localization.[2,3] Lobular carcinoma in-situ, which may be missed by routine mammography and ultrasound screening[4], can be detected by dual-energy CT. Radiologists should consider that incidental breast cancer may be missed out when evaluating dual-energy CT images of the thorax.

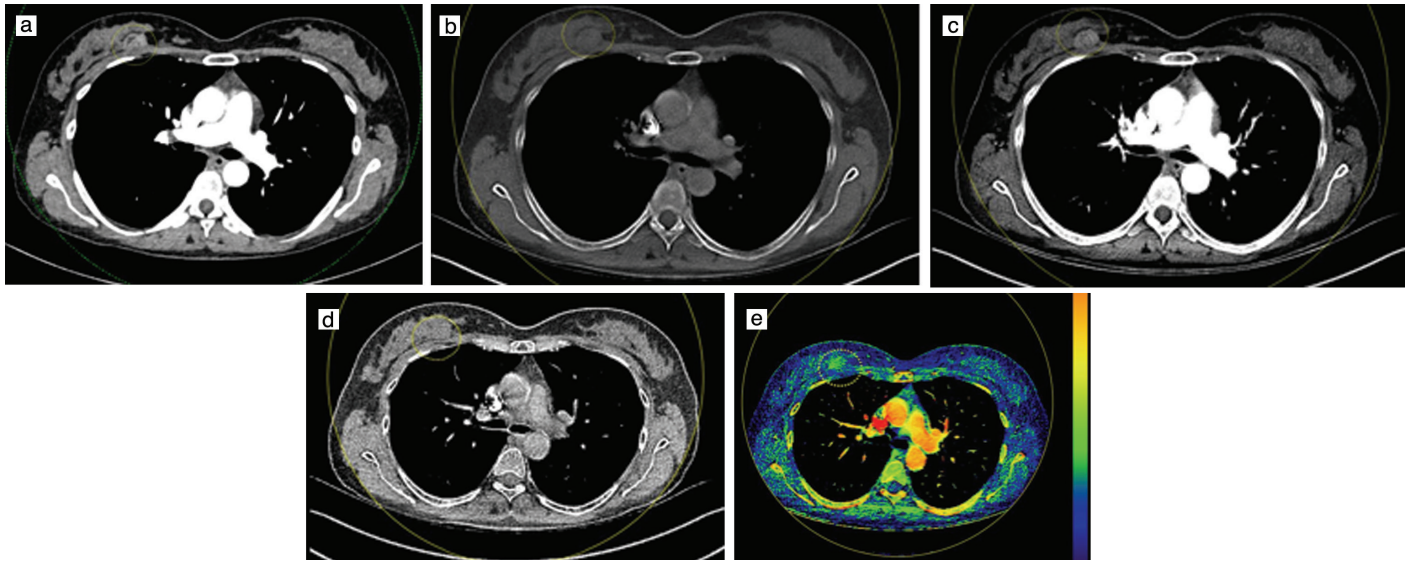

FIG. 1 (a-e). Fusion axial slice formed by dual-energy CT (a), 190 keV axial slice (b), 40 keV axial slice (c), iodine-extracted axial slice (d), and iodine map (e). On the high keV (b) and iodine-extracted slices (d), the lesion (circle) is not visible, whereas on the fusion axial slice (a), distinguishing it from the surrounding tissue is quite difficult. The lesion can be easily noticed when looking at the low-voltage image (c) and iodine map images (e)

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