

ASSESSMENT OF FOETAL MATURITY BY SPECTROPHOTOMETRIC ANALYSIS OF AMNIOTIC FLUID

by

BEENA BHATNAGAR, M.B.B.S., M.S.

and

PROF. SHASHI RAMESH**

Accurate method of determining foetal maturity would be an invaluable aid to the obstetrician while contemplating interruption of pregnancy, in interest of the foetus and the mother.

Amniotic fluid bilirubin can be used for prediction of foetal maturity, as amniotic fluid bilirubin decreases with the increasing period of gestation. Majority of authors reported disappearance of the bilirubin pigment at 450 mu e. Δ D 0.00 reading, by spectrophotometer indicates that pregnancy is at least of 36 weeks' duration, and that the foetus is mature (Liley, 1961; Mandelbaum and Cortex George, 1967; Edgar and Makowski, 1969; Henneman *et al*, 1970; White *et al*, 1969; Andrews, 1970; and Donni *et al*, 1971).

Material and Methods

Present study was carried out at the

State Zenana Hospital attached to S.M.S. Medical College, Jaipur from March 1972 to July 1973. Clear amniotic fluid was collected in clean and sterile bottles from 100 cases of the gestational period ranging from 28 to 40 weeks admitted to the hospital, with no selection of age and parity but with known date of last menstrual period.

Bilirubin pigments were analysed spectrophotometrically at 450 mu after treating with Diazo reagent in the Department of Pathology, S.M.S. Medical College, Jaipur.

Results and Discussion

Spectrophotometric analysis of amniotic fluid gives satisfactory and correct results of bilirubin pigment. This estimation can safely be used for assessing foetal maturity.

TABLE 1
Amniotic Fluid Bilirubin Levels at Different Periods of Gestation

Gestation period (weeks)	No. of cases	Bilirubin at 450 mu		
		Range	Mean	S.D. (\pm)
28-31	30	0.02-0.06	0.038	0.050
32-35	30	0.01-0.05	0.029	0.025
36-40	40	0.00-0.01	0.000	0.000

*Clinical Tutor in Obstetrics & Gynaecology, State Zenana Hospital attached to S.M.S. Medical College, Jaipur (Rajasthan).

**Professor and Head, Department of Obstetrics & Gynaecology, R.N.T. Medical College, Udaipur (Rajasthan).

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Table I shows fall in amniotic fluid bilirubin levels with advancing pregnancy; and Δ D 0.000 reading at 450 mu by spectrophotometer indicates mature foetus and gestation period of at least 36 weeks. These findings coincide with other

workers (Liley, 1961; Mandelbaum, 1967; Black and Pennington, 1969; Edgar and Makowski, 1969; Doregmüller and Jackson, 1969; Henneman *et al.*, 1970; Andrews, 1970; and Donni *et al.*, 1971).

Table II shows that there is rise in amniotic fluid bilirubin pigment with increasing parity of the mother at 36-40

weeks gestation, values being 0.00 Δ D in primipara and 0.01 Δ D in multipara.

It was also found (Table III) that there was a definite and significant correlation between amniotic fluid bilirubin and socio-economic status of the mothers of gestational period 36-40 weeks—bilirubin values being 0.00 Δ D among the patients

TABLE II
Distribution of Amniotic Fluid Bilirubin at Different Periods of Gestation According to Parity

Gestation period (weeks)	Parity	No. of cases	Bilirubin Δ D at 450 mu		
			Range	Mean	S.D. (\pm)
28-31	Primipara	17	0.02-0.03	0.025	0.025
	Multipara	12	0.03-0.06	0.037	0.030
	Grandmultipara	4	0.02-0.06	0.045	0.025
32-35	Primipara	9	0.02-0.03	0.025	0.200
	Multipara	20	0.02-0.05	0.035	0.300
	Grandmultipara	5	0.03-0.06	0.036	0.050
36-40	Primipara	14	0.00-0.10	0.000	0.000
	Multipara	16	0.00-0.01	0.001	0.000
	Grandmultipara	3	0.00-0.01	0.001	0.000

TABLE III
Distribution of Amniotic Fluid Bilirubin at Different Periods of Gestation According to Socio-economic status

Gestation period (in weeks)	Socio-economic Status (Rs.)	No. of cases	Bilirubin Δ D at 450 mu		
			Range	Mean	S.D. (\pm)
28-31	V Below 30	—	—	—	—
	IV 30 — 69	14	0.02-0.06	0.037	0.010
	III 70 — 149	8	0.02-0.05	0.031	0.030
	II 150 — 299	8	0.02-0.03	0.023	0.020
	I Above 300	—	—	—	—
32-35	V Below 30	—	—	—	—
	IV 30 — 69	—	—	—	—
	III 70 — 149	10	0.00-0.06	0.036	0.038
	II 150 — 299	11	0.00-0.06	0.026	0.030
	I Above 300	9	0.00-0.02	0.006	0.000
36-40	V Below 30	—	—	—	—
	IV 30 — 69	—	—	—	—
	III 70 — 149	16	0.01-0.02	0.015	0.000
	II 150 — 299	10	0.00-0.01	0.005	0.000
	I Above 300	14	0.00-0.01	0.000	0.000

of group I and higher in patients of other groups. These findings suggest that as status improves the amniotic fluid bilirubin pigment decreases with the result that incidence of prematurity is common among low socio-economic groups.

From the present series a definite correlation between amniotic fluid bilirubin and infants' birth weight was found (Table IV). 0.00 Δ D reading was noted

venous bed into the amniotic sac.

It is thus, concluded that spectrophotometric analysis of amniotic fluid can safely be used for prediction of foetal matu-

References

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TABLE IV
Correlation Between Amniotic Fluid Bilirubin and Infants' Birth Weight

Infants' Birth weight (in Kg)	No. of Cases	Bilirubin Δ D at 450 mu		
		Range	Mean	S.D. (\pm)
Infants weighing less than 2.5 Kg	56	0.02—0.06	0.035	0.050
Infants weighing more than 2.5 Kg	44	0.00—0.01	0.000	0.000

among infants weighing more than 2.5 Kg; which indicates that if reading is 0.00 Δ D at 450 mu by spectrophotometer, the baby is mature (Mandelbaum, 1967 and Donni *et al*, 1971).

All these observations take us to the conclusion that there was a direct and definite correlation between amniotic fluid bilirubin and maturation of the foetus. Interestingly, disappearance of bilirubin from the amniotic fluid at 450 mu by spectrophotometer was noticed. Fort *et al* (1971) explained the mechanism of disappearance of bilirubin. It was reported that unconjugated bilirubin perfuses through amnio-chorion from uterine

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