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Contrast-enhanced CT combined with 18-FDG PET in patients selected for cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (HIPEC): methodological issues on diagnostic value and reliability

Siamak Sabour,[1,2] Saeid Fallah,[1] and Sajjad Rahimi Pordanjani[1]

[1]Department of Clinical Epidemiology, School of Public Health, Shahid Beheshti University of Medical Sciences, Chamran Highway, Velenjak, Daneshjoo Blvd, Tehran 198353-5511, Islamic Republic of Iran

[2]Safety Promotions and Injury Prevention Research Center, Shahid Beheshti University of Medical Sciences, Chamran Highway, Velenjak, Daneshjoo Blvd, Tehran 198353-5511, Islamic Republic of Iran

We were interested to read the paper by Sommariva A and colleagues published in the May 2018 issue of the Abdom Radiol (NY) [1]. The purpose of the authors was to assess the reliability and correlation with surgical peritoneal cancer index (PCI) of combined PET/CT and ceCT scans (PET/ceCT) performed in a session in patients with peritoneal carcinomatosis candidates for cytoreductive surgery (CS) and hyperthermic intraperitoneal chemotherapy (HIPEC). They included 27 patients with different types of peritoneal carcinomatosis candidates to CS + HIPEC who underwent FDG PET/ceCT in a single session. Two nuclear medicine physicians and two radiologists independently and blindly evaluated PET/CT and ceCT imaging, respectively. Based on their results, the coefficient of correlation between PCI of PET/CT and surgery was 0.528, while it resulted higher between PET/ceCT and surgery (r = 0.878), very similar to ceCT and surgery (r = 0.876). They also reported that PET/CT had clearly high specificities (range 71%–100%) for each segment, except for the segment 0, 6, and 8. Conversely, PET/ceCT showed high sensitivities for all segments ranging between 60% and 85%. They concluded that PET/ceCT as single examination is more accurate than PET/CT [1].

However, the title of the paper (diagnostic value) is not consistent with the purpose of the authors (reliability) and more importantly with their final conclusion (accuracy). It is crucial to know that diagnostic value can be considered as diagnostic accuracy (validity) and diagnostic precision (reliability). Reliability as one of the main purposes of the authors is completely different methodological issues compared to the accuracy as they mentioned in their conclusion [2–5]. Although they correctly applied Pearson r as well as sensitivity and specificity to assess accuracy, they did not take into account two important methodological issues. First, for clinical purposes, diagnostic added value of a test by reporting the area under the receiver operating characteristics (ROC) curve (AUC) should be considered. The reason is the validity estimate (Pearson r for quantitative variable and sensitivity, specificity for qualitative variables) may be excellent (ceCT and surgery, r = 0.87, and sensitivity or specificity ranging from 71% to 100%), while diagnostic added value may be clinically negligible [2–5]. Moreover, positive and negative predictive values (PPV and NPV), positive and negative likelihood ratios (LR+ and LR−), as well as diagnostic accuracy and odds ratios (the ratio of true to false results) are among validity estimates which should be considered. The second methodological point is reliability (precision) as different issues of diagnostic value which should be assessed using appropriate tests. For quantitative variables, either Intra-class correlation coefficient (ICCC) or Bland Altman Plot can be applied. For qualitative variable, weighted kappa is suggested [2–5].

As a take-home message, accuracy and reliability as two issues of diagnostic value should be assessed by applying the above-mentioned appropriate tests. These

Correspondence to: Siamak Sabour; *email:* s.sabour@sbmu.ac.ir

two methodological terms should not be confused with each other. For clinical purposes, diagnostic added value of a test should also be reported.

Compliance with ethical standards

Conflict of interest All authors declares that they have no conflict of interest.

Ethical approval This article does not contain any studies with human participants performed by any of the authors.

Research involving human participants and/or animals N/A.

Informed consent N/A.

References

1. Sommariva A, Evangelista L, Pintacuda G, et al. (2018) Diagnostic value of contrast-enhanced CT combined with 18-FDG PET in patients selected for cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (HIPEC). Abdom Radiol (NY) 43(5):1094–1100
2. Szklo M, Nieto FJ (2014) *Epidemiology beyond the basics*, 3rd edn. Sudbury: Jones and Bartlett Publisher
3. Grobbee DE, Hoes AW (2015) *Clinical epidemiology: principles, methods, and applications for clinical research*, 2nd edn. Burlington: Jones and Bartlett Publisher
4. Sabour S, Ghassemi F (2016) Accuracy and reproducibility of the ETDRS visual acuity chart: methodological issues. Graefes Arch Clin Exp Ophthalmol 254(10):2073–2074
5. Sabour S, Farzaneh F, Peymani P (2015) Evaluation of the sensitivity and reliability of primary rainbow trout hepatocyte vitellogenin expression as a screening assay for estrogen mimics: methodological issues. Aquat Toxicol 164:175–176