

Early warning of fetal compromise - Absent end diastolic flow ?

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Summary

This report deals with the use of a relatively new investigative technique (Doppler ultrasound) in the management of a case of early onset pre-eclampsia and discusses the benefit of this new technique over conventional methods of fetal monitoring.

Key Words: Doppler ultrasound, pre- eclampsia.

Case Study

A 27 year old Malay woman in her second pregnancy was referred at twenty-ninth week of gestation to the maternity unit for hypertension. She was not known to be hypertensive in her last pregnancy and had no antenatal care prior to the present referral. Her first pregnancy was terminated by Caesarean section for breech presentation two years ago.

Physical examination revealed her general condition to be satisfactory. Her blood pressure was 170/100 mm. Hg. and all peripheral pulses were palpable. Renal bruit was absent and funduseopy was normal. Reflexes were not brisk. The uterine height corresponded to twenty-six week pregnancy and fetal heart sounds were heard.

Urinalysis revealed no proteinuria. Blood urea, creatinine and uric acid were within normal range. A single morphologically normal fetus in breech presentation was observed on ultrasound scanning. The fetus corresponded to a gestation of 26 weeks. Amniotic fluid index (AFI) was 8.5(not compromised). Cardiotocography did not suggest fetal compromise.

Antihypertensive therapy was initiated with labetalol 100 mg.b.d. which was gradually increased to 300 mg.t.d.s. by the end of a fortnight. Despite increasing antihypertensive therapy nocturnal elevation of blood pressure was a common occurrence necessitating intravenous hydralazine. Oral prazosin was added to the regimen in increasing dose till 5 mg. b.d. when the pregnancy

The fetus was monitored with daily cardiocography. Fetal movements were reported to be good. Ten days after admission occasional spontaneous decelerations (Fig 1) were observed and no other bad prognostic features were present.

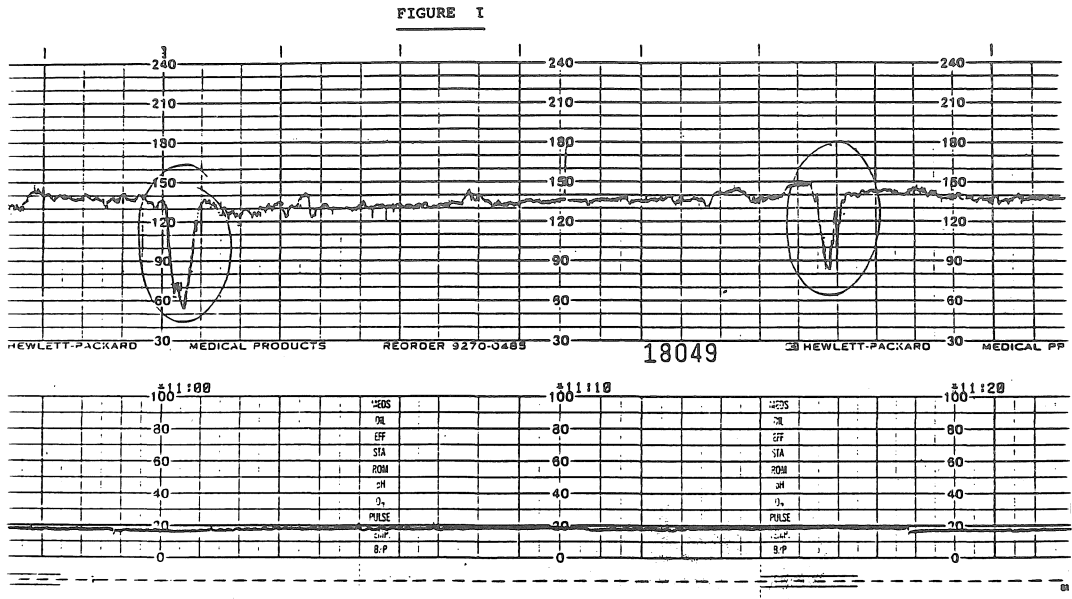


Fig.I: Cardiotocograph ten days after admission. Showing spontaneous deceleration.

Eighteen days after admission blood urea was 5 mmol/l and serum uric acid was elevated at 544 mmol/l. A repeat ultrasound demonstrated some fetal growth and AFI of 11.9. Cardiotocography showed more frequent episodes of deceleration. A paediatric opinion was sought and it was felt that the pregnancy should be further continued. Doppler flow study was arranged.

Three days later Doppler ultrasound flow study (with high filter) of the fetal umbilical artery showed absent end diastolic flow (ADEF) (Fig.II). Five days after, patient's hypertension was uncontrollable at 240/130 mm. Hg. despite intravenous hydralazine. Albuminuria (++) was observed for the first time. Blood urea and uric acid were further elevated. Late decelerations with poor recovery occurring during Braxton Hicks contractions was seen on cardiotocography (Fig III).

An emergency Caesarean section was successfully performed. A live male infant weighing 1.3 kg. (with and Apgar score of 4 at one minute and 8 at five minute) was delivered. Progress in the neonatal period was satisfactory.

The patient discharged herself against medical advice on the third day after operation despite being still hypertensive.

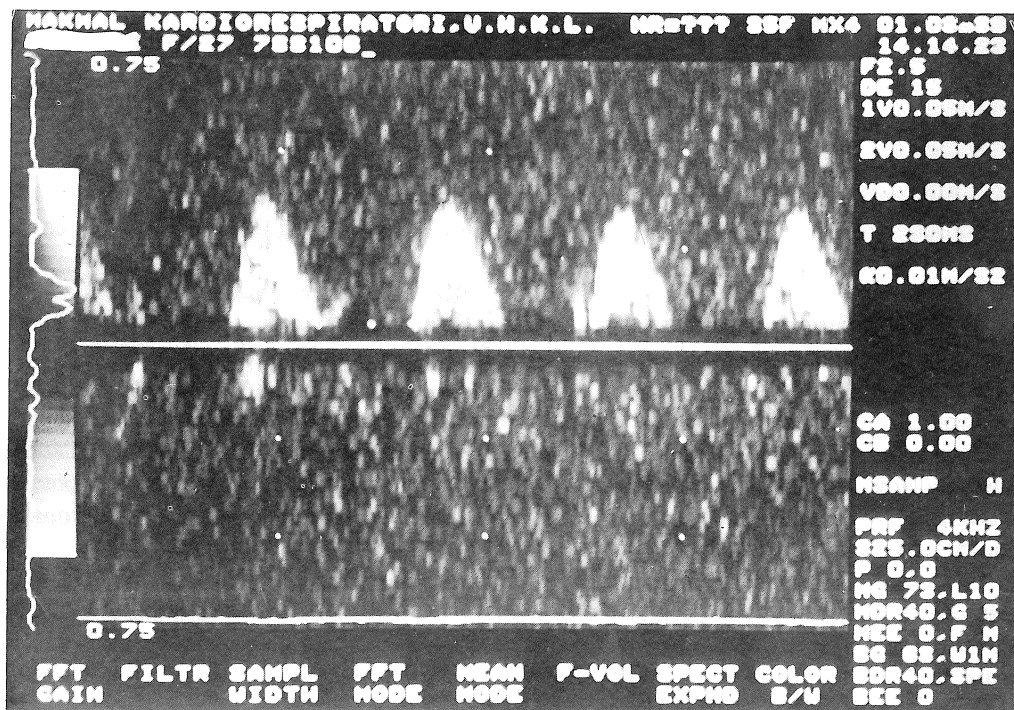
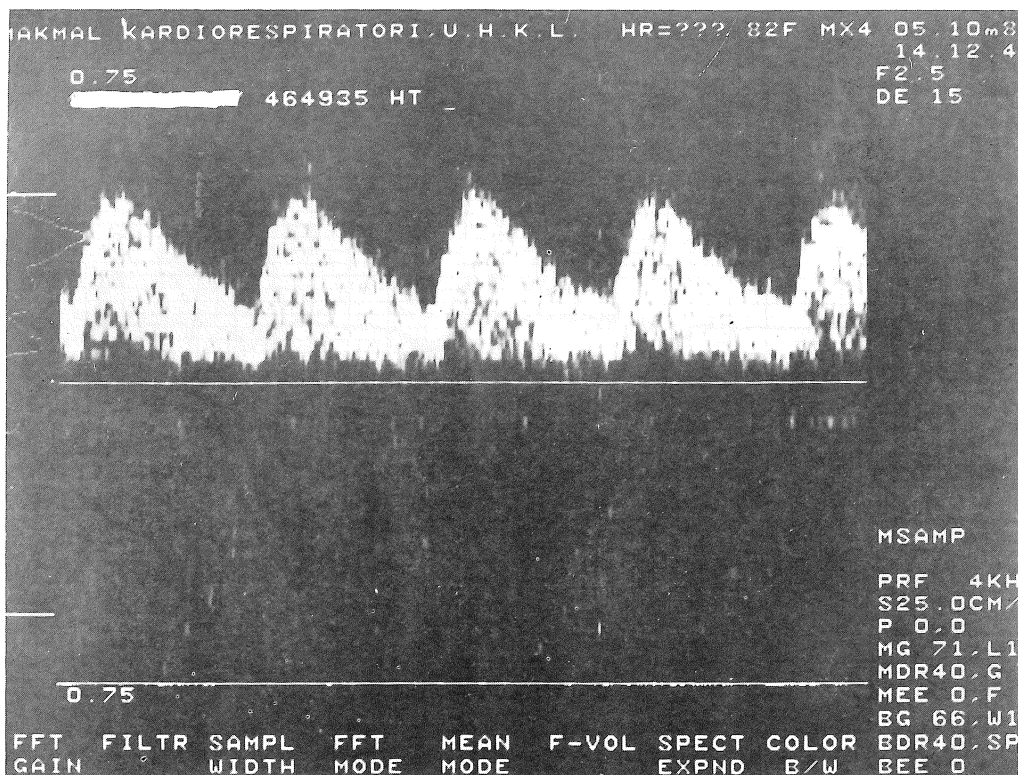


Fig.II: (a) This photo shows normal doppler flow signal.

(b) This photo shows absent end diastolic flow which was seen in this patient.

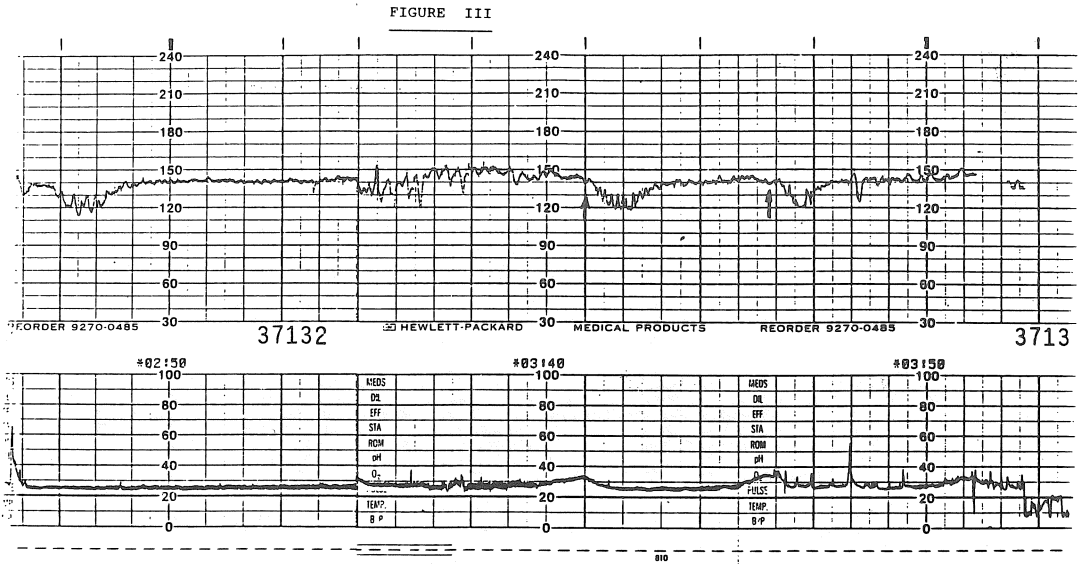


Fig.III: Cardiogram showing late deceleration with Braxton Hicks contraction.

Discussion

Our ability to reduce maternal morbidity and mortality in pre-eclampsia depends on early detection, careful monitoring and timely termination of the pregnancy. The improvement in fetal outcome is dependant on careful monitoring of the fetus at risk and judiciously timed delivery of the compromised fetus. Cardiotocography is an accepted tool for predicting fetal well being in utero.

In the management of high risk pregnancies, many workers [1] have found the use of Doppler ultrasound to be of value in assessing fetal well being. Absence of end diastolic flow in the umbilical artery may precede growth retardation in the fetus [2] and pregnancies at risk of developing pre-eclampsia can be predicted as early as 16 to 20 weeks of pregnancy [3]. In a study by Trudinger and co-workers [1] umbilical arterial flow waveform study was superior to cardiotocography in the recognition of fetal compromise. The two to three times higher sensitivity was not achieved at the expense of a larger number of false positive results. The ability of doppler ultrasound study to predict pregnancies with small for gestational age fetuses [4] and fetuses developing late decelerations in labour [5] may further influence obstetric management.

In pregnancies complicated by pre-eclampsia reduced umbilical blood flow is a more sensitive indicator of early hypoxia than traditional methods like cardiotocography and fetal movements charting [6]. Correlation has been established between umbilical flow pulsatility index and fetal pH, pCO₂ and lactate [7].

In this patient suspicious cardiotocographic changes were already present before doppler findings were available. Uncontrolled hypertension and marked deterioration of the fetal heart tracing within days of demonstrating AEDF forced the decision for delivery of the pregnancy. It is said that AEDF

can precede abnormal cardiotocographic changes in excess of three weeks [8]. The absence of end diastolic flow is usually a serious sign of fetal compromise and indication for extremely careful surveillance. The pregnancy is usually terminated shortly after as demonstrated in this case and confirmed by others [8]. If reversal of flow occurred adverse pregnancy outcome is not unexpected [9].

As with all investigations an abnormal finding has to be taken in relation to the total clinical picture. Obstetric intervention solely on the basis of an abnormal waveform finding is not justified [2].

Doppler ultrasound appears to be promising investigative tool which needs further evaluation in our local population. Admittedly doppler ultrasound requires skilled personnel and can be costly. It may however be cost effective if found to be useful in directing the attention of the obstetrician to high risk pregnancies deserving more costly method of fetal surveillance and improving fetal outcome while reducing the need for unnecessary monitoring in normal pregnancies. There is a need therefore to increase our experience with this new technique to evaluate its value.

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