

To the Editors – *Risk factors for complications in the implantation of epicardial pacemakers in neonates and infants*

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We read with interest the article by Chaouki, et al.¹, exploring risk factors for neonatal and infant pacemaker implantation. It is encouraging that their data support low morbidity in device implantation in patients >4kg and >21 days. We question, however, the result and conclusion that patients <3kg and <5 days are in fact at greater risk regardless of device size. We suggest that the driving force behind morbidity is device volume (more correctly, the total pocket volume, including the lead volume) to abdominal volume ratio, conferring greater abdominal wall stress. While such a value in the author's data set would likely reveal unchanged results, this is likely due to their cohort's lack of device volume variation. The mean volume described was 11.1 cm³ with an interquartile range of 10.8 cm³ – 11.1 cm³. If pacemakers smaller than those described did not exist, the conclusions could be supported on such grounds. While we are frustratingly limited by device choice in the newborn and infant patient population, smaller devices are, however, available including volumes as low as 5.9 cm³ for single chamber (introduced 1995)² and 8.0 cm³ for dual chamber (introduced 2007)³. Had these devices been represented in the cohort it would be more reasonable to conclude that "...device characteristics appear to play a minor role." It is somewhat similar to concluding that an athlete's VO₂ max plays a minor role in their ability to win a race if only athletes with VO₂ max's of 55 - 60 mL/(kg x min) are represented in a cohort. With smaller devices included, I suspect that device characteristics would play a larger role and that patient complication odds ratios would be different for the patient sizes presented. If true, limiting implantation to infants >3kg and >5 days of age would be unnecessarily stringent. As described by the authors, further evaluation with current devices between multiple centers would provide a wonderful opportunity to assist in risk stratifying patients based on patient size and age relative to device size and number of leads, all of which impact total pocket volume to abdominal volume ratio.

References

1. Chaouki AS, Spar DS, Khoury PR, Anderson JB, Knilians TK, Morales DL, Czosek RJ. Risk factors for complications in the implantation of epicardial pacemakers in neonates and infants. *Heart Rhythm* 2017;14:206–210.
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