

A COMPARATIVE STUDY OF CREATININE LEVEL IN LIQUOR AMNII AND VAGINAL CYTOLOGY AS AN INDEX OF MATURITY OF PREGNANCY.

by

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Introduction

In obstetric practice one is often confronted with the problem of deciding foetal maturity in cases of high-risk pregnancy and in cases of disputed or forgotten date of L.M.P.

The vaginal cytology is being considered as one of the reliable method for the diagnosis and maturity of pregnancy by many workers like Pundel (1959) and Nanavati *et al* (1977). The results although encouraging have not answered this problem.

The level of amniotic fluid creatinine reflects the size as well as the degree of maturation of foetus. In the past many workers (Begneand *et al*, 1969 and Singh 1970) have made use of amniotic fluid creatinine level for determining the gestational age.

The aim of this work is to find out whether vaginal cytology can be used as a substitute for the amniotic fluid creatinine level method or both of them can

be used in combination for a better accuracy in establishing the gestational age.

Material and Methods

In this series, 102 patients coming to Department of Obstetrics and Gynaecology, Patna Medical College Hospital, were selected for this study.

In the first group, 62 cases of pregnancy during labour with a definite history of L.M.P. were selected. Another group of 40 cases was selected from the patients who were in labour and in whom date of L.M.P. was not known.

A detailed clinical examination of the patient was done. After insertion of speculum, vaginal smear was taken by the gloved index finger from the mid-lateral wall of the vagina, spread over the slide, fixed immediately in a solution of equal parts of 95% ethyl alcohol and ether and staining will be done by the technique of Papanicolaou.

In this series the classification of smears were based on classification described by Clarke *et al* (1964) and Ghafoorzadeh *et al* (1967).

(i) *Clumped type*. Cells arranged in clumps with predominance of navicular

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cells. The karyopyknotic index is less than 10%.

(ii) *Partly discrete type*. Reduction in number and size of cell cluster. Navicular cells dominate the smear and karyopyknotic index remains less than 10%.

(iii) *Discrete type*. Completely depleted of cell clumps. Predominance of cells with cyanophilic cytoplasm, but which tend to be larger than previous two smear type, K.P.I. may exceed 10%.

(iv) *Postmature type*. Progression towards the postpartum type with appearance of so called parabasal (post partum) cells.

In the same patient liquor amnii was collected during labour either by aspiration from forebag of water or at the time of caesarean section by aminocentesis. Any liquor contaminated with blood or meconium was discarded. All the specimens of amniotic fluid were centrifused at rate of 2,000 sp for 10 minutes and stored at 20°C till the creatinine estimation was carried out by the Folin-Wu (1965) adaptation of Jafee reaction.

In the present series amniotic fluid creatinine level of 1.8 mg/100 c.c. was taken as a maturity index of foetus. It was supported by Karjalainen (1975), Bonnar and Redman (1977).

After birth the weight and length of baby was noted. Data of all the tests were recorded and statistical analysis was made.

Observation

In this series the cases were between the age group of 16-30 years and included primis and multi gravidas.

TABLE I
Creatinine Level in Amniotic Fluid in Relation to Gestation

Group	Gestation in weeks	No. of cases	Range of creatinine in mg/100 c.c.	Creatinine in mg/100 c.c.		Comparison between group	t	p	Remark
				Mean	S.E.				
Known L.M.P.	32-36	5	1.4-1.6	1.49	.055	1 and 2	12.36	<.001	Highly significant
	37-40	43	1.5-2.2	1.89	.138	2 and 3	15.03	<.001	-do-
	41-42	10	2.2-2.4	2.28	.048	1 and 3	27.33	<.001	-do-
Unknown L.M.P.	32-36	Nil							
	37-40	38	1.7-2.2	1.87	.108	2 and 3	4.74	<.01	-do-
	41-42	2	2.2-2.4	2.35	.141	..	—	—	-do-

TABLE II
Relation of Gestation Age With Type of Smear

Group	Gestation in weeks	No. of cases	No. of cases in different group							
			Clumped type	Per cent tage	Partly discrete	Per cent tage	Discrete	Per cent tage	Post mature	Per cent tage
Known L.M.P.	32-36	5	5	100						
	37-40	43	1	2.3	11	25.5	31	71.1		
	41-42	10					1	10	9	90
Unknown L.M.P.	32-36	Nil								
	37-40	38	1	2.6	11	28.9	26	68.4		
	41-42	2							2	100

TABLE III
Relation of Creatinine Level With Birth Weight of Baby

Group	Birth weight in gm.	No. of cases	Range of creatinine in mg/100 c.c.	Creatinine in mg/100 c.c.		Comparison between group	t	p	Remark
				Mean	S.E.				
Known L.M.P.	1900-2500	5	1.4-1.6	1.51	.053	.02	8.38	<.01	Highly significant
	2501-2800	16	1.7-2.2	1.87	.142	.037	1.52	.07	Not significant
	2801-3000	27	1.7-2.3	1.94	.133	.025	13.22	<.001	Highly significant
	3001-3200	10	1.9-2.4	2.23	.132	.041	15.55	<.001	-do-
Unknown L.M.P.	1900-2500	Nil							
	2501-2800	16	1.7-2.2	1.81	.103	.0	3.29	<.01	-do-
	2801-3000	18	1.7-2.2	1.92	.091	.021	1.77	.1	Not significant
	3001-3200	6	1.9-2.5	2.03	.216	.038	2.93	<.01	Significant

TABLE IV
Relation of Birth Weight of Baby With Type of Smear

Group	Weight in gm.	No. of cases	No. of cases in different group							Per-centage	
			Clumped	Percen- tage	Partly dis- crete	Percen- tage	Dis- crete	Percen- tage	Post mature		
Known L.M.P.	1900-2500	5	5	100							
	2501-2800	16	1	6.2	6	37.5	9	56.3			
	2801-3000	27			4	14.8	22	81.5	1	3.7	
	3001-3200	10			2	20			8	80	
Unknown L.M.P.	1900-2500	Nil									
	2501-2800	16	1	6.2	9	56.3	6	37.5			
	2801-3000	18			2	11.1	16	88.9			
	3001-3200	6					4	66.7	2	33.3	

TABLE V
Percentage of Accuracy of Two Methods

Group	Parameters	Accuracy of methods in percentage	
		Amniotic fluid creatinine level	Vaginal cytology
Known L.M.P.	Clinical gestational age	93	72
	Birth weight	94.9	58.8
	Birth length	94.9	58.8
Unknown L.M.P.	Clinical gestational age	95	68.4
	Birth weight	95	65
	Birth length	95	65

Discussion

The age and parity of the patient had no influence upon either the vaginal cytology or amniotic fluid creatinine level as a test for foetal maturity.

The comparison of amniotic fluid creatinine level between different gestational age group was statistically highly significant in both known and unknown L.M.P. groups (Table I). The accuracy of prediction of maturity in present series was 93% and 95% in known and unknown L.M.P. groups respectively. This result was in confirmity with the findings of Pitkin and Zwirek (1967). The accuracy of prediction of maturity of pregnancy with vaginal cytology was 72% and 68.4% in known and unknown L.M.P. groups respectively (Table II). The findings were similar of Barnes and Zuspan (1956) and Pande *et al* (1978).

Assessment of foetal maturity tested against birth weight of baby as second parameter, taking 2,500 gm birth weight and 1.8 mg/100 c.c. amniotic fluid creatinine level as a border line between prematurity and maturity of pregnancy. It was possible to predict the maturity of pregnancy by birth weight in 94.9% and 95% in known and unknown L.M.P. groups (Table III). Our findings were similar to those of Morrison *et al* (1977).

With vaginal cytology it was possible to predict maturity of pregnancy in accuracy 58.8% and 68% in known and unknown L.M.P. group respectively (Table IV).

Table V shows the accuracy of prediction of foetal maturity in both the methods tested against gestational age, birth weight and birth length of baby. With amniotic fluid creatinine level it was possible to predict the maturity of pregnancy in 93-95% cases in both known and unknown groups. With vaginal cytology the predic-

tion was possible in 59-72% of cases. Thus, so far as accuracy is concerned the estimation of creatinine concentration in liquor amnii is superior than vaginal cytology as a method of determination of foetal maturity.

Amniotic fluid creatinine estimation cannot be repeated if desired for serial estimation because of possibility of a risk both to mother and foetus. In retarded foetal growth it is unable to provide the accurate result and finally it is costly too.

Vaginal cytology has its limitations regarding the collection of smears, difficulty of interpretation due to lack of fixed nomenclature and basis of classification of smear, low percentage of accuracy in comparison to creatinine level. But the vaginal cytology is cheap, does not alarm patient and material can be obtained in the course of routine examination. It can be repeated as many times as desired, for serial examination.

Our results indicate that both the methods provide some useful information for the assessment of gestational age and foetal weight. One is superior in accuracy and the other is superior in convenience and cost. Unfortunately, no single technique has proved itself as an ideal method for estimation of foetal maturity.

Summary and Conclusion

The accuracy of prediction of foetal maturity by amniotic fluid creatinine level and vaginal cytology method was tested against gestational age, birth weight and birth length of baby in known and unknown L.M.P. in 102 cases.

This series showed that both the methods provide some useful information for assessment of gestational age. Amniotic fluid creatinine level is superior in

accuracy than vaginal cytology but vaginal cytology is superior in convenience and cost. Though both these methods have their limitations and drawbacks, they have a place in modern obstetric practice.

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See Figs. on Art Paper I