

## Letter to the Editor

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With great interest, we read the study presented by Dilek Dilli and colleagues in a current issue of this journal.<sup>1</sup> The authors reported that pulse oximetry screening is an effective screening tool for CHD in newborns at different altitudes. In this study, physical examination was done in all babies for signs and symptoms related to the cardiovascular system to detect CHD. The presence of central cyanosis, abnormal peripheral pulses, abnormal precordium, murmurs on cardiac auscultation, tachypnea, and chest retractions was considered as positive findings suggesting CHD. Babies with positive clinical findings underwent echocardiography. As a result, echocardiography was performed in 319 babies. The indications were presence of clinical finding ( $n = 277$ ), test positivity ( $n = 34$ ), or both ( $n = 8$ ). They showed that if a murmur ( $n = 288$ ) was heard, there was a 7.4% ( $n = 17$ ) chance of there being an underlying cardiac malformation.

Cardiac murmurs are common in asymptomatic babies and represent the most frequent reason for referral to a cardiologist.<sup>2,3</sup> The reported prevalence of cardiac murmurs in apparently healthy children varies widely from 5 to 80% of screened population, depending on the group studied.<sup>4,5</sup> The majority of cardiac murmurs in infants and children are normal or innocent. However, many with CHD are first diagnosed following the detection of a heart murmur incidentally. Identifying these infants and children is important as CHD can cause significant morbidity and may even lead to death without prompt and appropriate treatment. Pulse oximetry has been confirmed as an effective screening modality for CHD.<sup>6</sup> However, pulse oximetry detects only those lesions with hypoxia. Most cases of CHD, such as severe left heart obstructive lesions and large left-to-right shunt lesions, cannot be recognised early enough by pulse oximetry. Using pulse oximetry plus cardiac auscultation significantly improved the detection rate of CHD in the early neonatal stage, with high sensitivity and a reasonable false-positive rate.<sup>6</sup>

Although murmurs on cardiac auscultation have been considered in the study presented by Dilek Dilli and colleagues, the loudness grades of cardiac murmurs have not. However, our previous study showed that schoolchildren with the loudness of grades 3–6 and those younger than 10 years of age should raise a high index of suspicion of CHD and should refer to the echocardiographic examinations.<sup>7</sup> Therefore, the loudness grades of cardiac murmurs should be considered in this study. Data should be collected in the baseline clinical characteristics. We are surprised that this potentially important clinical characteristic has not been considered, despite the known increase in CHD risk with louder cardiac murmurs and younger age.<sup>7</sup> If the loudness grades of cardiac murmurs have been recorded in the study presented by Dilek Dilli and colleagues, it would have been of utmost interest to consider this factor in this study to evaluate its potential contribution to the CHD risk.

Challenges remain in the judgement of pathological murmurs in newborns, and there are still many CHD patients in developing countries who are not diagnosed in a timely fashion due to insufficiencies in training of clinicians with regard to auscultation. *Thus, the importance of training for cardiac auscultation should be emphasised*, highlighting the need to improve the ability of paediatricians to accurately discern a heart murmur. This not only decreases the need for unnecessary echocardiographic studies but can also ensure that major CHD can be detected during the neonatal period. It is a challenging work for the paediatricians to distinguish pathological murmurs from the far more common innocent murmurs accurately.

Numerous studies have identified clinical predictors of pathological murmurs, but the absence of abnormal findings does not always guarantee that the diagnosis of CHD can be excluded. Echocardiography remains the gold standard of formal diagnosis. Sending all murmurs for echocardiographic examinations is a poor use of resources.<sup>8</sup> Given the incidence of murmurs in this population, adoption of the strategies of pulse oximetry plus cardiac murmur auscultation would result in considerable cost savings.

We must emphasise that echocardiography should not replace the cardiovascular examination, particularly in the developing countries. As valuable as echocardiography may be, the basic cardiovascular physical examination is still the most appropriate method of screening for CHD.

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**Conflict of Interest.** None.

**Ethical Standards.** The authors assert that all procedures contributing to this work comply with the Helsinki Declaration of 1975, as revised in 2008, and have been approved by the institutional committees (the Ethics Committees of the Fifth People's Hospital of Dongguan).

## References

1. Dilli D, Dogan V, Ozyurt BM, et al. Should we start a nationwide screening program for critical congenital heart disease in Turkey? A pilot study on four centres with different altitudes. *Cardiol Young* 2019; 1–6.
2. Pelech AN. Evaluation of the pediatric patient with a cardiac murmur. *Pediatr Clin North Am* 1999; 46: 167–188.
3. Smythe JF, Teixeira OH, Vlad P, Demers PP, Feldman W. Initial evaluation of heart murmurs: are laboratory tests necessary? *Pediatrics* 1990; 86: 497–500.
4. Etchells E, Bell C, Robb K. Does this patient have an abnormal systolic murmur? *JAMA* 1997; 277: 564–571.
5. McLaren MJ, Lachman AS, Pocock WA, Barlow JB. Innocent murmurs and third heart sounds in black schoolchildren. *Br Heart J* 1980; 43: 67–73.
6. Hu X, Ma X, Zhao Q, et al. Pulse oximetry and auscultation for congenital heart disease detection. *Pediatrics* 2017, 140: e20171154.
7. Kang G, Xiao J, Wang Y, et al. Prevalence and clinical significance of cardiac murmurs in schoolchildren. *Arch Dis Child* 2015; 100: 1028–1031.
8. Geva T, Hegesh J, Frand M. Reappraisal of the approach to the child with heart murmurs: is echocardiography mandatory? *Int J Cardiol* 1988; 19: 107–113.