The instant effect of intrauterine intervention stress on fetal heart rate tracings

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We have investigated the instant effect of intrauterine intravascular blood transfusion on the cardiotocograms of severe erythroblastosis fetalis cases with our knowledge-based analysis program for the interpretation of fetal heart rate tracings.

We have demonstrated that fetal heart baseline and macrovariability were decreased due to intrauterin intervention stress. It can be concluded that early fetal monitoring after fetal therapy does not show the supportive effect of the blood transfusion but demonstrates the reaction of the hydropic fetus to therapy stress.
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KeyWords: " Erytliroblastosis fetalis, Fetal asphyxia, Fetal therapy, Fetal heart rate, Signal processing and non-stress testing.

Erythroblastosis fetalis (EF) is a progressive disease of the fetus caused by rhesus incompatibility (1-3). Intrauterine blood transfusion is frequently necessary in severe forms of the EF (4-7). The critical issue is to decide about the timing of intervention to prevent fetal loss (1-7).

Antepartum fetal heart rate (FHR) recordings (non-stress testing= NST) are widely used as a screening test forfetal surveillance (8-12). Very recently, we have developed a computerized system for the evaluation of cardiotocograms (CTGs) (8,9). A doppler ultrasound fetal heart rate monitor was connected to an IBM-AT compatible computer with RS-232C interface and related software support with a knowlodge-based analysis system for the interpretation of AP-FHR tracings (8,9).

In this study, we have investigated the instant effect of intrauterine intervention stress on the CTGs of severe EF cases with hydrops fetalis.

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MATERIALS AND METHODS

This study consisted of 8 severe EF cases with hydrops fetalis. Intrauterine intravasculer blood transfusion by means of cordocentesis was decided according to the laboratory and clinical evaluations. The gestational age during the course of transfusion was ranged in between 26 weeks 4 days to 34 weeks 2 days. The aim of the transfusion was to increase the fetal hematocrit as much as possible preferably till 40 per cent (2,3,6,7).

Pre-and post-transfusion FHR tracings were evaluated by our computarized system (8,9). Post-transfusion CTGs were obtained in the second hour after procedure.

Wilcoxon signed ranks test is used for statistical analysis.

RESULTS

Table 1 shows the pre- and post- intrauterine intervention values of the baseline, FHR variability and output of the computerized system. Figure I shows the pre- and post- transfusion CTGs of a patient.

We have observed that intrauterine intervention causes bradycardia and a decrease in the fetal heart rate variability.

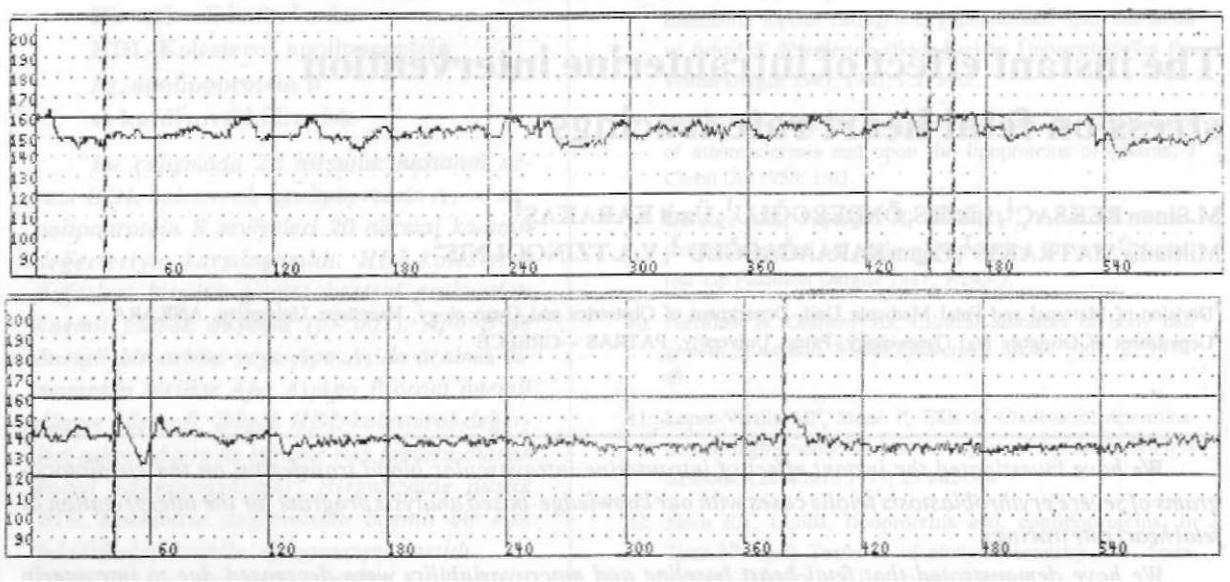

Figure 1. The pre-and post- transfusion. CTGs of a patient.

Table 1. Pre- and Post-Intrauteshe blood transfusion values of baseline, FHR variability and the output of computerized system

	Intrauterine Blood Transfusion	
	Pre-	Post-
Basseline (bpm)	150.1± 6.9	143.7± 8.6
PHR variability (filter in seconds)	10.4± 2.1	8.4± 1.8*
Output of computarized system	3.6± 1.2	3.0± 0.9

\+ p-0.05 * p-0.036

DISCUSSION

The modem trend in the treatment of severe EF is intrauterine intravascular blood transfusion (2-7). In this study, we tried to demonstrate the instant effect of intrauterine intervention stress on the FHR tracings of hydropic fetuses. We observed that FHR baseline and macro variability were reduced in response to this stressful condition while the interpretation of our knowledge-based analysis program was not changed within six hours after the procedure. FHR changes in severe Rh isoimmunization was also reported by several investigators (13,14). We believe that further investigations are necessary in physiological basis to explain the CTG changes.

It can be concluded that early fetal monitoring after fetal therapy does not show the supportive effect of the blood transfusion but demonstrates the reaction of the fetus to stress.

Intrauterin girişim stresinin fetal kalp hızı traseleri üzerindeki erken etkisi

Fetal kalp hızı traselerinin değerlendirilmesinde kullanılan bilgi-tabanlı analiz programımız ile şiddetli eritroblastozis fetalis vakalarında kordosentez uygulaması ile yaptığımız intrauterin intravasküler kan transfüzyonlarının kardiyotokogramlar üzerinde olan erken etkisini araştırdık.

intrauterin girişim stresine bağlı olarak fetal kalp hızı baseline ve makrovariyabilitesinin azaldığı gösterildi. Fetal terapi ertesi erken fetal moniterizasyonunun kan transfizyonunun destekleyici etkisini değil, hidropik fetüsün terapi stresine olan reaksiyonunu gösterdiği sonucuna varıldı.

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Anahtar Kelimeler: Eritroblastozis fetalis, Fetal asfiksi, Fetal terapi, Sinyal işleme ve non-stres test

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