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Breast Cancer Diagnosis Possibility By Means Of Vedruccio's Non-Linear Resonance Interaction Scanner (TRIMprob)

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Background: the possibility to use a weak electromagnetic field for the functional analysis of several anatomic structures opens an interesting new chapter in the clinical research. We now know well that Tissue Resonance Interaction Method Probe (TRIMprob) is an useful tool for early detection of prostate and bladder malignancies, and its role in screening programs for the cancer in these organs could be valuable in the future.
Purpose: moving from these evidences, we decided to investigate the potential of TRIMprob in the detection of the malignant lesions of the female breast. The study design included two different steps: 1) identification of the most accurate modes of usage of the TRIMprob device in the evaluation of the female breast (standardization phase); 2) accuracy comparison of the TRIMprob results with those of mammography, ultrasonography and/or nuclear magnetic resonance (NMR) of the breast (validation phase).
Method: we started with the first phase of the study on January 2007. To date, we have evaluated an unselected sample of more than 180 breasts harbouring cancer (either palpable or not palpable) or benign lesions or no disease. We recorded 16 distinct TRIMprob "output-signals" (at the frequency of 460 Mhz), expressed in decibel (db), for each breast, obtained putting the probe on specific areas of the mammary gland (commonly named *quadrants*: superior-external, superior-internal, inferior-internal, inferior-external) and standing with the patient at four different distances from the TRIMprob receiver (conventionally named Frontal, Back, Far and Very Far).
Results: for 15/16 "output-signals", there was a highly significant ($p<0.001$) difference between the distribution of values recorded in the breasts with cancer and that of values recorded in healthy breasts or in breasts with benign lesions. In particular, the TRIMprob "output-signals" obtained in breasts with cancer were significantly lower. In the Receiver Operating Characteristic (ROC) analysis, several "output-signals" showed an area under the ROC curve (AUC) >0.90 with a maximum as high as 0.97.
Conclusions: the preliminary observations on the frequency distribution and ROC curves of the "output-signals" recorded so far suggest a potential role of this tool for the diagnosis of breast malignancies, and stimulate to go on with the exploration of this method. The standardization phase will be completed with the recruitment of a larger patient sample. The most accurate combinations and patterns of the TRIMprob "output-signals" will be identified using a multivariate ROC analysis.

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