Fetal Electrocardiography and Cardioversion with Direct Current Countershock*

Report of a Case

MARVIN L. MEITUS, M.D., F.C.C.P.

Miami Beach, Florida

The first fetal electrocardiogram in utero was obtained by Cremer,1 in 1906. Of the clinical applications of fetal electrocardiography described in the literature, the following are included:

1. Confirmation of fetal life in utero.
2. Detection of early (first-trimester) pregnancy.
4. Diagnosis of fetal position.
5. Prenatal detection of congenital heart disease.
6. Continuous monitoring of the fetal heart during labor.
7. Postmaturity or fetal anoxia.
8. Diagnosis of fetal arrhythmias.

Disorders of the maternal heart beat during pregnancy may develop in the presence or absence of organic heart disease. Sinus tachycardia, paroxysmal supraventricular tachycardia, atrial flutter and atrial fibrillation may precipitate severe heart failure. There have been instances of fetal distress and of intra-uterine death attributed to intrapartum hypoxia associated with impairment of the circulation in paroxysmal tachycardia and arrhythmias.1

Pregnancies complicated by rheumatic heart disease and paroxysmal or established atrial fibrillation have been analyzed.5 The incidence of heart failure and embolic episodes was higher in the atrial fibrillation group, resulting in a higher maternal mortality rate and fetal loss. Szekely and Snaith1 believed that the onset of atrial fibrillation in rheumatic heart disease should be regarded as a medical emergency, and, in suitable situations, every effort should be made to restore normal sinus rhythm.

The patient, seven weeks pregnant, with atrial flutter, was successfully treated with direct current countershock.6 The fetal electrocardiogram was performed approximately 19 weeks after the cardioverter was used, confirming the presence of a viable fetus (Fig. 1). Subsequent fetal electrocardiograms have been obtained concomitant with the routine electrocardiograms (Fig. 2). The technic utilized to obtain the fetal electrocardiograms has been described in detail in previous articles.4 The equipment consists of the commercial preamplifier, Sanborn Model 55, and Standard Sanborn Electrocardiograph.

CASE REPORT:

The patient, age 32 years, gravida IV, para 3-0-3-3, had undergone open heart surgery on January 27, 1960 for repair of a congenital interatrial septal defect. Three previous pregnancies ended in spontaneous delivery of full term, normal infants. On February 5, 1964, when the patient was approximately seven weeks pregnant, she developed acute atrial flutter at a rate of 280 per minute with 1:1 A-V conduction. Clinically, the patient’s physical condition suddenly became critical. The patient then was prepared for cardioversion by being given 100 mgm. of meperidine hydrochloride intramuscu-

*From the Section of Cardiology, Department of Medicine, Mount Sinai Hospital.

FIGURE 1: Fetal electrocardiogram approximately 19 weeks after use of direct current countershock. (M indicates maternal complexes and FE indicates fetal complexes.)
was transmitted through the body of the mother. In addition, the intramuscular and intravenous drugs utilized in preparation of the application of the 100 watt/second synchronized direct current countershock did not seem to affect the viability of the fetus.

The fact that there is proof of a viable fetus after the above described procedures, furnished the case history with valuable medical information. It is also indicated direct current countershock is not contraindicated in pregnancy. It became clear moreover that the practical use of fetal electrocardiography has additional value in the diagnosis of fetal arrhythmias and probably also congenital cardiac anomalies. Although it could not be applied in this situation, fetal electrocardiograms should be performed prior to direct current countershock, as well as at periodic intervals afterwards.

ACKNOWLEDGMENT: Acknowledgment is made of the technical assistance and help in investigation of the literature by Sally Rouman.

REFERENCES

For reprints, please write: Dr. Meitus, 407 Lincoln Road, Miami Beach.