Accurate tumor size determination in breast cancer: The debate continues

Sir,

I read with interest the study "Defining the T status in breast cancer: Where do we stand?" by Rajaraman *et al.* My congratulations to the authors for attempting to clarify an important issue, which most practice guidelines have ignored. Evidence in published literature regarding the most accurate technique for breast cancer tumor size determination continues to be conflicting. I note several key concepts of this study fallacious.

First, the authors have assumed that the tumor size of a fresh specimen to be the "true" size estimate without quoting scientific proof and then have proceeded to compare the observed mean size differences with other size measurement techniques. It is well-known tissue volume decreases on disconnection from vasculature, and furthermore, shrinkage of a breast tumor after formalin fixation is still contested in literature.[1,2]

Second, I am surprised by the statement that measurements by a single surgeon and radiologist would make the study immune to inter/intraobserver variations. A scientific study cannot permit such superficial assumptions particularly while measuring continuous variables such as tumor dimension. This study uses two observers to measure a single continuous variable with different measurement techniques and bias due to intra/interobserver variations are inevitable. To assess bias due to inter/intraobserver variations, a statistical measure such as Cohen's kappa is required but unfortunately not applied in this study.[3]

Third, the authors state that the fresh tumor specimen was sectioned sagittally at 1 cm intervals, this methodology would permit only measurement of the cephalocaudal and anteroposterior tumor dimensions only, it is important to realize tumors are three-dimensional structures with complex shapes and hence sectioning technique adopted in the study seems incapable of accurately measuring the maximum tumor dimension of most tumors. It is highly probable this factor has confounded observations, perhaps serial-parallel sections along the plane of maximum dimension as determined by preoperative imaging should have been the specimen sectioning sequence. The next issue is the slicing interval of 1 cm; quite obviously, this slice thickness cannot determine the accurate tumor size in small T1 tumors. However, T-size determination is most useful in node-negative tumors of this size only, in deciding adjuvant chemotherapy. This study with 17% (n = 23) of samples in T1 category may have failed in accurate T-size measurement of T1 tumors due to selection of inappropriate sectioning interval.

Fourth, with regard to the statistical analysis, I am surprised the authors despite having quoted Bland and Altman have relied on Pearson's linear correlation coefficient which merely would show the association of one variable with regard to another not "agreement" as the authors expect.[4] The study conclusions are based on P value for mean tumor size measurements by mammogram and ultrasound being more than 0.05. The authors have grossly misunderstood the concept of hypothesis testing. A P value measures neither the probability of the hypothesis being true nor the probability of the observed data occurring due to random chance. This statistical model also does not measure the size or importance of the observed effect as well. The authors have made certain inverse assumptions in interpreting the P values which this model does not permit.[5] Tumor diameter being a continuous variable, it is essential to report on the 95% confidence interval for the mean of tumor diameter and the study fails to report on the same.

This study lacks sound scientific methodology and statistical robustness to accept its conclusions and the questions the study investigators chose to answer remain unanswered.

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Conflicts of interest

There are no conflicts of interest.

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