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CORRESPONDENCE

Transient elastography lacks precision in children

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Enaud et al. have recently concluded that transient elastography (TE) is a reliable method to evaluate and monitor liver disease progression in children with cystic fibrosis (CF).[1] This is based on TE measurements performed on 33 children with CF in 2011/2012, only 5 of whom had cirrhosis.[1] In contrast, our study published in this journal, which included 235 healthy children and 66 children with CF, determined that TE lacked precision in healthy children and in children with CF.[2] However, reviewing the study by Enaud et al. it appears that contrary to their conclusion, their results are consistent with our findings, confirming a lack of precision of TE.[1,2]

The data presented in the Bland and Altman plots in their study (Figs. 1 and 2) demonstrate the lack of adequate precision.[1] Bland and Altman are clear that the first and most important steps in assessing agreement between tests are to demonstrate that the data follows a normal distribution and that the standard deviation of the paired differences should be narrow.[3,4] A wide standard deviation of the paired differences signifies little agreement.[3]

Enuad et al., in the "Methods" section, state that they will report quantitative variables as mean ± standard deviation. They also outline the requirement for the Bland and Altman limits of agreement (LOA) that the differences of the paired measurements must follow a normal distribution.[1] However despite this, Enuad et al. do not provide evidence to support a normal distribution and do not provide the standard deviation for the mean difference of the paired liver stiffness measurements.[1] They do, however, provide a confidence interval (CI) for the mean of the paired differences between repeat measurements by the same observer (0.045 kPa; 95% CI −0.278 to +0.369) and different observers (−0.137 kPa; 95% CI −0.491 to +0.218). Extrapolating from the CIs, it is clear that the standard deviation of mean of the paired differences is wide, confirming a lack of acceptable precision.

The disagreement between paired measurements in this study is further highlighted by Figs. 1 and 2.[1] In Fig. 1 the limits of agreement ranged from −2.0 to +2.2 kPa for the same observer, while in Fig. 2 the limits range from −1.75 to +1.8 for different observers.[1] The disagreement between paired measurements as reported by Enaud et al. is even greater than that reported in our study.[1,2]

The authors state that their a priori accepted difference between repeat measurements was 10–20%.[1] While variation on clinical measurement is inevitable, a difference of 20% between first and second measurements over a short period of time for any investigation is clinically unacceptable. The normal range of TE measurements in children is 2.45–5.56 kPa[5] and therefore a 20% difference would mean >1 kPa difference between two measurements. This level of difference was observed in 20% of participants in their study. Differences of this magnitude between repeat TE measurements would, as reported in studies of adults,[6–8] result in misclassification of liver disease status without any change in underlying pathology.

The need for a noninvasive test to diagnose and monitor liver disease in children with CF is a priority. However, any clinical investigation must have both diagnostic accuracy and precision if we are to make appropriate clinical decisions for patients. The results reported by Enaud et al. confirm the findings in our earlier study that the precision of TE is inadequate in children.

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COMPETING INTERESTS

The authors declare no competing interests.

ADDITIONAL INFORMATION

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