ESC HEART FAILURE
ESC Heart Failure 2021; **8**: 3444–3446
Published online 13 June 2021 in Wiley Online Library (wileyonlinelibrary.com) **DOI:** 10.1002/ehf2.13467

Author reply: S-ICD eligibilities in adults with congenital heart disease

We thank Wang *et al*. for their interest in our article on S-ICD eligibility in adults with congenital heart disease (ACHD).[1]

Wang *et al*. emphasize that our results are in contrast to several previous ACHD studies,[2–5] including one recent study from their group.[2] Carefully reviewing the references, our results regarding S-ICD eligibility in ACHD patients (83%) are obviously in line with previous published data. In the studies mentioned by Wang *et al*., S-ICD eligibility was 75%,[3] 77%,[4] and 75.4%.[5] Further studies not mentioned by Wang *et al*. showed even higher eligibility rates of 93.5%[6] and 86.7%.[7] More precisely, the result of Wang *et al*.[2] reporting only 60% S-ICD eligibility is exceptionally lower compared to the above-mentioned studies. Our eligibility rate lies even closer to the aforementioned mean of the published data than the eligibility rate from Wang *et al*.[2] (*Figure 1*). The references added by Wang *et al*. therefore nicely extend the well-described underlying evidence in the field.

Wang *et al*. highlight a discrepancy between the reported data in the figures and the results section in a previous version of our manuscript, which has already been corrected in the final version of the publication. In detail, 70 patients (70%) were found eligible in both left and right parasternal positions, 8 patients (8%) only in left, and 5 patients (5%) only in right parasternal position adding up to the 83 patients (83%) found eligible in either left and/or right parasternal position as correctly reported in the study (*Figure 2*). Thus, *Figure 1* of our manuscript and the eligibility rate mentioned in the study are correct.[1]

Wang *et al*. mention that the discussion of our results was not sufficient and that details about the Boston Scientific programmer settings of the automated S-ICD screening test including SMART Pass function (ECG filtering settings)[6] were not appropriately described in our study. Of note, the automated S-ICD screening test does not include or allow the SMART Pass function, since the SMART Pass function is a filter setting of *implanted S-ICD devices*, whereas the automated S-ICD screening test is a test performed with the *device programmer*. The automated screening test automatically evaluates vector eligibility using the Latitude Programmer Model 3120 (Boston Scientific

Figure 1 S-ICD eligibility in different studies evaluating ACHD patients as wells as the mean value of the different S-ICD eligibility rates reported.

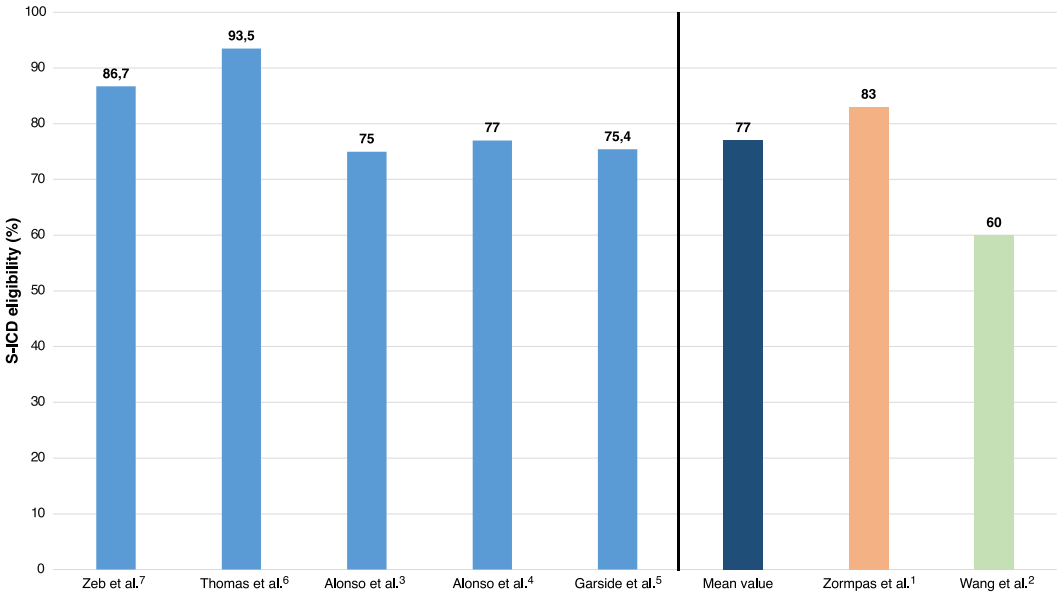
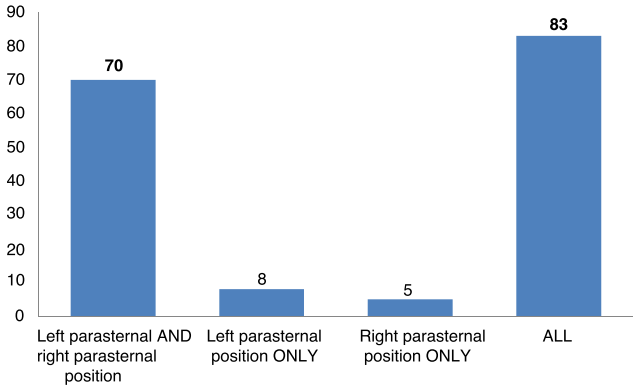


Figure 2 S-ICD eligibility rate in the different parasternal positions. Summing up, 78 patients were eligible in left parasternal position (22 patients ineligible) and 75 patients were eligible in right parasternal position (25 patients ineligible).



Natick, MA, USA). Thus, no settings can be adjusted before or during the test. Colleagues familiar with this screening tool will confirm that the reason for failure is not provided by the programmer. Cases of the automated screening test unable to deliver a result have been previously reported and are often due to paced QRS complex, low R wave amplitudes, and electromagnetic interferences.[8,9] The ECG-based screening test was performed as standard of care, but was not the main focus of our study, since this has already been largely examined in ACHD patients in previous studies.[2,3,5,7,10]

Furthermore, Wang *et al*. propose a comparison of S-ICD eligibility in different positions (standing and supine) on the left and right parasternal position using McNemar's chi-square test. Clinicians performing S-ICD screening will agree, that the proposed analysis comparing S-ICD eligibility in different positions is irrelevant in clinical practice, since S-ICD eligibility is only met if at least one vector is eligible in *both*, supine *and* standing position. The statistical test requested by Wang *et al*. therefore seems superfluous.

Christos Zormpas
Hannover Heart Rhythm Center, Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany
Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany

Ann Sophie Silber-Peest
Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany

Jörg Eiringhaus
Hannover Heart Rhythm Center, Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany
Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany

Henrike A.K. Hillmann
Hannover Heart Rhythm Center, Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany
Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany

Stephan Hohmann
Hannover Heart Rhythm Center, Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany
Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany

Johanna Müller-Leisse
Hannover Heart Rhythm Center, Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany
Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany

Mechthild Westhoff-Bleck
Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany

Christian Veltmann
Hannover Heart Rhythm Center, Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany
Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany

David Duncker
Hannover Heart Rhythm Center, Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany
Department of Cardiology and Angiology, Hannover Medical School, Hannover, Germany
E-mail: duncker.david@mh-hannover.de

DOI: 10.1002/ehf2.13467

References

1. Zormpas C, Silber-Peest AS, Eiringhaus J, Hillmann HAK, Hohmann S, Müller-Leisse J, Westhoff-Bleck M, Veltmann C, Duncker D. Eligibility for subcutaneous implantable cardioverter-defibrillator in adults with congenital heart disease. *ESC Heart Fail* 2021; **8**: 1502–1508.
2. Wang L, Javadekar N, Rajagopalan A, Rogovoy NM, Haq KT, Broberg CS, Tereshchenko LG. Eligibility for subcutaneous implantable cardioverter-defibrillator in congenital heart disease. *Heart Rhythm* 2020; **17**: 860–869.
3. Alonso P, Osca J, Rueda J, Cano O, Pimenta P, Andres A, Sancho MJ, Martinez L. Conventional and right-sided screening for subcutaneous ICD in a population with congenital heart disease at high risk of sudden cardiac death. *Ann Noninvasive Electrocardiol* 2017; **22**: e12461.
4. Alonso P, Osca J, Cano O, Pimenta P, Andrés A, Yagüe J, Millet J, Rueda J, Sancho-Tello MJ. The role of conventional and right-sided ECG screening for subcutaneous ICD in a tetralogy of Fallot population. *Pacing Clin Electrophysiol* 2017; **40**: 145–153.
5. Garside H, Leyva F, Hudsmith L, Marshall H, de Bono J. Eligibility for subcutaneous implantable cardioverter defibrillators in the adult congenital heart disease population. *Pacing Clin Electrophysiol* 2019; **42**: 65–70.
6. Thomas VC, Peterson M, McDaniel M, Restrepo H, Rothman A, Jain A. Analysis of screening electrocardiogram for the subcutaneous defibrillator in adults with congenital heart disease. *Pediatr Cardiol* 2017; **38**: 1162–1168.
7. Zeb M, Curzen N, Veldtman G, Yue A, Roberts P, Wilson D, Morgan J. Potential eligibility of congenital heart disease patients for subcutaneous implantable cardioverter-defibrillator based on surface electrocardiogram mapping. *Europace* 2015; **17**: 1059–1067.
8. Zormpas C, Eiringhaus J, Hillmann HAK, Hohmann S, Müller-Leisse J, Schmitto JD, Veltmann C, Duncker D. Eligibility for subcutaneous implantable cardioverter-defibrillator in patients with left ventricular assist device. *J Interv Card Electrophysiol* 2020; **60**: 303–311.
9. Zormpas C, Eiringhaus J, Hillmann HAK, Hohmann S, Müller-Leisse J, Schmitto JD, Veltmann C, Duncker D. A novel screening tool to unmask potential interference between S-ICD and left ventricular assist device. *J Cardiovasc Electrophysiol* 2020; **31**: 3286–3292.
10. Thomas JA, Perez-Alday EA, Hamilton C, Kabir MM, Park EA, Tereshchenko LG. The utility of routine clinical 12-lead ECG in assessing eligibility for subcutaneous implantable cardioverter defibrillator. *Comput Biol Med* 2018; **102**: 242–250.