

Assessment of fetal cardiac function and adaptation by color tissue Doppler imaging during labor

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Introduction

Every fetus undergoing vaginal delivery is potentially at risk for intrapartum hypoxia and/or asphyxia. Fetal cardiac adaptation plays a crucial role in ensuring intact survival during hypoxic conditions.

Aim

To evaluate the feasibility of color tissue Doppler imaging (cTDI) during labor and to assess fetal cardiac function.

Inclusion criteria

50 singleton full-term pregnancies during active phase of labor (cervix dilatation of at least 5 cm and regular contractions).

Methods

Fetal echocardiography was performed using cTDI to assess cardiac function. Peak myocardial velocities during systole (Sm), early diastole (Em), and atrial contraction (Am) were measured, and atrioventricular plane displacement (AVPD) was calculated. Data analysis was conducted using an in-house developed automated software. All measurements were compared with gestational age-specific pre-labor reference ranges.

Results

It was feasible to assess fetal heart function using cTDI during the active phase of labor in all cases. An examination lasted approximately 10-15 minutes.

A trend toward increased fetal peak myocardial velocities (Sm, Em, Am) and AVPD was observed. However, none of the measured variables reached statistical significance.

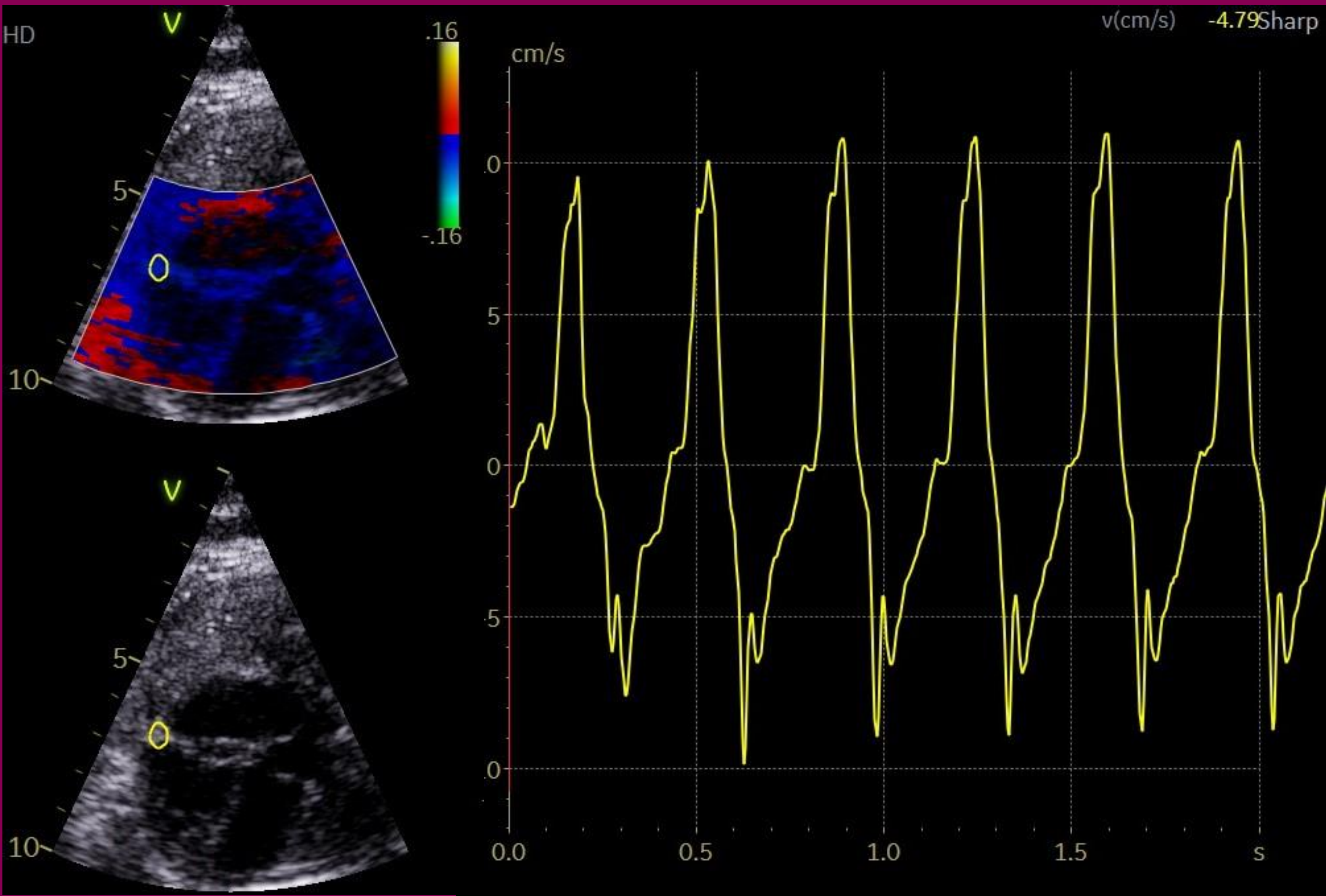


Figure 1. Basal four-chamber view of the fetal heart with cTDI and a myocardial velocity trace of the right ventricle

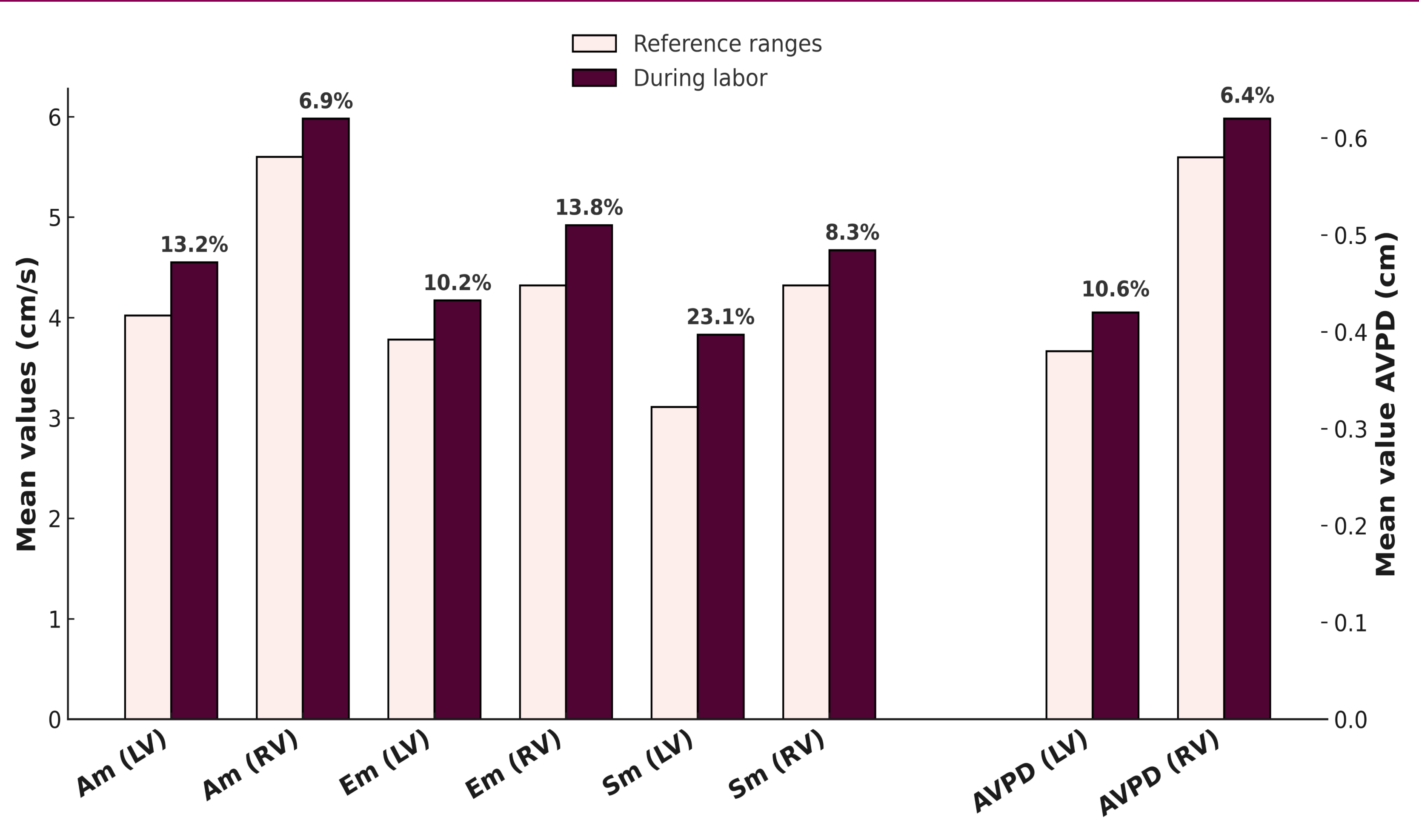


Figure 2. Mean values and percentage increase of fetal peak myocardial velocities (absolute values) and AVPD during active phase of labor