# AMNIOTIC FLUID AMYLASE AS A PARAMETER OF FOETAL MATURITY IN NORMAL PREGNANCY

by

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## SUMMARY

**Efficiency of amniotic fluid amylase was studied for determining fetal maturity. It was found to have a definite correlation with period of gestation and with birth weight of new born.**

**Levels of above 100 units/100 ml were never seen before 36 weeks of pregnancy and birth weight above 2.5 kgs was always seen above this level of amniotic fluid amylase.**

**Taking 100 units/100 ml of amylase level in amniotic fluid as an index of maturity when compared to clinical findings, erroneus prediction was 12%.**

*Introduction*

Amylase is one of the 24 enzymes which have been isolated in amniotic fluid and represents the maturity of salivary and pancreatic glands of fetus, which in turn reflects it's maturity. Vohra *et al* (1980) found a rise in amylase levels with increase in gestational age. This study was undertaken to determine if amylase changes in amniotic fluid could reflect foetal maturity and with how much accuracy.

*Material and Methods*

The present study was conducted in the Department of Obstetrics and Gynaecology, Pathology and Biochemistry, M.L.B. Medical College, Jhansi. Cases were selected from O.P.D. and those hospitalised and included 300 normal cases after 18 weeks of gestation.

A detailed history with special stress on L.M.P., quickening was taken and general systemic examination was carried out. Position and lie of fetus and F.H.S. to exclude twins and hydramios was done. Vaginal examination was done as and when needed. Invvetigation like Hb%, urine for albumin, blood grouping in primigravida was done.

Amniotic fluid was collected under aseptic precaution by inserting needle with glass syringe into unruptured bag or by A.R.M. or at the time of spontaneous rupture of membranes or by abdominal

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paracentesis or during caesarean section before incising the uterus. Precautions were taken not to contaminate the samples with vaginal discharge or blood, 15 ml of liquor was aspirated and kept at 40°C and amylase estimations was done within 24-48 hours.

*Amniotic Fluid Amylase Estimation:* 1 ml of starch solution was taken in 2 tubes. One of which was incubated at 37°C for mts, 0.4 ml of $I_2$ was added to this tube and it was again incubated at 37.2°C for 5-7 mts. 0.1 ml of 1:10 dilution of amniotic fluid (dilution done with 0.9% N saline) was added and total volume made to 10 ml by adding 8.5 ml D water (T-Test).

To 2nd tube containing 1 ml starch solution, 0.4 ml of working $I_2$ solution was added and 8.6 ml. of distilled water added to make the volume 10 ml (C-Control). In a third test tube 0.4 ml solution was taken and 9.6 ml of distilled water was added to make volume 10 ml (B-Blank). Reading of all these test tubes was read in calorimeter calculation was done by the following formula:

$$\text{A.F. Amylase} = \frac{C-T}{C-B} \times 800 \text{ IU}$$

C is the reading of contral test tube.
T is the reading of test.
B is the reading of test blank test tube.

TABLE I

*Distribution of Normal Cases According to Period of Gestation in Weeks*

| S. No. | Period of gestation (in weeks) | No. of cases | %age |
|---|---|---|---|
| 1. | 18-34 | 60 | 20.00 |
| 2. | 35-36 | 30 | 10.00 |
| 3. | 37-40 | 200 | 66.67 |
| 4. | 41 and above | 10 | 3.33 |
| | Total | 300 | 100.00 |

TABLE II

*Amniotic Fluid Amylase Levels in Different Periods of Gestation*

| S. No. | Gestation period in weeks | Value of A.F. Amylase as Units/100 ml. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Upto 50 | | 51-100 | | 101-150 | | 151-200 | | 201-250 | |
| | | No. of cases | % | No. of cases | % | No. of cases | % | No. of cases | % | No. of cases | % |
| 1. | 18-34 | 45 | 75 | 15 | 25 | — | — | — | — | — | — |
| 2. | 35-36 | 9 | 30 | 21 | 70 | — | — | — | — | — | — |
| 3. | 37-40 | — | — | 18 | 9 | 30 | 15 | 146 | 73 | 6 | 3 |
| 4. | 41 & above | — | — | — | — | — | — | 7 | 70 | 3 | 30 |

TABLE III

*Relationship Between AF Amylase Levels in Units/100 ml With Weight of Newborn*

| S. No. | Amylase Levels in Units/ 100 ml. In A.F. | Weight of newborn in Kg. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *1-1.5 | | 1.6-2.0 | | 2.1-2.5 | | 2.6-3 | | 3.1-3.5 | | 3.6-4.0 | |
| | | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| 1. | Upto 50 | 29 | 53.70 | 17 | 31.48 | 6 | 14.82 | — | — | — | — | — | — |
| 2. | 51-100 | 6 | 11.11 | 10 | 18.52 | 38 | 70.37 | — | — | — | — | — | — |
| 3. | 101-150 | — | — | — | — | — | — | 18 | 60.00 | 12 | 40.00 | — | — |
| 4. | 151-200 | — | — | — | — | — | — | 13 | 9.04 | 140 | 91.56 | — | — |
| 5. | 201-250 | — | — | — | — | — | — | 2 | 22.22 | 5 | 55.56 | 2 | 22.22 |
| 6. | 251-300 | — | — | — | — | — | — | — | — | — | — | — | — |

*Discussion*

In our study AF amylase levels showed a rise with increase in gestational period. Considering maximum cases, between 18-34 weeks gestation levels upto 50 units/100 ml (75% cases between 35-36 weeks levels between 51-100 units/100 ml (70% cases) between 37-40 weeks, levels between 151-200 units/100 ml (73% cases) where as after 41 weeks level was still between 151-200 units/100 ml (70% cases). Our findings are in accordance with Vohra *et al* (1980) who observed mean amylase level of 53.18 $\mu$/100 ml. at 36 weeks and before, 187.68 unit/100 ml between 37-40 weeks and 186.01 ml/100 ml after 41 weeks. No further rise at 41 weeks + after because of maximum maturity of salivary glands probably.

In our study a good correlation between amylase level in amniotic fluid and birth weight of new born was observed. Considering maximum cases, amylase level upto 50 units/100 ml. weight between 1-1.5 kg (53.70% cases), between 51-100 units/100 ml birth weight of 2.1-2.5 kg (70.37% cases), between 101-150 units/100 ml which was only after 36 weeks birth weight of 2.6-3 kg (60% cases) between 151-200 units/100 ml birth weight of 3.1-3.5 kg (91.56% cases) between 201-250 units/100 ml birth weight of 3.1-3.5 kg (55-56% cases). Similarly Vohra *et al* (1980) found amylase levell of 53.18 units/100 ml with new born of 1283 gm at 37-40 weeks gestation mean, amylase of 187.68 IU/100 ml and mean birth weight 2711 gm and after 41 weeks mean amylase was 186.01/IU/100 ml and mean birth weight was 3024 gms. In our study however birth weight between 3.6-4 kg was observed only 22.22% cases and that too after 41 weeks the reason was probably malnourishment in our cases.

Taking amylase level as 100 U/100 ml or more as an index of maturity, 12% cases were found to be premature although all cases with amylase more than 100 U/100 ml were found to have birth weight above 2.5 kg. Thus erroneus prediction by amylase was 12% in our study. Decastro (1975) found erroneus perdiction in 17% cases, when maturity was based on A.F. amylase level. Vohra *et al* (1980) found false negative results in 3.45% cases and false positive in 11.78% when amylase level for maturity was taken as 100 somogyi unit/100 ml.

*References*

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