

## Peer Reviewed Case Report

# LINGUINE SIGN OF RUPTURED BREAST IMPLANT DETECTED ON CT COLONOGRAPHY. A CASE REPORT

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### Abstract

An incidental finding is presented of a ruptured breast implant showing the linguine sign in a CT colonography patient. Causes of ruptured breast implants are discussed. A brief discussion of current literature on breast implant evaluation is presented.

**Keywords.** breast augmentation, extracolonic findings, reasons for breast implants

### CASE REPORT

A 71 year old female presented for a screening CT colonography (CTC) study. As shown in Figures 1a and b an extracolonic finding of an intracapsular rupture of the breast implant was noted. Figures 1c and d are magnified views of this extracolonic finding. This incidental finding was diagnosed by noting the linguine (aka linguini) sign due to the collapse of the implant. On questioning her she stated she had the implant done seven years ago for cosmetic reasons. She had noted a slight asymmetry of her right breast a few months ago compared to the left breast. She however ignored the finding because she did not experience pain or discomfort.

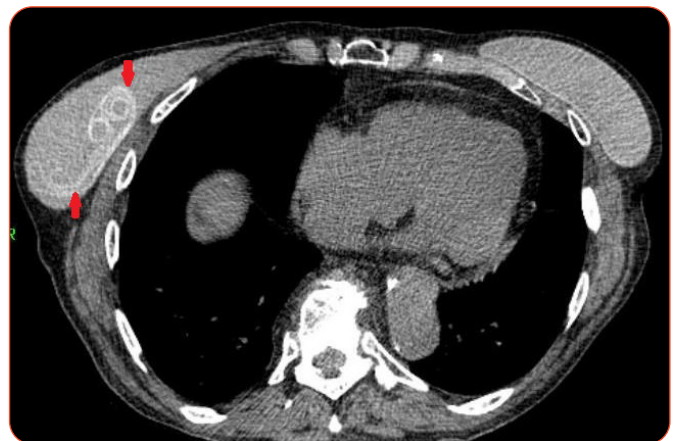
Her management is observation as she is asymptomatic and no silicone leakage was evident.

### DISCUSSION

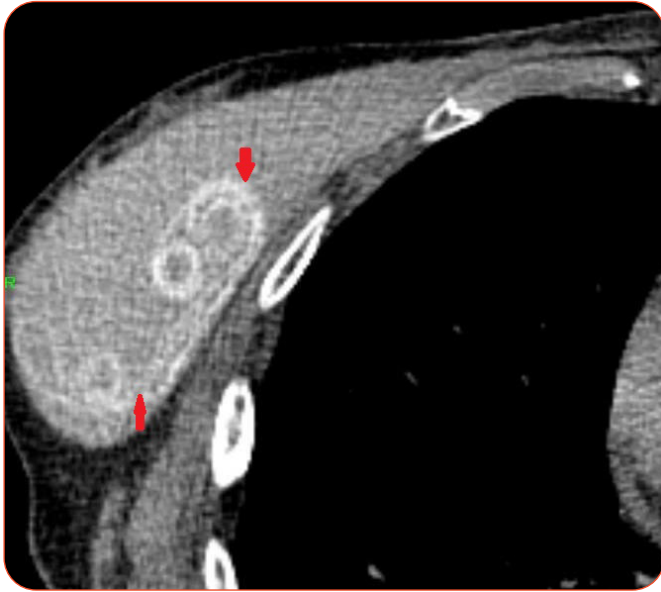
Intra-abdominal and pelvic organs are visualised at CTC, and extracolonic lesions may be identified. As shown in Figures 1a and b an extracolonic finding was that of a ruptured breast implant. Implant rupture is a known complication post implant surgery. Magnetic resonance imaging (MRI) has the highest sensitivity and specificity for implant rupture.<sup>[1-3]</sup> Mammography, ultrasound and CT also play a role, especially for patients that suffer from claustrophobia.<sup>[4]</sup> Literature reports that after 10 years the shell rupture rate is ~10+%;<sup>[5]</sup> it increases with age after implantation.<sup>[11]</sup> Surgical removal is necessary in view of the complications of a ruptured breast implant.<sup>[6]</sup> Complications when there is extracapsular rupture of silicone include, for example, granulomatous inflammation of local tissues, possible migration



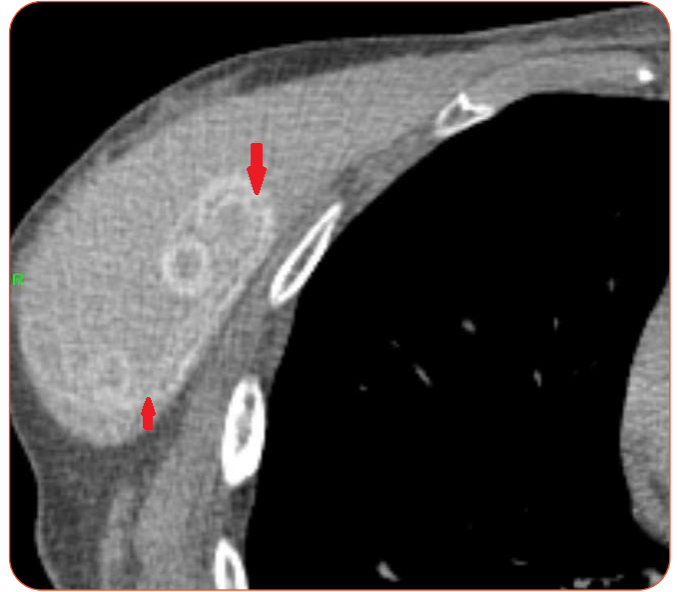
**Figure 1a.** Unenhanced axial CT scan shows a curvilinear shadowing in the right breast compatible with the linguine sign (red arrows) of an intracapsular rupture of the augmented breast.



**Figure 1b.** This axial scan is at the same level as Fig 1a. A lower density setting was used to visualise the linguine sign (red arrows).



**Figure 1c.** Magnified view of the intracapsular rupture with denser curvi-linear shadowing from the partially collapsed implant (red arrows). No leakage of silicone is seen.



**Figure 1d.** Same image as that of Figure 1c, but with soft tissue settings to better visualise the implant (red arrows).

of silicone gel to other locations in the body (e.g., arm, torso, or legs); postoperative haematoma following an implant may occur.<sup>[7]</sup>

There are two main categories of breast implant rupture: intracapsular rupture, and extracapsular rupture, which is less common. The former is a rupture of the implanted shell with silicone leakage that does not macroscopically extend beyond the fibrous capsule. In terms of MRI there are multiple curvi-linear low signal intensity lines within the high signal intensity silicone gel;<sup>[8]</sup> also known as the 'linguine sign'<sup>[9]</sup> because it resembles cooked linguine pasta (see Figures 1a to d). These lines represent the collapsed implant shell floating within the gel;<sup>[8]</sup> in a rupture that has not collapsed the sign is absent. An extracapsular silicone rupture involves the implant shell as well as the fibrous capsule; macroscopic silicone leakage extends beyond the fibrous capsule into the surrounding tissues;<sup>[8]</sup> the linguine sign is often present in this type of rupture.

Current literature on the role of imaging for evaluation of breast implant is as follows. The 2018 ACR appropriateness criteria breast implant evaluation includes the role of ultrasound, mammography, digital breast tomosynthesis (DBT), and MRI with and without intravenous contrast.<sup>[10]</sup> The panel of authors, in their review of the literature, state that CT is not routinely used, but dual-energy CT (DECT) does have a role for patients with contra-indications to MRI.<sup>[10]</sup> According to them, the 'gold standard' for evaluation of silicone implant rupture is MRI without contrast; intracapsular silicone implant rupture is not detected on mammography; and since ultrasound is operator dependent the findings of this imaging modality often are equivocal.<sup>[10]</sup>

A 2019 comparative study of the detection of silicone gel breast implant rupture, in terms of the performance of

DECT and breast MRI, was done by Glazebrook et al:<sup>[11]</sup> they reported that the performance of DECT was similar to MRI and may therefore be an alternative imaging option for patients who are not willing to have a MRI examination. A very recent review of the role of imaging, in terms of inflammation and infections of breast implants, underscored that PET/CT and radio-labelled leukocytes scintigraphy are second-line imaging tools that contribute positively in cases of suspected breast implant infections.<sup>[12]</sup>

## CONCLUSION

This case report is of an extracolonic finding on a patient who presented for screening CT colonography. An incidental finding of collapse of her right breast implant is presented in terms of the linguine sign as described in the literature.

## CONFLICT OF INTEREST

None

## ETHICAL CONSIDERATIONS

This article followed all ethical standards. Verbal consent was obtained.

## FUNDING INFORMATION

Nil to declare.

## DATA AVAILABILITY

The data supporting the findings of this case report are within the article.

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