



Assessing the outcome of cryoablation treatment on different molecular subtype of low-grade breast cancer



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PURPOSE: The aim of this study was to define in which kind of molecular subtype of low-grade breast cancer **ultrasound-guided cryoablation (UGC)** is more effective

METHODS: **UGC** was performed at our center on 28 biopsy-proven malignant lesions of **28 patients** (mean age 73.4 years old) **deemed inoperable** by a multidisciplinary group and submitted to hormone therapy. All the lesions were ultrasound-visible **invasive ductal carcinoma** (<30 mm), **low grade**, HR-positive, HER2-negative. Each patient underwent staging by means of **Contrast Enhanced Mammography (CEM)** to confirm the unifocality. The study popolation was divided according to molecular subtype, Ki67%(< or >20%) and 1 cm dimensional cut-off. Ultrasound (**US**) follow-up were performed to evaluate the **size reduction rate (RR)**, at 1, 3, and 6 months. At one year after UGC, a second CEM was carried out to compare the enhancement pre and post treatment . Finally, the effectiveness of the UGC was evaluated by core needle biopsy on the post procedural scar to determine the **absence of residual tumoral cells** . **Fisher test** and **chi-square test** were applied.

Results - Size Reduction Rate (RR) with US

Molecular subtype	RR after 1 month	RR after 3 months	RR after 6 months
Luminal A	21,,6%	70,2%	96,8%
Luminal B	19,8%	60,7%	93,4%
Dimension			
<1cm	22.9%	84,4%	100%
>1cm	19,7%	63,4%	93%
Ki67%			
<20%	24,6%	65,3%	96,5%
>20%	18,7%	62,8%	93,4%

RESULTS: Overall, the 28 lesions had a mean RR of 20.14%, 66.42% and 94.03% at 1, 3, and 6 months respectively. As far as the molecular subtupe: 14 were Luminal-A (Lum-A) and 14 Luminal B (Lum-B), all of them Her-2 negative. At each US follow-up exam, the RR was always slightly higher for Lum-A in comparison to Lum-B: at 1 month 21.59% versus 19.83%, at 3 months 70.16% versus 60.71% and at 6 months 96.81% versus 93.43% .

After the onset of post-procedural **hyperechoic scar the effacement of the lesion** was **earlier** in Lum-A than in Lum-B: at 1 month 6/14 versus 2/14, at 3 months 9/14 versus 5/14, at 6 months 14/14 in all Lum-A. However , in 2/14 Lum-B lesions the hypoechoic nodule was still recognizableat the 6 months US-check. Lesions having the highest RR and fastest US size reduction were the lower size (<1 cm) and lower Ki67 %. Fisher test did not show statistically significant difference. At 12 months CEM check,, all the Lum-A lesions did not show enhancement, while to 2/14 **Lum-B,CEM demonstrated suspicious enhancement at the site of the index lesion B5**. These 2 enhancing cases, after CEM and biopsy, confirmed the presence of residual malignant cells. Conversely no residual malignant cells were found in all the negative CEM cases.

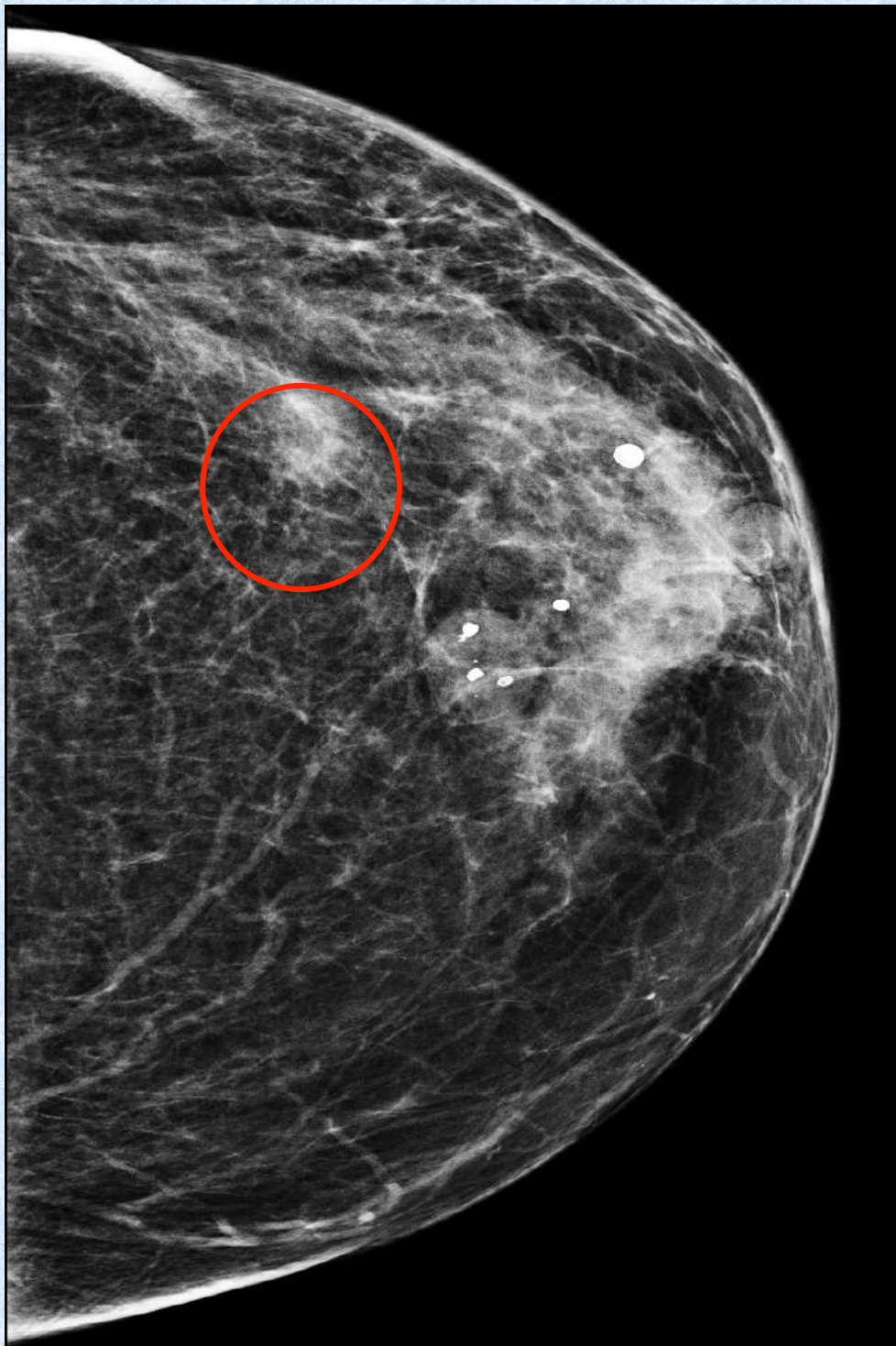


Fig.1A



Fig. B

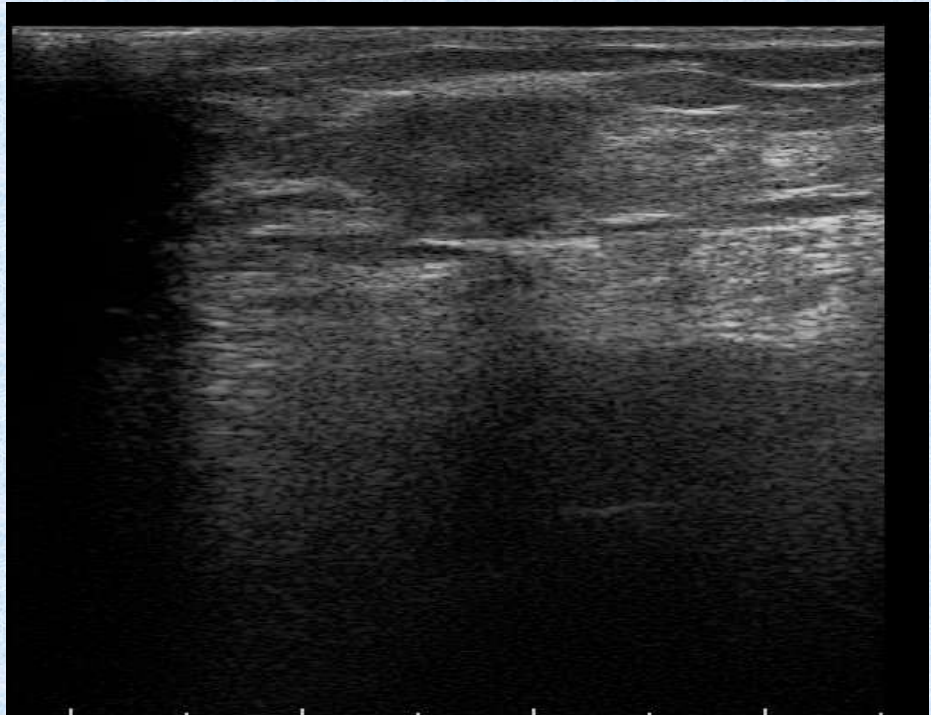


Fig. 1C

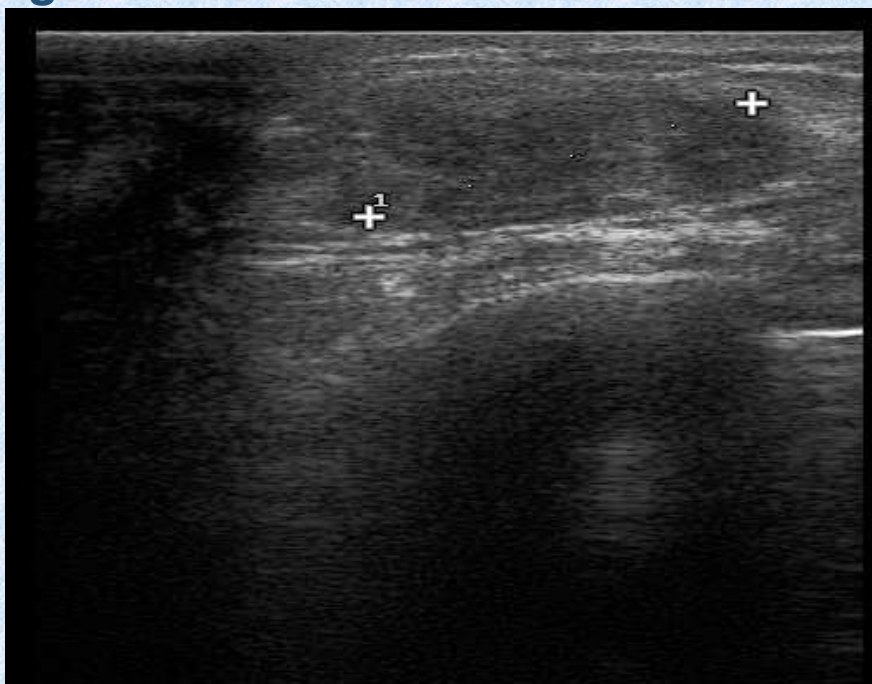


Fig. 1D

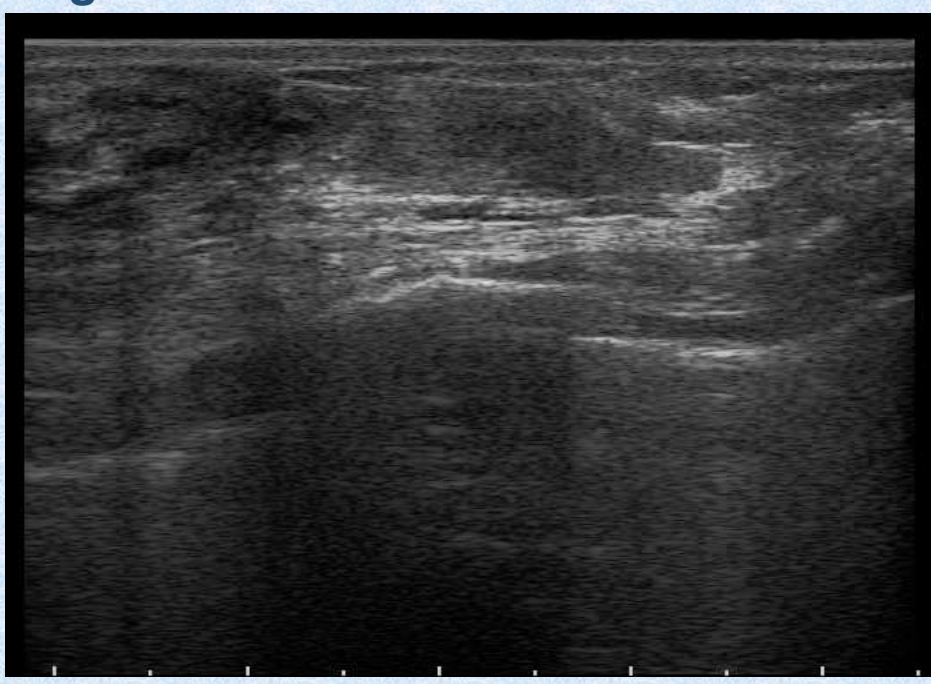
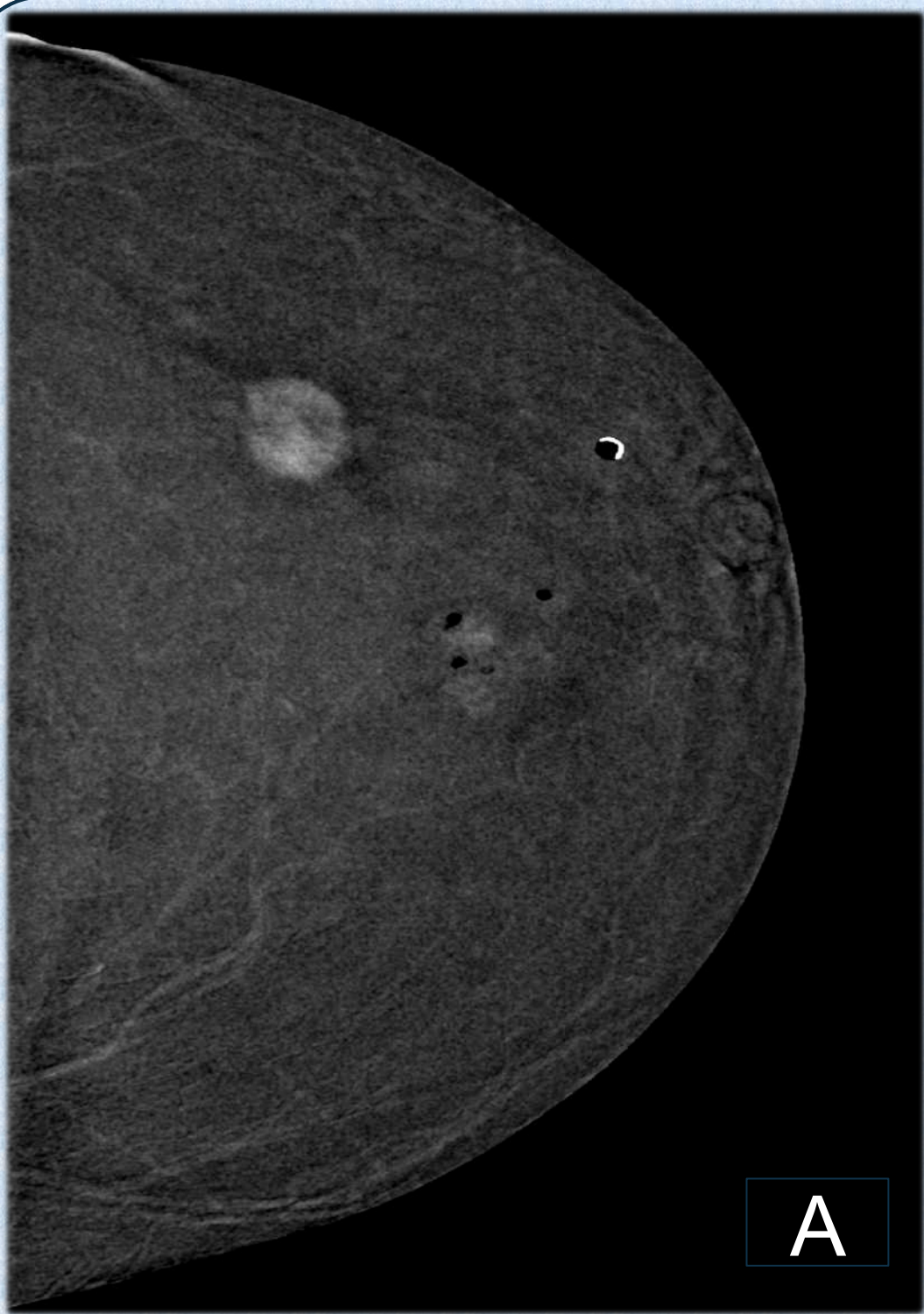
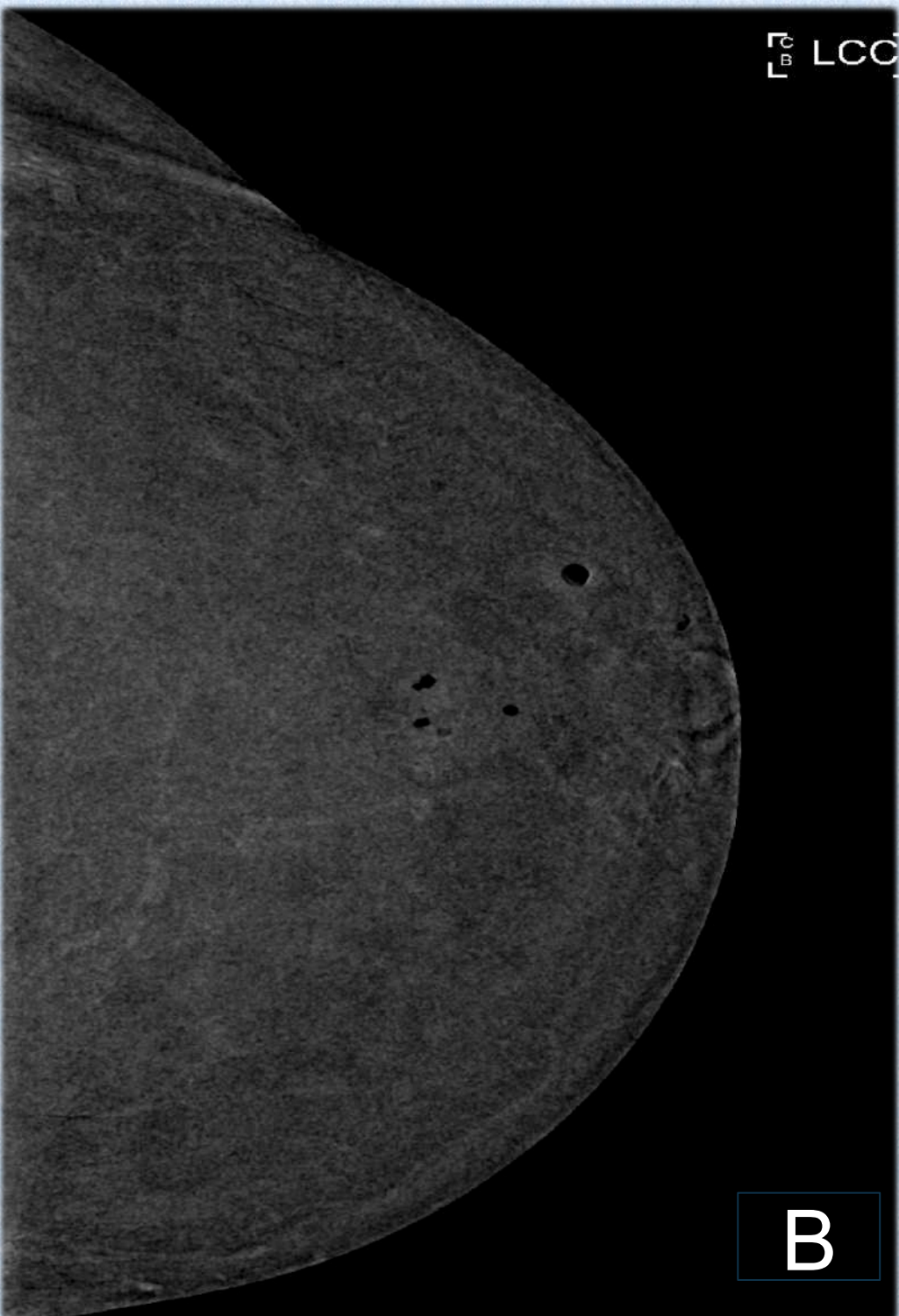


Fig. 1E

FIG.1 Images of B5 lesion observed in Mammography (A) and Ultrasound (B), with consecutive US follow-ups at 1, 3, and 6 months (C-D-E)



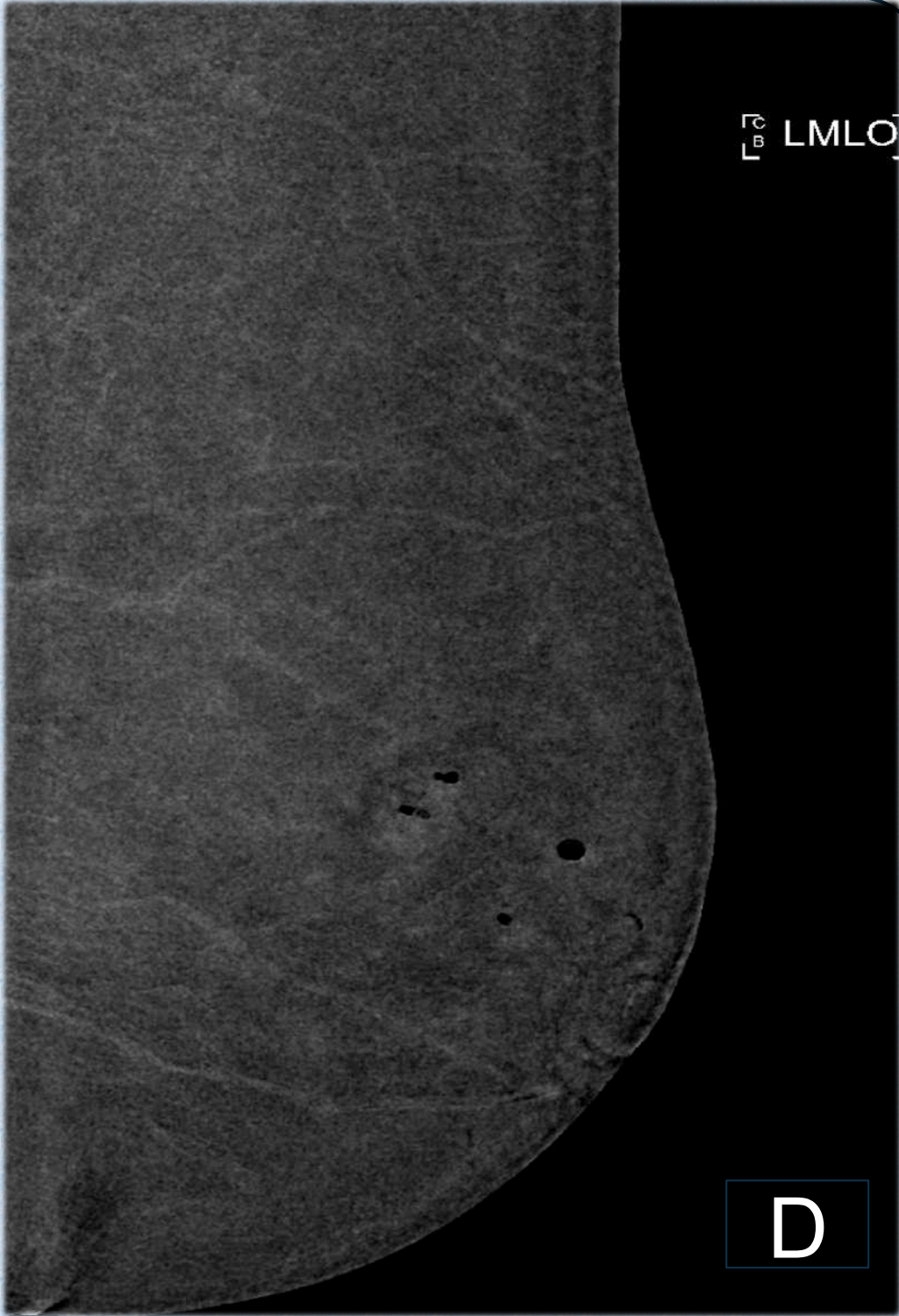
A



B



C



D

CEM PRE VS.POST CRYOABLATION: FIG. A-C show mass enhancement in central outer left breast referable to B5 lesion and a slight central mass (fibroadenoma). FIG B-D show no mass enhancement in central outer breast, biopsy reported benign lesion (flogosis).

CONCLUSION: In our series, **UGC had the best outcomes on Luminal-A lesions**. In this type of lesions the efficacy of UGC was confirmed by the lack of CEM enhancement and the absence of residual maignant cells in all biopsy samples. For this reason, in Lum-A lesions the disapperance of the enhancement in post procedural CEM can be considered as a predictive factor for the complete effectiveness of treatment.

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