A STUDY OF CREATININE LEVEL IN LIQUOR AMNII AND VAGINAL CYTOLOGY AS AN INDEX OF FOETAL MATURITY

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SUMMARY

Neurological assessment of the new born by Dubowitz scoring system in cases with known LMP showed a reasonable correlation with the gestational age assessed from LMP.

In cases with unknown LMP neurological estimation of the new born was used to estimate the period of gestation and the other parameters were compared to this.

Amniotic fluid creatinine levels are superior to vaginal cytology in accuracy but vaginal cytology is superior to amniotic fluid creatinine level in convenience and cost.

Though both these methods have their limitations and drawbacks they have a place in modern obstetrics.

Introduction

The accurate assessment of foetal maturity is of great practical importance in obstetric practice when induction of labour or elective caesarean section is contemplated either in foetal or maternal interest. In conditions like erythroblastosis foetalis, placental insufficiency, APH, toxaemias, dysmaturity or maternal diabetes, one has to choose between early termination of pregnancy with resultant prematurity of the baby and the high foetal risk of continued intrauterine existence. Therefore, keeping in view the need for simple, inexpensive and safe procedures, this study was undertaken:

(1) To formulate a standard of values of these two tests in the known gestational age groups.

(2) To correlate the values of amniotic fluid creatinine and vaginal cytology with the maturity calculated by Dubowitz scoring system afterwards in the known gestational age group.

(3) In cases of unknown gestational age group an attempt was made to find out if the values of these two simple parameters will correlate with the age determined later on by the Dubowitz scoring system.

Material and Methods

In the present study a total of 100 cases of different age groups and parity admitted to the antenatal or labour ward of

Government Hospital for Women/Medical College, Amritsar have been studied. Twenty-five cases out of this series were with unknown LMP.

Amniotic fluid samples were taken by amniotomy, from amniotic sac at the time of caesarean section or by amniocentesis. Amniotic fluid creatinine was estimated by Folinwu (1965) adaptation of Jafee reaction.

Vaginal smear was taken by the gloved index finger from the midlateral wall of the vagina and spread over the slide, fixed and stained by Papanicolaou technique. Classfication of smear was done according to the classification of Clark *et al* (1964).

The outcome of labour was recorded as normal delivery, forceps delivery or caesarean section with its indications. Weight of the baby and crown rump length was recorded. Apgar scoring was done and gestational age was estimated by Dobowitz scoring.

The clinical findings were correlated with the results of the tests of amniotic fluid creatinine level and vaginal cytology.

Results

Results are depicted in Table I.

Conclusions

Taking 1.8 mg% as an index of maturity at 37 weeks, the percentage of accuracy in estimating gestational age with amniotic fluid creatinine level in known LMP group at 34-36 weeks was 100%, at 37-40 weeks 88.37% and beyond 40 weeks again 100%. In unknown LMP group this percentage of accuracy at 34-36 weeks 100%, at 37-40 weeks 88.89% and beyond 40 weeks again 100%. Overall percentage of accuracy in 2 groups was 93.33% and 92% respectively.

Taking 2 mg% as an index of maturity

at 37 weeks the percentage of accuracy of prediction of gestational age in known LMP group at 34-36 weeks was 100%, at 37-40 weeks 86.05% and beyond 40 weeks was 92.3%. In unknown LMP group at 34-36 weeks of estimated age this accuracy at 34-36 weeks was 100%, at 37-40 weeks 83.33% and beyond 40 weeks again 100%. Overall percentage of accuracy came out to be 89.33% and dicted in 84% of the cases in each group. 88% in two groups respectively.

On studying the relation of birth weight with creatinine level taking 2500 gm weight as a standard at a creatinine level of 1.8 mg%, the percentage of accuracy in determining gestational age in known LMP group came out to be 94.67% and in unknown LMP group 92%.

With vaginal cytology the Accuracy in estimating gestational age in known LMP group at 34-36 weeks was 50%, at 37-40 weeks, 90.69% and beyond 40 weeks was 100%. Overall percentage of Accuracy in this group was 77.33%. In unknown LMP group at 34-36 weeks the percentage of accuracy in estimating the gestational age was 50%, at 37 weeks 40%. Overall percentage of accuracy in this group was 84%.

On studying the relation of birth weight with vaginal cytology taking 2500 gm as an index of maturity the percentage of accuracy in determining gestational age in known LMP group was 90.67% and in unknown LMP group it was 84%.

On comparing the percentage of accuracy of two methods in known LMP group with creatinine level, gestational age could be estimated in 93.33% and birth weight in 94.67% of the cases. Whereas in unknown LMP group gestational age could be estimated in 92% and birth weight again in 92% of the cases.

TABLE I

Amniotic Fluid Creatinine Level and Vaginal Cytology

S. No.	Study	Group	Gestation (in weeks)	No. of cases	Values	Mean
1.	2.	3.	4.	5.	6.	7.
1.	Creatinine level in relation to gestational age	(a) Known LMP	34-36	6	1.3 -1.6 mg%	1.48 mg%
			37-40	43	1.66-2.5 mg%	2.05 mg%
			> 40	26	1.78-2.5 mg%	2.19 mg%
		(b) Unknown LMP	34-36	6	1.4 -1.6 mg%	1.48 mg%
			37-40	18	1.7 -2.2 mg%	1.92 mg%
			> 40	1	2.2 mg%	2.2 mg%
					Correct	Incorrect
2.	Relation of birth weight with creatinine level taking 2500 gm weight as standard at creatinine level of 1.8 mg%	(a) Known LMP	34-36	6	4	2
			37-40	43	42	1
			> 40	26	25	1
			Percentage accuracy—94.67%			
		(b) Unknown LMP	34-36	6	6	0
			37-40	18	16	2
			> 40	1	1	0
			Percentage accuracy—92%			
3.	Percentage accuracy in estimating gestational age taking 1.8 mg% as an index of maturity at 37 weeks	(a) Known LMP	34-36	6	6	0
			37-40	43	38	5
			> 40	26	26	0
			Percentage accuracy—93.33%			
		(b) Unknown LMP	34-36	6	6	0
			37-40	18	16	2
			> 40	1	1	0
			Percentage accuracy—92%			

4.	Percentage of accuracy in estimating gestational age taking 2 mg% as an index of maturity	(a) Known LMP	34–36	6	6	0
			37–40	43	37	6
			> 40	26	24	2

Percentage of accuracy—89.33%

		(b) Unknown LMP	34–36	6	6	0
			37–40	18	15	3
			> 40	1	1	0

Percentage of accuracy—88%

5.	Percentage of accuracy in estimating gestational age with vaginal cytology	(a) Known LMP	34–36	6	3	3
			37–40	43	39	0
			> 40	26	26	

Percentage of accuracy—77.33%

		(b) Unknown LMP	34–36	6	3	3
			37–40	18	17	1
			> 40	1	1	1

Percentage of accuracy—84%

6.	Relation of birth weight with vaginal cytology taking 2500 gm as an index of maturity	(a) Known LMP	34–36	6	3	3
			37–40	43	39	4
			> 40	26	26	0

Percentage of accuracy—90.67%

		(b) Unknown LMP	34–36	6	3	3
			37–40	18	17	1
			> 40	1	1	0

Percentage of accuracy—84%

			Creatinine level	Vaginal cytology
7.	Comparison of percentage of accuracy in two methods	(a) Known LMP	(i) Gestational age : 93.33%	77.33%
			(ii) Birth weight : 94.67%	90.67%
		(b) Unknown LMP	(i) Gestational age : 92.0%	84%
			(ii) Birth weight : 92.0%	84%

Taking vaginal cytology as an index of maturity in known LMP group gestational age could be predicted in 77.33% and birth weight 90-67% of the cases, whereas in unknown LMP group gestational age and birth weight could be predicted n 84% of the cases in each group.

Discussion

The comparison of amniotic fluid creatinine level between different gestational age groups is statistically highly significant in both known and unknown LMP groups. Maternal age, parity and type of the diet had no effect on creatinine levels in liquor amnii. The findings of 2 mg% being the demarcation between pregnancies of 37 weeks or more is in agreement with the observations of Pitkin and Zwirek (1967), White et al (1969), Droegemuller et al (1960), Chandiok et al (1971). The results of Pitkin and Zwirek (1967), Doran et al (1970) and Sinha et al (1981) showed a progressive rise in amniotic fluid creatinine level towards term and agree closely with our results. Our mean of amniotic fluid creatinine from 37-40 weeks in known and unknown LMP groups is 2.05 mg% and 1.92 mg% respectively, whereas those of Pitkin and Zwirek (1967) was 2 mg%, Doran et al (1970) was 1.9 mg% and that of Sinha et al (1981) was 1.89 mg% and 1.87 mg% in cases with known and unknown LMP.

Taking 1.8 mg% as an index of maturity as supported by Sinha et al (1981) our percentage of accuracy in determining gestational age in known and unknown LMP group was 93.33% and 92%, whereas percentage accuracy in their series was 93% and 95%.

Assessment of foetal maturity tested against birth weight of the baby as a 2nd parameter, taking 2500 gm weight and 1.8 mg% of creatinine level as a borderline between prematurity and maturity of pregnancy it was possible to predict the maturity of pregnancy by birth weight in 94.67% and 92% cases in known and unknown LMP groups. Our findings are similar to those of Morrison et al (1977) and Sinha et al (1981).

Taking vaginal cytology as an index of maturity we were able to predict gestational age in 77.33% of cases with known LMP and in 84% cases with unknown LMP. Results of Chandiok et al (1971) were 82.5% and 89.5% whereas those of Sinha et al (1981) were 72% and 68.4% respectively.

Taking birth weight as a parameter, with the vaginal cytology, it was possible to predict maturity of pregnancy accurately in 90.67% and 84% of cases in known and unknown LMP groups respectively.

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