

Foreword

The Newborn Heart and Circulation



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Consulting Editor

In a 1959 article exploring the physiology of newborn transition, Dr G.S. Dawes¹ pointed to striking differences between the newborn and adult cardiac responses to challenges and made a fervent appeal that the cardiovascular function of the newborn should not be taken for granted just because it appears to be more resilient. “The task with which the cardiovascular system of a newborn creature is faced is not the same, quantitatively, as that in an adult. Distinct differences include the ability to survive in the total absence of oxygen....in the presence of anoxia from which any adult would rapidly succumb.” Indeed, a large epidemiologic study of apparently stillborn newborns published in 1989 showed intact survival in up to one-third of the cohort.² Despite the resilience, it was clear that newborns were not immune to cardiovascular compromise, and our inability to adequately monitor and manage their cardiovascular function had dire consequences. Yet, throughout the ensuing years, clinicians largely relied on a singular measurement: blood pressure; they were content using a regimented approach to maintaining it in a “physiologic range” with the assumption that autoregulation of cerebral blood flow worked over a fairly wide range, and significant brain injury only happened in extremes.

Recent evidence shows that cardiac function, systemic blood flow, and end-organ perfusion require much more than blood pressure measurements and form the basis of cellular homeostasis (Fig. 1).³ This points to the need for clinicians to be adequately trained in cardiovascular assessment and sections within our neonatal intensive care units to be geared toward managing hemodynamically unstable babies.

In this issue of *Clinics in Perinatology* Drs. EL-Khuffash and Dempsey have brought together authors from all over the globe to cover advances in cardiovascular care of neonates and have challenged many current paradigms with provocative new approaches. The authors also point to the need for more research into hemodynamic monitoring and a cellular, physiology-driven approach to interventions. As

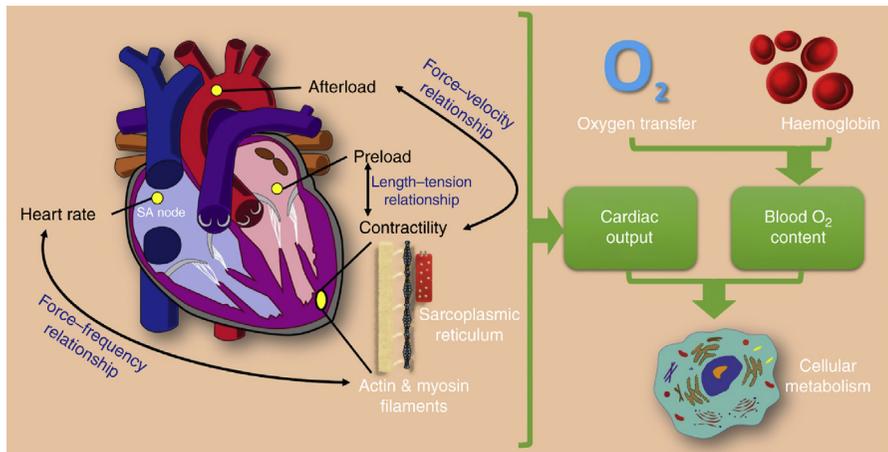


Fig. 1. Determinants of cardiac output and adequate cellular metabolism. SA, sinoatrial. (From Bussmann N, EL-Khuffash A. Future perspectives on the use of deformation analysis to identify the underlying pathophysiological basis for cardiovascular compromise in neonates. *Pediatr Res* 2019;85: 592; with permission.)

always, I am grateful to the publishing staff at Elsevier, including Kerry Holland, Casey Potter, and Nicholas Henderson, for their support in bringing this important publication to you.

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REFERENCES

1. Dawes GS. Some respiratory and cardiovascular problems after birth. *Arch Dis Child* 1959;34:281–91.
2. Jain L, Ferre C, Vidyasagar D, et al. Cardiopulmonary resuscitation of apparently stillborn infants: survival and long-term outcome. *J Pediatr* 1991;18:778–82.
3. Bussmann N, EL-Khuffash A. Future perspectives on the use of deformation analysis to identify the underlying pathophysiological basis for cardiovascular compromise in neonates. *Pediatr Res* 2019;85:591–5.