

Finding Breast Cancer in the Woman with Dense Breasts

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ABSTRACT

Evaluation of women with dense breasts is limited using mammography due to the increased fibro glandular tissue present in 50% of all women. Measurement of regional blood flow (RBF) and metabolic differences differentiate tissue types and can be used in women with dense breasts to determine if breast cancer is present. We present once such case of a woman with positive genetic markers and familial history of breast cancer, whose biopsy and FMTVDM results revealed breast cancer – missed by mammography.

KEYWORDS: FMTVDM; Breast cancer; Mammography; Dense breasts; Lynch syndrome

INTRODUCTION

One in every eight women will be diagnosed with breast cancer at least once in their lifetime. Half (50%) of all women have what is defined as dense breasts – breasts associated with 50% or more of their breast being either supportive (fibrous) or glandular tissue. The remaining 50% of women have breasts with less fibro glandular tissue and are considered to have non-dense breasts; i.e. they have more fatty tissue. Mammographic x-rays more easily penetrate fatty breast tissue - in contrast to fibro glandular tissue.

Qualitative mammography for screening and diagnostic purposes has proven to have little value in women with dense breasts and according to the Canadian National Breast Screening Study [1], provided no survival benefit for women in general. Accordingly, efforts to quantify changes in tissue associated with cancer and inflammation have resulted in the patented (9566037) development of a method for quantitatively measuring differences in regional blood flow (RBF) and metabolism, associated with these different types of tissue [2-4].

Following decades of state-by-state legislation, and efforts by Nancy Cappello, PhD – whose breast cancer was missed by mammography [5] her husband Joe, and DenseBreast-info.org, the U.S. Congress passed legislation in 2019 [6] after Nancy's passing; legislation requiring mammographic reports to include notification for women with dense breasts, that the mammogram may miss finding breast cancer. Following more than 1000 women and men previously studied using FMTVDM [2-4], including individuals with dense breast tissue, we present this case study where FMTVDM and a breast biopsy found the breast cancer missed by mammography.

PATIENT STUDY

Using FMTVDM [2-4], a middle-aged Caucasian female with a family history of breast and colon cancer and genetic markers for Lynch Syndrome was evaluated. She had undergone a breast biopsy reported as abnormal (Figure 1) and wanted a comparison FMTVDM measurement. The result of her FMTVDM is shown in Figure 2. Multiple regions of interest (ROIs) were drawn and

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measurements obtained for regional blood flow (RBF) and metabolism. The maximal count for the right breast of 395 is consistent with breast cancer [2-4] and matches the region of the biopsy (Figure 1).

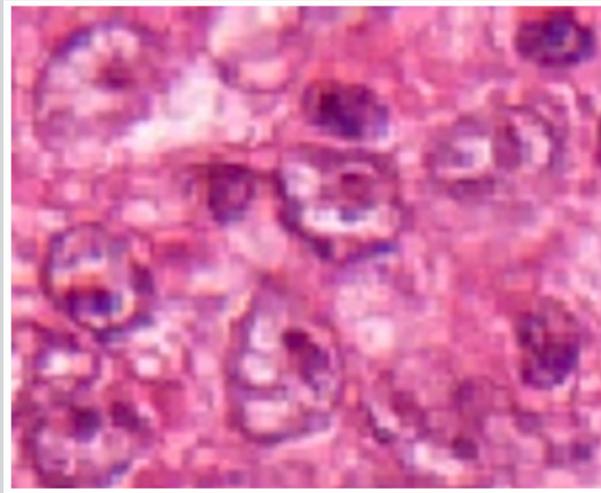


Figure 1: Abnormal biopsy with what appears to be an increased mitotic activity.

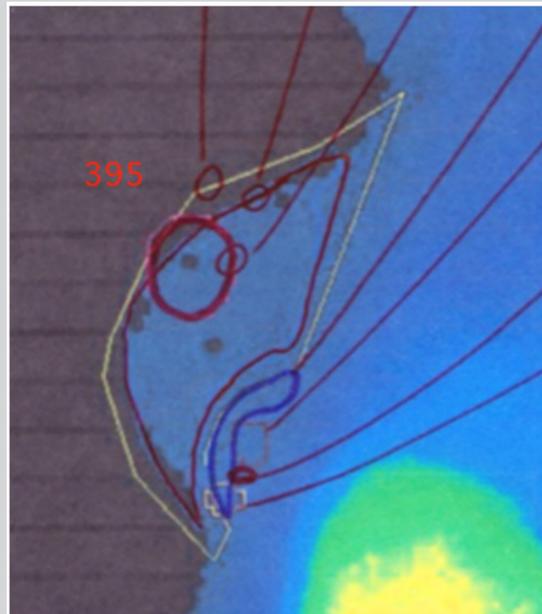


Figure 2: FMTVDM results for a woman with breast cancer and dense breasts.

DISCUSSION

Lynch syndrome is a well-known genetic syndrome associated with distal gastrointestinal, ovarian and endometrial carcinoma in addition to other cancers - although it is not clear if there is an association with breast cancer [7,8]. The use of mammography is unreliable in women, such as this patient, with dense breasts due to the limitations of radiographs and tissue penetration - thus a normal appearing mammogram and abnormal biopsy result left more questions than answers.

FMTVDM measurement of metabolic and RBF differences is not impaired by dense (fibro glandular) tissue, as this tissue is truly normal breast tissue and is what is present in 50% of all women. FMTVDM measurement of fibro glandular tissue is measured as normal tissue as it is truly normal - absent actual inflammation

or cancer. As such, this dense tissue measures as normal fibro glandular (dense) breast tissue. However, cancerous tissue has - as is seen here - significantly increased metabolic activity and regional blood flow, which can be measured independent of the presence of increased breast density [2-4]. In this instance, the measured FMTVDM value confirmed that the abnormal tissue was in fact cancer.

CONCLUSION

While considerable debate exists as to how to address mammographic findings in women with dense breasts, FMTVDM provides at least one method for measuring the metabolism and RBF present in women with and without dense breasts. The presence of dense breasts is merely the existence of more fibro glandular supportive tissue than others. This tissue is normal and is

measured by FMTVDM as thus, while cancerous tissue demonstrates statistically increased metabolism and RBF differences compared with normal dense breast tissue.

*FMTVDM = The Fleming Method for Tissue and Vascular Differentiation and Metabolism

**FMTVDM provided to patient following standard laboratory explanation and signing of informed consent.

ACKNOWLEDGMENT

FMTVDM is a utility patent issued to first author. All figures reproduced with expressed consent of first author. The authors wish to dedicate this work to all the women and men with dense breasts and to Joe and Nancy Cappello, PhD.

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