

Improved Fetal Heart Rate Study Using Update Actocardiogram

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Aims: To precisely diagnose Fetal Heart Rate (FHR) with actocardiogram (ACG), which is the simultaneous record of FHR and movement signal spikes.

Method: Low frequency ultrasonic Doppler signal of fetal movement and high frequency Doppler of fetal heart beat were detected with single ultrasonic probe, and separated into two groups by a new electric circuit. FHR was recorded by autocorrelation heart rate meter, and fetal chest movement was changed to spikes, and their chart record was ACG.

Results: Whole body fetal movements were recorded, because fetal body movements were conducted to fetal chest and recorded. Movement spike amplitude was parallel to fetal movement. FHR increased if fetus moved with 7 sec delay. FHR acceleration was associated with fetal movement burst, moderate movement developed moderate FHR change, and

FHR variability was provoked by minor fetal movements, where fetal brain responded fetal movements then produced FHR changes by integral function of fetal midbrain. Thus, FHR changes were lost, if fetal brain was damaged by hypoxia, i.e. FHR acceleration was lost in mild hypoxia preserving variability, then the variability was lost by severe hypoxia. Problems unsolved by the CTG were solved by ACG, e.g. physiologic sinusoidal heart rate was provoked by periodic changes of fetal movements to separate pathologic one in ACG. Fetal hiccupping was not recorded by CTG but recorded by ACG. Fetal behavior was classified by ACG. Outcome of fetal bradycardia was beneficial when FHR acceleration was provoked responding to fetal movements.

Keywords: Actoardiogram; Cardiotocogram; Fetal heart rate; Fetal brain; Hypoxia; Ultrasound doppler