

Gas chromatographic study of palmitic acid / stearic acid ratio in paired samples of amniotic fluid and vernix caseosa at term

by

S. CIANGHEROTTI *, F. DIANI ** and D. PECORARI **

In view of the increasing importance of prenatal evaluation of fetal lung maturity, a simplified method for gas chromatographic determination of fatty acids in amniotic fluid was recently developed in our Institutes (2).

According to data from other Authors (1,5,9) palmitic acid/stearic acid ratio (P/S ratio) was selected as indicator for the presence of lung surfactant in amniotic fluid; precisely, when palmitic acid/stearic acid ratio is equal or superior to 5, an acceptable degree of fetal lung maturity can be assumed.

The same method developed by us for fatty acids in amniotic fluid was also applied with minor modifications to vernix caseosa (3). In the present paper the data concerning 20 paired samples of amniotic fluid and vernix caseosa of the same subjects are presented; this has two purposes: first, to investigate possible correlations between palmitic acid/stearic acid ratio of vernix caseosa and of amniotic fluid; secondly, to evaluate the role of vernix contamination of amniotic fluid samples used for predicting fetal lung maturity.

MATERIAL AND METHODS

20 amniotic fluid samples were obtained from healthy gravidas at term either by means of high puncture of the membranes (Drew-Smythe catheter) or by means of transparietal puncture of the amniotic cavity at caesarean section in cases with intact membranes. When the baby was born, vernix caseosa was collected immediately after birth directly from the skin using small soft plastic containers. The technical details of the procedures for fatty acids determination are described in the papers by Castello *et al.* (2,3) and will not be repeated here.

RESULTS AND DISCUSSION

The results of the determinations of P/S ratio in our series of 20 paired samples of amniotic fluid and vernix caseosa are summarized in table I. It is easily seen that the figures for P/S ratio of vernix caseosa are always higher than the corresponding figures in amniotic fluid and that on occasions the difference is rather great; furthermore, there is no correlation between the values of vernix caseosa and those of amniotic fluid.

This observation has more than theoretical interest, because one of the main problems of prenatal evaluation of fetal lung maturity by means of amniotic fluid studies is the possibility of erroneous interpretations due to interference by contaminants.

Vernix caseosa is one of the major particulate contaminants of amniotic fluid,

* Institute of Human Physiology, University of Genova.

** Department of Obstetrics and Gynaecology, University of Genova.

Table 1. *Clinical data and palmitic acid/stearic acid ratio (P/S ratio) in amniotic fluid and vernix caseosa.*

Case Nr.	Chart Nr. (year)	Amniotic fluid obtained	P/S ratio		Newborn			Comments
			amniotic fluid	vernix caseosa	gestational age weeks	sex	birth weight g	
1	1213(75)	T.C.	5.6	7.2	36	F	2100	Potential diabetes
2	1154(75)	T.C.	7.1	11.1	36	F	2200	Diabetes class B
3	70(76)	A.	5.1	6.8	39	F	3700	—
4	1316(76)	T.C.	15.1	17.4	39	F	3230	Disproportion
5	1385(76)	T.C.	7.5	10.4	39	F	3950	Potential diabetes
6	1456(76)	A.	15.0	18.7	40	M	3500	—
7	47(77)	T.C.	5.2	9.5	37	M	2260	Acute fetal distress
8	96(77)	T.C.	4.7	6.3	37	F	2650	Diabetes class B, intrauterine growth retardation
9	140(77)	A.	11.9	17.5	40	F	3810	—
10	221(77)	A.	13.5	18.0	40	F	3180	—
11	183(77)	T.C.	4.2	5.5	33	M	2650	Diabetes class B
12	289(77)	A.	10.4	15.8	42	F	2670	—
13	284(77)	T.C.	14.8	18.8	39	F	3220	Previous intrauterine fetal death
14	293(77)	A.	17.4	22.7	37	F	3320	Previous intrauterine fetal death
15	329(77)	T.C.	9.7	13.4	39	F	2520	Breech
16	315(77)	T.C.	8.7	12.6	40	M	3750	Acute fetal distress
17	277(77)	T.C.	2.2	5.4	30	M	1080	Severe EPH gestosis
18	318(77)	T.C.	7.7	12.6	37	F	3380	Potential diabetes, previous myomec-tomy
19	416(77)	T.C.	9.1	13.7	40	M	3270	Breech, hydramnion
20	426(77)	T.C.	6.6	9.1	39	F	3030	Disproportion

Definitions of diabetes and gestosis: see Pescetto et al., 1977.

A: High puncture of membranes

T.C.: Caesarean Section

together with epithelial cells, blood cells, hairs and meconium. Concerning specifically vernix caseosa, it can be calculated, for instance, that a quantity as small as 0,3 mg with a P/S ratio of 8,5 suspended in 1 ml of centrifuged amniotic fluid with a P/S ratio of 4,4 would shift its P/S ratio to 5,2 as a consequence of the high quantity of fatty acids present in the vernix caseosa (^{3,6,7,8}).

This fact has an obvious relevance in cases where P/S ratio of amniotic fluid is inferior to 5, but the corresponding P/S ratio of the vernix is higher, as in our cases N. 8, 11 and 17. In a similar situation, the presence of small amounts of vernix caseosa in the amniotic fluid sample submitted to fatty acids analysis would induce a spurious elevation of P/S ratio and originate an erroneous clinical judgement.

Contamination of amniotic fluid with particulate materials changes from case to case and is not necessarily correlated with gestational age or fetal lung maturation. Therefore, accurate clinical prediction of fetal lung maturity by means of evaluation of P/S ratio in amniotic fluid is possible only if the samples are previously centrifuged in standardized conditions. For our method, centrifugation should be done at least for 60 minutes at 3500 x g as shown by a study (⁴) on different times and modalities of centrifugation. Although our experience is

limited to P/S ratio determination, we feel that the importance of centrifugation is the same also for all other methods of prediction of fetal lung maturity by means of amniotic fluid studies.

SUMMARY

The results of the determination of palmitic acid/stearic acid ratio in 20 paired samples of amniotic fluid and vernix caseosa at term are presented. Vernix caseosa has a high content of fatty acids and its palmitic acid/stearic acid ratio is constantly higher than the ratio of the corresponding amniotic fluid. Centrifugation in standard conditions of amniotic fluid samples before its analysis for palmitic acid/stearic acid ratio is an essential step in order to avoid the serious consequences of an erroneous prediction of fetal lung maturity.

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Effect of tryptophan-free diet on prolactin and cortisol plasma levels in normal males

by

G. B. MELIS *, A. CONCU **, S. BLANCO **, A. M. PAOLETTI *,
S. MURRU *, F. FADDA ** and A. NASI *

INTRODUCTION

It is well known that the administration of a tryptophan-deficient diet to the rat gives rise to a diminution of the plasma concentrations of this amino acid, with consequent inhibition of cerebral serotonin synthesis (^{1,6,8}).

In man too, the intensive administration by the oral route of a mixture of

* From the Department of Obstetrics and Gynaecology, University of Cagliari.

** From the Institute of Human Physiology, University of Cagliari.