DISCUSSION
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The quality of perinatal life is known to be dependent on genetic input, maternal environment, the gestational age and birth weight attained, and it is further modified by intrapartal and neonatal events. More recently, as one of the first major advances made in perinatal medicine, there has been the further recognition that fetal biologic maturity, apart from gestational age and weight, is also essential to a safe transition through crisis of birth and neonatal period. This is specially throughout fetal pulmonary maturity.

As the perinatologist has gained better control of the timing of birth, both by delaying and hastening it based on increased fetal concerned, it has become critical to have a reliable perinatal prognostic index of fetal maturity. This is specially so in cases were complicating factors are involved such as previous cesarean section, Rh sensitization, maternal diabetes mellitus, toxemia of pregnancy and uncertain gestation period based upon irregular or inaccurate menstrual reporting. The practice of early delivery especially were date of delivery is uncertain, might increase perinatal mortality. In order to avoid this mishap a variety of 'fetal maturity tests' have been developed.
A test for foetal maturity should be quick and accurate.

In recent years a number of components of amniotic fluid have been noted to change progressively during pregnancy and accordingly have been intensely investigated as indication of foetal maturity. Amniotic fluid is now easily accessible and amniocentesis is relatively simple and safe technique to help the issue further.

Many intratetraline tests to detect foetal well being have been described including by maternal diameter by ultrasound (Dinh 1969) and lee et al 1971), distal femoral epiphysis (Harrock 1959), bile blue dye test (Droese et al 1966, Sharma et al 1970) amniotic fluid bilirubin (Mundal beam et al 1967) and Creatinine (Pithia et al 1967). But all these tests have been recommended as indices for determining the gestational age and or foetal weight.

But the most essential is the physiological maturity that of the foetal lungs.

The foetal lungs make a small contribution of amniotic fluid (Goodlin and Rudolph 1970) and are the source of some of its constituents including phospholipids (Scarpelli 1967, Nelson 1969). Amniotic fluid phospholipids and in particular the lecithin to sphingomyelin ratio appeared to provide an index of foetal maturity (Sluck et al 1971) and Spallasy et al (1972).
The present study of determination of foetal lung maturity by L/S ratio was undertaken to ascertain whether such an estimation would prove helpful in determining foetal maturity as well as in reducing the incidence of R.D.S. in neonates especially in complicated pregnancies.

For the purpose of discussion total of 215 cases were divided into 2 groups.

Group I - Cases of normal pregnancy
Group II - Cases of abnormal pregnancy.

Group I - A total of 130 cases were studied out of which 80 cases were followed up through delivery till discharge. Out of these 80 cases, 74 cases (93.33%) delivered vaginally. 46 cases were normal vaginal delivery (73%) and 16 cases (17.66%) were delivered by forceps and 6 cases (7.59%) underwent caesarean section for causes like contracted pelvis, cephalopelvis disproportion and malpresentations.

The lecithin : sphingomyelin values and their ratio were studied during various periods of gestation (Table No. VIII and Table No. IX).

Sheganai et al (1974) noted rising values of lecithin throughout pregnancy till term. Our findings are consistent with their observations. (Fig. No.8)
Picture No. 3. Leicithin Sphingomyelin spots on T.L.C.

(i) Standard Leicithin spot

(ii) Standard Sphingomyelin spot

(iii) Leicithin and Sphingomyelin spots on 40 weeks of gestation period.

(iv) Leicithin Sphingomylin spots at 36 wks. of gestation period.

(v) Leicithin Sphingomyelin spots at 30 wks. of gestation period.

(vi) Leicithin incontaminative

(vi) Leicithin and Sphingomyelin spots in contaminated samples. (Blood and Mucous)
Dunn and Bhutani (1973) reported a gradual rise in each of these phospholipids beginning at 16th week and continuing as pregnancy approaches term.

(Table No. VIII), maxium rise was observed between 35-36 weeks in our series while Bhagwanani et al (1973) observed exaggregation from 34 weeks. Binswanger (1973) recorded a similar trend in lecithin concentration.

Gluck et al (1971) saw a surge in lecithin concentration at 36th week of gestation, heralding maturity of fetal lung.

Clinical interpretation was made in T.L.C. lecithin spot clearly larger than sphingomyelin mark pulmonary maturity in the fetus. (Fig. No. 13). Makinson et al (1971) could predict the respiratory outcome of newborns by studying lecithin sphingomyelin spots on T.L.C.

Their results were very similar to Gluck et al (1971), Clemets et al (1971). They observed an abrupt rise in the titer of surfactant at about 35 week of gestation. Their study has revealed the same pattern. (Fig, No. 2).

Reverse trend was observed with sphingomyelin values (Table No. VIII). A gradual fall was seen which was also observed by Arvidson et al (1974) Binswanger et al (1973). Both Gluck (1977) Dunn et al (1973) have reported rising values of sphingomyelin throughout the pregnancy which was opposite for our observations. (Fig, No. 3).
While an abrupt surge in lecithin level was detected at 35-36 weeks of gestation, the fall in sphingomyelin level was throughout our gradual in our study.

Thus it is correct to say that lecithin is the principal phospholipids of late pregnancy with a rise from 3.0 at 24 weeks to 63.08 at 40 weeks, whereas sphingomyelin appeared to be the principal phospholipids of early pregnancy with a fall in levels from 57.30 at 24 weeks to 20.282 at 40 weeks, as according to our study. (Table No.8).

L/S ratio was studied in some series of 130 cases. A general rise is in the values with increasing gestational age was detected (Fig.No.8). Estimation of the ratio between lecithin and sphingomyelin by far the most widely used and accepted approach to the measurement of the surfactant in amniotic fluid.

The mean values of lecithin, L/S ratio, sphingomyelin observed in present series are shown in Table No.8 & 9. The range of L/S ratio is shown in Table No.9. Graph No.9 shows minimum, mean and maximum values of L/S ratio.

The mean values were quite low before 28 weeks of gestation i.e. 0.085 before 24 weeks, 0.096 between 25-28 weeks and 0.056 between 27-30 weeks.

Sharma et al (1981) have reported mean values 0.96 between 28-30 weeks almost in accordance to our values.
The comparison of mean values and range of L/S ratio observed by us and reported by Tivari et al (1969) are much resembling, as shown below.

<table>
<thead>
<tr>
<th>Cost. (Wk.)</th>
<th>Mean L/S ratio</th>
<th>Rate of rise</th>
<th>Range of L/S</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Our series</td>
<td>Tivari series</td>
<td>Our series</td>
</tr>
<tr>
<td>29-30</td>
<td>.300</td>
<td>.37</td>
<td>-</td>
</tr>
<tr>
<td>31-32</td>
<td>.449</td>
<td>.65</td>
<td>.349</td>
</tr>
<tr>
<td>33-34</td>
<td>1.16</td>
<td>1.16</td>
<td>.331</td>
</tr>
<tr>
<td>35-36</td>
<td>2.186</td>
<td>2.30</td>
<td>1.006</td>
</tr>
<tr>
<td>37-38</td>
<td>2.412</td>
<td>2.86</td>
<td>.223</td>
</tr>
<tr>
<td>39-40</td>
<td>3.026</td>
<td>3.02</td>
<td>.668</td>
</tr>
</tbody>
</table>

Values reported by Sharma et al (1981)

<table>
<thead>
<tr>
<th>Cost. period (Wk.)</th>
<th>Mean L/S ratio</th>
<th>Rate of Rise</th>
</tr>
</thead>
<tbody>
<tr>
<td>26-28</td>
<td>0.086</td>
<td>-</td>
</tr>
<tr>
<td>29-31</td>
<td>0.318</td>
<td>0.721</td>
</tr>
<tr>
<td>32-34</td>
<td>1.212</td>
<td>0.495</td>
</tr>
<tr>
<td>35-37</td>
<td>2.207</td>
<td>1.094</td>
</tr>
<tr>
<td>38-40</td>
<td>2.567</td>
<td>0.089</td>
</tr>
</tbody>
</table>
It is evident from Table No. XXIV and XXV that our values are identical with their values with very insignificant difference. In all the series, there is definite spurt between 35-36 weeks while before and after this period of gestation there is a slow rise in L/S ratio in each series. This rises is significant as Gluck et al (1971) clarified sudden rise in lecithin levels and the L/S ratio from about 35 weeks signifies that foetal lungs are now mature and R.D.S will not occur. (Fig. No. 15).

Whitfield et al (1974) stated that there is a widening range of normal values during last two months are pregnancy which considerable individual variation in both time of onset (32-37 weeks) and rate of terminal increase.

It is clear from Table No. 10 that no values exceeded 2.0 prior to 30th week of gestation. Till 24 weeks, more cases (75%) had less than 2.0 ratio while between 35-36 the pattern reversed in most of the cases (66.67%) had L/S ratio more than 2.0, at term 94.44% cases had L/S ratio more than 2.0 and only 5.66% cases had values less than 2.0. One of 3 cases who had less than 1.0 L/S ratio, 2 cases had ratio of 2.0 while one had 1.96. (Fig No. 10)

Follow up study of 80 cases where amniotic fluid was obtained within 10 days of delivery (Table No. XI and XII) revealed significant results regarding new born. All the babies in this group remained well and discharged. Only two babies developed mild R.D.S and were fully and easily revived. The criteria taken for diagnosis of R.D.S in our study were - tachypnoea, retractions and expiratory grunting.
All the respiratory difficulties were recorded. The newborns were examined clinically. Gestational age was estimated by physical characters and pregnancy data.

All babies remaining well signify that the lungs are mature. A ratio of two or more seen in majority of cases coincides with the capability of neonate to thrive.

According to Whitfield et al (1972) L/S ratio above 2.0 can be regarded as safe from the viewpoint of pulmonary function. They held a ratio in the range of 1.5 to 4.0 as an index of transitional level of pulmonary maturity with chances of R.D.S. after delivery. A ratio of 4.0 always indicate that baby born at that time may be free from R.D.S. (Gluck et al 1974), as is evident from study too. (Table No. XII).

Correlation of L/S ratio with neonatal weight was done also (Table No. XII). It was seen that higher the birth weight more was the L/S ratio. (Fig. No. XI). One neonate with birth weight less than 2 Kg, developed mild R.D.S while L/S ratio in this baby was also less than 2. In another baby with birth weight 2.5 Kg, also developed R.D.S. where L/S ratio was less than 2.

In cases studied by Spellacy and Mahi (1974), L/S ratio and infant birth rate correlated significantly. No constant relationship could be established between neonatal weight or gestational age and lung maturity by Hivazi et al (1975).
Group II Abnormal Pregnancy cases

A total of 85 cases were studied and all followed up through delivery till discharge.

Prematurity 17 cases of group II of our study fell in this group. Samples were collected during labour. The values observed are shown in Table No. 16. The gestational period was between 28-36 weeks.

6 cases (47.059%) out of this series had 4.0 L/S ratio while 9 had (55.23%) 4.0 or more. 5 neonates (29.41%) ceased to live R.D.S. 3 had moderate 17.64% and 4 were the victims of severe R.D.S (24.54%).

Since many neonatal deaths are due to respiratory distresses, the association of R.D.S. with prematurity is inevitable. R.D.S. due to progressive atelectasis of hyaline membrane disease is a leading cause of death.

(Tiver et al 1979).

In agreement with Cluck et al (1974), in our series, the severity of R.D.S. was inversely related to L/S ratio. The infants definitely had low birth weight and morbidity and mortality in inverse relation to the incidence of R.D.S. i.e. higher the birth rate lower are the chances of R.D.S. according to our results. (Kiwaki et al (1979) could not establish a constant relationship neonatal weight and lung maturtity. But Spalacci and Kubi (1972) found significant correlation between L/S ratio and infant birth weight.
It is clear that L/S ratio of 2.0 always indicates a mature foetal lung. Per infants in this group died due to severe R.D.S., their birth weights were 1.30, 1.40, 1.70, 1.55 Kg. and L/S ratio were .75, 1.00, 1.20 and .90 respectively. Three cases had moderate R.D.S. with birth weight 1.60, 1.90, 1.95 Kg. and L/S ratio was 1.40 1.10, 1.55 respectively. One of this died within 24 hours while 2 were revived difficulty but survived. 5 cases had mild R.D.S. All had birth weight above 1.90 Kg. and L/S ratio 2.0 or more. And all were revived. Almost all infants who survived required intensive resuscitation and care.

It is evident from the study that lesser the L/S ratio more are the chances of R.D.S. Similarly, babies with higher birth weight had better chances of survival.

This study can help us in deciding the time of induction in various cases like those of mistaken dates and bad obstetric history. L/S ratio of 2.0 or more will certainly lung maturity; hence better chances of survival of neonate after birth.

<table>
<thead>
<tr>
<th>Gestation Period</th>
<th>Mean L/S Ratio Group I</th>
<th>Premature Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 weeks</td>
<td>0.250</td>
<td>0.75</td>
</tr>
<tr>
<td>27-28</td>
<td>0.500</td>
<td>1.20</td>
</tr>
<tr>
<td>31-32</td>
<td>0.849</td>
<td>1.845</td>
</tr>
<tr>
<td>33-34</td>
<td>1.199</td>
<td>2.048</td>
</tr>
<tr>
<td>35-36</td>
<td>2.188</td>
<td>4.540</td>
</tr>
</tbody>
</table>
The table shows the difference in L/S ratio determined during labour in premature cases as against the values of L/S ratio in normal pregnancy cases at same gestation period without labour. The values are definitely higher in premature labour cases. (Fig. No. 13).

The effect of labour on the production of surfactant in the foetal lungs has not yet been adequately studied. Creaven et al. (1976) reported fluctuating amniotic fluid lecithin levels, with a significant overall downward trend during labour. Cabare et al. (1976) found significantly higher values for lecithin and L/S ratio in samples obtained at amniocentesis during labour than in samples obtained before labour. Whittle (1977) has recently demonstrated a very variable effect of L/S ratio. He also found increasing trend of L/S ratio in 50% cases. Our findings are consistently with those of Cabare et al. and Whittle.

Prenatal Distress: 12 cases were studied and amniotically fluid samples collected vaginally and at the time of Caesarean section. In 41.64% cases L/S ratio was less than 2.0 while in 58.36% it was more than 2.0. 75% cases had R.D.S. out of which 2 had severe R.D.S and died; 1 was still born. Total mortality rate being 33.33%.

It was observed that in spite of L/S ratio more than 2.0, 8 cases out of 7 developed R.D.S.
Donald et al (1973) besides findings particularly high incidence of R.D.S., when both predelivery L/S ratio and Apgar score were unsatisfactory, noted that 14 out of 13 ladies developed R.D.S despite a predelivery L/S ratio at least 1.0 with Apgar score less than 7, five minutes after birth.

Several authors have reported R.D.S. occurring despite L/S ratio in babies delivered by Caesarean section. (Kalbac and Shuman (1976); Balzinger and Thompson, 1975; Henisten et al 1973).

In our series, 5 out of 6 cases who developed R.D.S. were delivered by Caesarean section. These cases provide example of impaired replenishment of surfactant resulting from acute if usually transient asphyxia, i.e. not infrequently seen in babies delivered by Caesarean section.

Post-maturity — A total of 7 cases were studied and results are shown in Table No. 23. In all cases L/S ratio was more than 2.0 and incidence of R.D.S. are nil.

Our findings are consistent with Sharma et al (1961) and Tivari et al 1979. Their values are 2.016 and 3.45 respectively by in our study mean L/S ratio in the gestation period was (more than 40 weeks) 3.66.

Twin — In our series twin cases were 5 in number. Amniotic fluid samples collected during labour gestation period ranged from 31-39 ws.
Out of the 10 new borns, 2 had severe R.D.S. with L/S ratio less than 2. One baby with L/S ratio less than 2
2 suffered from moderate R.D.S. But the neonate with L/S ratio 2.4 also had severe R.D.S. Birth weight being 1.6 Kg.
Mild R.D.S was in one case and 3 babies remained well.
Mortality rate was 60%. It was observed that infants with
L/S ratio more than 2 has better chances of survival.

Toxemia of Pregnancy: A series of 15 cases was studied,
out of which 3 cases had eclampsia. Comparatively higher
mean L/S ratio values were observed than corresponding
group I values. Figure 5b,14. Early rise of L/S was
observed and hence, early lung maturation.

Dyson et al (1975) also observed significant pulmonary
maturation acceleration in condition of pre-eclampsia.
3 cases in our series had essential hypertension, and L/S
ratio was 6.34, 6.02 and 5.84. As a study by Richardson
et al (1975) is his series with conclusion that among
Chronic hypertensives there was a definite trend towards an early
rising L/S ratio.

33.33 cases developed R.D.S., while in two cases,
there was still birth. Total mortality rate was 45%.
Higher incidence of R.D.S. was observed in 4 cases of L/S ratio
more than 1.0.

ANTE PARTUM HAEMORRHAGE
This series included 12 cases of group IIIb of
which three had chronic bleeding per vagina.
The overall incidence R.D.S. was 53.64% (7 cases).

L/S ratio was less than 1 cases, overall mortality weight was 30.07% (Table No. XXI). It is evident from graph No. 14 that the values of L/S ratio were almost corresponding to those of normal pregnancy. One case had very high L/S ratio (5.60) in which case the baby had abruptio placentae with toxemia. There were two still births. High incidence of R.D.S. was obtained in this group despite of the L/S ratio being mature (1.0 or more).

Kinsman and Jaffe (1973) and Dehning and Thompson (1975) found that R.D.S may occasionally occur despite L/S ratio greater than 2.0. In this series, such results were obtained in cases of diabetes. No sensitization and A.F.P.

HYDROCEPHALUS

3 cases of hydrocephalus were studied between 30-40 weeks of gestation period. One was still born and the other 2 neonates death occurred due to R.D.S within 24 hours. The values in these 2 cases were less than 2.0 and in one case it was 1.50 i.e slightly on both side. But the series is too small to comment upon.

Heart Disease

Amniotic fluid sample from 4 cases of heart disease were studied. No changes in L/S ratio was observed. As compared to the normal pregnancy group. No R.D.S, was detected in this group.

Rh Incompatibility

Only these cases were studied and gestation period was 27-40 weeks. Neonates were healthy and L/S ratio more than two.
 Whitfield and Sproule (1974) found L/S ratio within normal range in cases, in which the features was not surely affected. Lower L/S ratio were separated in 50% cases, where features were severely affected.

Leone and Jaffe (1973) and Dabring and Thompson (1973) reported normal L/S ratio in those patients of Rh-incompatibility. Our findings are consistent with all these authors. The series is very small and the field needs further exploration to give any opinion.

**HYPOGLYCEMIA** :- Only 4 cases were under study. One case of L/S ratio 1.80 developed mild R.D.E. All other babies remained well and L/S ratio was more than 2.0.

**Diabetes Mellitus** :- This series covered only 2 cases of Group II. L/S ratio was more than 4.70 in all cases. Our findings are correspondent with Donald et al (1973), Scheyer et al (1974) and Dyson et al (1973) who found normal L/S ratio values. Our findings do not correspond with Whitfield and Sproule (1974) to found normal L/S values in diabetes.


But our series is very small for any conclusive results.