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Evaluation of the feto-placental function by means of intraamniotic administration of dehydroepiandrosterone-sulphate

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1 Introduction

The estriol or estrogens determination in maternal urine is a well established test of feto-placental function, extensively used for the diagnosis of pregnancy at risk.

It is known that the most important precursor of estriol (representing 90% of the total estrogens excreted in maternal urines) is fetal 16-hydroxylated dehydroepiandrosterone-sulphate.

In the last trimester of gestation about 80–90% of the estriol precursors are produced by the fetal adrenals and about 10–20% by the maternal ones; about 50% of the precursors of estrone and 17β -estradiol are produced by the fetus and about 50% by the mother (for a review, see DICZFALUSY [3]).

The predictive value of urinary estriol or estrogens determinations concerning fetal outcome in different pathological conditions seems to be only about 70% correct [7].

In recent years several investigators have proposed the use of dynamic tests, which could complement and improve the diagnostic possibilities provided by the simple estriol or estrogens assay, also in terms of long-term prognosis of fetal conditions [8].

The conversion of DHEA-S into estrogens takes place mainly in the placenta [3].

Such tests are based upon supplying a large amount of DHEA-S to the placenta, to evaluate its steroid-metabolizing capacity under load conditions.

Curriculum vitae

SERGIO DELL'ACQUA born 1936, graduated from the University of Milan (Italy) in 1962. Training in obstetrics and gynecology at the University of Milan. Guest scientist from February 1964 to October 1965 at the Reproductive Endocrinology Research Unit, Karolinska sjukhuset, Stockholm, as a holder of a special Ford Foundation Fellowship in Reproductive Endocrinology. At present associate professor of Obstet. Gynecol. Endocrinology, Università Cattolica del Sacro Cuore, Rome, Italy. Research in the field of human reproductive endocrinology, both in pregnant and in non pregnant women, especially in the steroids synthesis and metabolism in the ovary and in the foeto-placental unit.

The purpose of the present investigation was to establish the clinical utility of a dynamic test based on the administration of DHEA-S into the amniotic cavity.

2 Material and method

The test was performed in 12 cases of normal pregnancies, ranging from the 33th to the 37th week of gestation and in 33 cases of pathological pregnancies (10 intrauterine fetal growth retardation, 3 diabetes, 3 cardiopathy, 4 chronic hyper-

tension, 2 toxemia, 3 idiopathic jaundice of pregnancy, 2 anaemia, 2 Rh-isoimmunisation, 2 fetal anencephalia, 1 myomectomy in pregnancy, 1 plastic unification of a double uterus before pregnancy) ranging from the 32th to the 38th week of gestation.

Two hundred mg of DHEA-S were rapidly injected into the amniotic cavity, after localization of the placental area using IN¹¹³ [12].

The increment of maternal urinary excretion of total estrogens over the 24 hrs following the DHEA-S injection was assessed as the percentage of the mean of the two 24 hr excretion values before DHEA-S administration.

By means of urinary assays performed every 2–4 hrs, it was established that the increase in urinary estrogens starts 6–8 hrs after DHEA-S administration (Fig. 3).

For the above reason it seems more convenient to begin the evaluation of the increment 8 hrs after DHEA-S injection.

As daily urines collection in our department starts at 6 a.m., the intraamniotic injection of DHEA-S was given to 10 p.m. on the previous day.

Total urinary estrogens were measured according to the BROWN, BEISHER and SMITH [1] method, modified by MENINI and BOMPIANI [11].

DHEA-S was kindly supplied by ROCHE, Basel.

3 Results

Fig. 1 illustrates the profiles of total urinary estrogens excretion in 8 cases of normal pregnancies before and after intraamniotic administration of DHEA-S.

In all the 12 cases examined, an increment of total urinary estrogens exceeding 100% was obtained, with an average of $147.6\% \pm 46.6$ S.D. (Tab. I).

Fig. 2 illustrates the profiles of total urinary estrogens excretion in 8 cases of pathological pregnancies.

In 28 out of 33 cases of pathological pregnancies examined the increment never reached 100% with an average of $48.6\% \pm 19.2$ S.D. (Tabs. II, III).

It is interesting to note that in normal pregnancies the increase is contained over the first 24 hr period, but persists in the following days.

Fig. 3 shows two profiles of urinary assays of total estrogens, performed every 4 hrs, in two cases, one normal and one pathological. The two profiles clearly exhibit a different increment curve. Furthermore no significant increase in the excretion is found to occur in either profile over the first 8 hrs period following DHEA-S administration.

Tabs. I–IV show a comparison of the results obtained using the intraamniotic DHEA-S test with the values of the daily urinary estrogens determined serially during the last trimester of gestation.

Tab. I illustrates the 12 normal cases, in which the urinary estrogens values were all within the normal range and the increase after DHEA-S administration always exceeded 100%.

In this group all the deliveries were normal and the newborn weight and the APGAR score were within normal limits.

Tab. II shows 4 pathological pregnancies, in which the urinary estrogens values were below the normal range and the increase after DHEA-S administration never reached 100%.

Two of these patients were submitted to cesarian section for fetal distress and the newborns were underweight.

Tab. III illustrates 24 pathological cases, in which the urinary estrogens values were within the normal range or at border line, but the increment after DHEA-S administration never reached 100%. In this group we can observe 6 cesarian sections for fetal distress and one in utero fetal death.

In Tab. IV 5 pathological cases have been collected, in which the urinary estrogens values were below the normal range, but the increment after DHEA-S administration always exceeded 100%. We have no explanation for the first case, where the abnormal increment could be due to a technical error, but in the other four cases one newborn was mongoloid, the second was affected with congenital nanism and the other two were anencephalic.

4 Discussion

Intraamniotic injection of DHEA-S rather than maternal intravenous administration was favored, assuming that a higher concentration of the steroid would thus reach the feto-placental unit.

Fig. 1. Total urinary estrogens excretion in 8 cases of normal pregnancies before and after intraamniotic administration of dehydroepiandrosterone sulphate.

The results obtained confirm this assumption: LAURITZEN [6], who first used DHEA-S intravenous administration to the mother to test the steroid-metabolizing capacity of the fetoplacental unit, obtains a much lower increase of urinary estrogens.

Even when very high doses of DHEA-S (500 mg) are administrated intravenously to the mother, the increase of urinary estrogens is lower than that obtained by us [4].

By using intraamniotic administration a more significant correlation between the percentage of

the increase and the functional condition of the steroid-synthesizing enzymatic complex can be established.

We introduce in the amniotic compartment the rather high dose of 200 mg DHEA-S to be sure that the enzymatic complex was completely saturated.

It was found that normal pregnant women exhibit an average increase of 147.6 ± 46.6 S.D., in any case exceeding 100%.

We can assume this limit as an indication of a good functional reserve of the enzymatic complex.

Tab. I. Increase in % of total urinary estrogens in 12 cases of normal pregnancies after intraamniotic administration of dehydroepiandrosterone sulphate. The total urinary estrogens were determined daily during the last trimester of gestation.

Case	Urinary estrogens	Performance % of test at week	Delivery	Sex	Newborn			Placental weight
					Weight	Apgar score		
1 L.M.V.	Within normal range	33	Spontaneous at term	M	3.510	8	9	450
2 P.A.	Within normal range	36	Spontaneous at term	F	3.550	8	9	670
3 G.R.	Within normal range	36	Spontaneous at term	F	3.300	9	9	400
4 M.A.	Within normal range	36	Spontaneous at term	F	3.100	9	10	500
5 I.R.	Within normal range	36	Spontaneous at term	F	3.000	9	9	480
6 M.T.	Within normal range	35	Spontaneous at 38 weeks	M	2.750	8	9	440
7 P.A.	Within normal range	34	Spontaneous at term	F	3.440	9	9	500
8 V.A.	Within normal range	37	Spontaneous at term	F	3.420	8	9	480
9 F.R.	Within normal range	35	C.S. (Brown presentation)	F	3.800	7	9	450
10 T.P.	Within normal range	35	Spontaneous at 39 weeks	F	2.800	9	10	400
11 V.R.	Within normal range	34	Spontaneous at term	M	3.080	9	9	490
12 D.F.	Within normal range	35	C.S. (mitral comissurotomy prior to pregnancy)	M	2.900	9	10	450

Fig. 2. Total urinary estrogens excretion in 8 cases of pathological pregnancies before and after intraamniotic administration of dehydroepiandrosterone sulphate.

On the other hand the average increase of pathological pregnancy with primary or secondary placental insufficiency was $48.6\% \pm 19.2$ S.D. From a clinical standpoint too it is interesting to determine whether injected DHEA-S is metabolized mainly by the placenta, or by the feto-placental unit.

JEFFERY et al. [4] have shown that the estriol/estrone+estradiol ratio in maternal urine after intravenous administration of DHEA-S to the mother is much lower during estrogens increment than before DHEA-S administration and concluded that this precursor is metabolized mainly by the placenta, rather than by the feto-placental unit.

Some conclusions were reached by LAURITZEN [8], who administered tritiated DHEA-S intravenously to 6 pregnant women at term shortly before delivery and measured the distribution of

labelled steroids in fetal umbilical vein and arteries, in the amniotic fluid as well as in maternal venous blood and urines at 10–20 and 30 min. following injection.

Only 20% of the DHEA-S injected goes to the fetus. The bulk is converted by the placenta to estrone and estradiol: estrone is the most important estrogenic metabolite excreted in the urine.

MANGO et al. [10] reached a similar conclusion after careful investigation of the metabolic fate of 200 mg of DHEA-S injected into the amniotic compartment, with the determination in maternal urines of estriol, estradiol, estrone, DHEA, etiocholanolone and androsterone, before and after DHEA-S injection.

Different results were obtained by LEHMANN and STRECKER, who injected a mixture of cold DHEA and radioactive DHEA-S into the amniotic

Tab. II. Increase in % of total urinary estrogens in 4 cases of pathological pregnancies after intraamniotic administration of dehydroepiandrosterone sulphate. The total urinary estrogens were determined daily during the last trimester of gestation.

Case	Disease	Urinary estrogens	Performance of test at week	% Increase	Delivery	Sex	Weight	Newborn Apgar score	Placental weight
1 S.S.	Intrauterine fetal growth retardation	Below normal range	37	29.4%	Spontaneous at term	F	2.650	9 10 10	400
2 S.E.	Mitral stenosis	Below normal range	33	67.5%	C.S. at term for fetal distress	M	2.780	7 7 10	420
3 B.P.	Intrauterine fetal growth retardation	Below normal range	35	51.8%	Spontaneous at 36 weeks	M	1.350	7 8 9	300
4 G.F.A.	Intrauterine fetal growth retardation	Below normal range	34	21.4%	C.S. at 35 weeks for fetal distress	M	1.260	5 7 7	220 Infarcts

Tab. III. Increase in % of total urinary estrogens in 24 cases of pathological pregnancies after intraamniotic administration of dehydroepiandrosterone sulphate. The total urinary estrogens were determined daily during the last trimester of gestation.

Newborn									
Case	Disease	Urinary estrogens	Performance of test at week	% Increase	Delivery	Sex	Weight	Apgar score	Placental weight
1 E.T.	Mitral stenosis	Within normal range	34	64.3%	C.S. at term for maternal indication	M	3.740	8 9 10	390
2 V.S.	Pulmonary stenosis	Within normal range	38	44.8%	C.S. at term for cervical dystokia	M	3.100	8 9 10	450
3 S.Q.	Severe anaemia	Within normal range	37	32.1%	Spontaneous at term	M	4.130	8 9 9	630
4 M.V.	Severe anaemia	Within normal range	36	56.4%	C.S. at 38 weeks for fetal distress	F	2.750	7 8 9	400
5 C.N.	Diabetes	Border line	38	86.0%	Spontaneous at term	M	3.000	9 9 10	400
6 L.G.	Diabetes	Within normal range	38	56.4%	C.S. at term for cervical dystokia	F	3.900	9 9 10	500
7 P.L.	Diabetes	Within normal range	36	29.5%	C.S. at 38 weeks for uterine inertia	F	3.180	10 10 10	530

8 M.S.	Intrauterine fetal growth retardation	Border line	37	42.8%	C.S. at 38 weeks for fetal distress	F	2.200	2	5	7	280
9 R.G.	Intrauterine fetal growth retardation	Border line	34	16.4%	C.S. at term for fetal distress	M	2.760	7	8	8	480 Infarcts
10 D.G.	Intrauterine fetal growth retardation	Border line	36	71.1%	C.S. at term for fetal distress	F	3.300	9	10	10	400
11 P.L.	Intrauterine fetal growth retardation	Border line	38	71.0%	Spontaneous at term	M	2.900	9	9	10	420
12. D.T.	Intrauterine fetal growth retardation	Border line	36	57.4%	C.S. at term for fetal distress	M	2.250	6	7	9	400
13 P.G.	R.H. Isoimmunisation	Within normal range	35	42.4%	Spontaneous at 39 weeks (in utero fetal death)	F	3.400				520
14 T.A.	R.H. Isoimmunisation	Within normal range	38	20.6%	C.S. at term for fetal distress	M	3.200	6	7	8	500
15 T.F.	Miomectomy in pregnancy	Within normal range	36	48.4%	C.S. at 37 weeks for maternal indication	M	2.780	7	8	9	400
16 C.A.	Plastic unification of a double uterus before pregnancy	Within normal range	36	45.1%	C.S. at term for maternal indication	M	3.410	8	9	9	540
17 Z.T.	Severe idiopathic jaundice of pregnancy	Within normal range	35	55.0%	C.S. at term for previous C.S.	F	3.150	8	9	10	420
18 S.G.	Severe idiopathic jaundice of pregnancy	Within normal range	32	90.7%	C.S. at 35 weeks for maternal indication	M	2.130	8	9	9	300
19 P.M.	Toxemia	Within normal range	37	36.7%	Spontaneous at term	M	2.650	8	9	10	400
20 D.M.	Toxemia	Within normal range	35	71.5%	Spontaneous at 36 weeks	M	2.450	8	9	9	380
21. L.M.	Chronic hypertension	Within normal range	35	42.0%	Spontaneous at term	F	2.880	9	10	10	520
22 A.A.	Chronic hypertension	Within normal range	36	34.3%	C.S. at 38 weeks for maternal indication	M	3.070	7	8	9	480 Infarcts
23 G.I.	Chronic hypertension	Within normal range	38	29.3%	Spontaneous at term	M	2.280	8	8	9	400 Infarcts
24 B.G.	Chronic hypertension	Within normal range	34	47.9%	C.S. at term for previous C.S.	M	2.870	9	9	10	430 Infarcts

Fig. 3. Two profiles of urinary assays of total estrogens, performed every 4 hrs, in two cases, one normal and one pathological, before and after intraamniotic administration of dehydroepiandrosterone sulphate.

cavity, but in different experimental conditions (at 20th week of gestation, 5 mg of DHEA).

They found that estriol was the most important radioactive C_{18} steroid that rise in the maternal circulation [9].

The high increment of urinary estrogens after DHEA-S administration in the cases illustrated in Tab. IV could be explained by the fact that in these patients the fetus synthesized insufficient quantities of DHEA-S, whereas the placental function was normal.

In many pathological cases (Tab. III) the results demonstrated that the predictive values of the intraamniotic DHEA-S test can improve those

obtained by the simple urinary estrogen assay. These findings agreed with those obtained by LAURITZEN [8], STEMBERA and HERZMANN [13], KELLER [5], VAN DER CRABBE et al. [2], by injecting DHEA-S intravenously to the mother.

In conclusion we consider the intraamniotic DHEA-S test very reliable and maybe more significant than the analogous maternal intravenous DHEA-S test.

It can be used in the case of pregnancies at risk where the urinary estrogen values are questionable, particularly when a pathological pregnancy is suspected, but the urinary estrogens values are within the normal range.

Summary

It is well known that in pregnancy dehydroepiandrosterone-sulphate (DHEAS) (90% synthesized by the fetal adrenals, 10% by the maternal ones) is converted into estrogens mainly in the placenta.

In order to evaluate the steroid metabolizing capacity of the placental enzymatic complex under load conditions,

a test was devised based upon a rapid introduction of 200 mg of DHEAS into the amniotic compartment during the third trimester of gestation.

The purpose of the present investigation was to establish the clinical utility of such a test in comparison with the simple urinary estrogen determination test.

Tab. IV. Increase in % of total urinary estrogens in 5 cases of pathological pregnancies after intraamniotic administration of dehydroepiandrosterone sulphate. The total urinary estrogens were determined daily during the last trimester of gestation.

+ Fetal mongolism
++ Fetal congenital nanism

Case	Disease	Urinary estrogens	Performance of test at week	% Increase	Delivery	Sex	Newborn				Placental weight
							Weight	Apgar score			
1 C.A.	Intrauterine fetal growth retardation	Below normal range	33	100.0%	C.S. at 38 weeks for fetal distress	M	1.700	6 7 8			350
2 M.P.+	Idiopathic jaundice of pregnancy	Below normal range	34	156.9%	C.S. at 37 weeks for fetal distress	M	2.140	2 2 4			320
3 C.G.++	Intrauterine fetal growth retardation	Below normal range	38	135.1%	C.S. at term for fetal distress	F	2.140	8 9 9			400
4 C.P.	Fetal anencephalia	Below normal range	39	220%	Spontaneous at term	M	2.580				400
5 D.G.	Fetal anencephalia	Below normal range	39	291%	Spontaneous at term	M	2.920				450

After DHEAS administration an increment in maternal urinary excretion of total estrogens was obtained: this increment over the 24 hrs following the DHEA-S injection was assessed as the percentage of the mean of the two 24 hrs excretion values before DHEA-S administration.

The test was performed in 45 pregnancies (12 normal, 33 pathological). In all the normal pregnancies an increment of total urinary estrogens in the first 24 hrs urine exceeding 100% was obtained, with an average of $147,6\% \pm 46,6$ S.D. (Fig. 1).

Conventionally, an increment exceeding 100% was considered an indication of normality. In these 12 cases the values of the daily urinary estrogens determinations were within the normal range (Tab. I). In 4 of the cases of pathological pregnancies considered, both daily urinary estrogens excretion and estrogens increment after DHEA-S administration were below the normal range (Tab. II).

In 24 cases the daily urinary estrogens excretion was within the normal range or at border line, but the in-

crement after DHEA-S administration never reached 100% (Tab. III).

The last 5 cases presented low daily urinary estrogens excretion, but a normal increment after DHEA-S administration (Tab. IV).

This group collected cases of fetal pathology, in which the synthesis of DHEA-S by the fetal adrenals was probably insufficient, whereas the placental function was normal.

In conclusion we consider the intraamniotic DHEA-S test very reliable and maybe more significant than the analogous maternal intravenous DHEA-S test, because utilizing the intraamniotic administration it is possible to obtain a higher increment in estrogens synthesised by the placenta and excreted in maternal urines.

It can be used in the case of pregnancies at risk, where the urinary estrogens values are questionable, particularly where there is suspicion of fetal distress, but the urinary estrogens values are within the normal range.

Keywords: Dehydroepiandrosterone sulphate, feto-placental function, injection intraamniotic.

Zusammenfassung

Bestimmung der feto-plazentaren Funktion durch intraamniotische Gabe von Dehydroepiandrosteron-Sulfat

Es ist bekannt, daß Dehydroepiandrosteron-Sulfat (DHEA-S), von dem 90% in der fetalen und 10% in der mütterlichen Nebenniere synthetisiert wird, während der Schwangerschaft hauptsächlich in der Plazenta in Östrogene umgewandelt wird. Um die Fähigkeit des plazentaren Enzymapparates für den Steroidstoffwechsel bei Belastung zu bestimmen, wurde ein Test angewendet, der auf einer raschen Injektion von 200 mg DHEA-S in das Fruchtwasser während des letzten Drittels der Schwangerschaft beruht. Das Ziel der vorliegenden Untersuchung war dabei, die klinische Brauchbarkeit eines solchen Tests im Vergleich mit der herkömmlichen Östrogenbestimmung im Urin aufzuzeigen.

Nach DHEA-S-Injektion wurde ein Anstieg der Gesamtöstrogene im Urin beobachtet. Die Zunahme, die während der nächsten 24 Stunden nach DHEA-S-Gabe erfolgte, ließ sich als prozentualer Anstieg gegenüber dem Mittel von 2 Gesamtöstrogenbestimmungen in den 24 Stunden vor der DHEA-S-Injektion berechnen. Der Test wurde bei 45 Schwangeren durchgeführt (12 normale und 33 pathologische Schwangerschaften). Bei allen normalen Schwangerschaften betrug der Anstieg der Gesamtöstrogene im ersten 24-Stunden-Urin über 100%. Die Zunahme lag im Mittel bei $147,6\%$ mit einer Standardabweichung von $\pm 46,6$ (Fig. 1). Gewöhnlich bedeutet ein Anstieg, der über 100% liegt, daß eine normale Funktion vorhanden ist. Auch die Östrogenausscheidung war bei

diesen 12 Fällen innerhalb der Norm (Tab. I). In 4 Schwangerschaften, die als pathologisch eingestuft waren, lag sowohl die Östrogenausscheidung wie auch der Anstieg nach DHEA-S-Gabe unterhalb der Norm (Tab. II). Bei 24 der untersuchten Fälle zeigte sich, daß die Gesamtöstrogenbestimmung im Urin normale Werte oder Grenzwerte lieferte, die Zunahme nach DHEA-S-Injektion jedoch in keinem Fall 100% erreichte (Tab. III). In den 5 übrigen Schwangerschaften waren die Gesamtöstrogenwerte im Urin niedrig, während aber nach DHEA-S-Gabe ein normaler Anstieg gemessen werden konnte (Tab. IV). Diese Gruppe faßt Fälle zusammen, in denen die DHEA-S-Synthese durch die fetale Nebenniere möglicherweise zu gering war, wohingegen die Plazentafunktion als normal anzusehen ist.

Abschließend kann gesagt werden, daß ein Belastungstest, der auf einer intraamniotischen DHEA-S-Gabe beruht, eine gute und möglicherweise bedeutsamere Aussage liefert als der analoge Test nach intravenöser Applikation von DHEA-S an die Mutter. Nach intraamniotischer Verabreichung kann man einen höheren Anstieg der von der Plazenta synthetisierten und im mütterlichen Urin ausgeschiedenen Östrogene beobachten.

Der Test sollte bei Risikoschwangerschaften eingesetzt werden, in denen unsichere Östrogenwerte im Urin vorliegen und insbesondere in Fällen, wo der Verdacht einer fetalen Gefährdung besteht, die Östrogenausscheidung aber normal ist.

Schlüsselwörter: Dehydroepiandrosteron-Sulfat, Fetoplazentare Einheit, intraamniotische Injektionen.

Résumé

Evaluation de la fonction foeto-placentaire par l'administration intra-amniotique de dehydroepiandrosterone-sulphate

Il est bien connu que, dans la grossesse, le dehydroepiandrosterone-sulphate (DHEAS) (90% synthétisés par les glandes surrénales du fœtus, 10% par celles de la mère) se transforme en oestrogènes principalement dans le placenta.

Afin d'évaluer la capacité métabolisante de stéroïde du complexe enzymatique placentaire sous les conditions de charge, un test a été établi, basé sur une introduction rapide de 200 mg de DHEAS dans le compartiment amniotique pendant le troisième trimestre de gestation.

Le but de l'investigation présente a été d'établir l'utilité clinique d'un tel test en comparaison avec le simple test de détermination d'oestrogène dans l'urine. A la suite de l'administration de DHEA-S, on a obtenu un incrément de l'excrétion urinaire maternelle des oestrogènes totaux: cet incrément des 24 h. consécutives à l'injection de DHEA-S a été évalué comme le pourcentage de la moyenne des deux valeurs d'excrétion de 24 h. avant l'administration de DHEA-S.

Le test a été effectué dans 45 grossesses (12 normales, 33 pathologiques). Dans toutes les grossesses normales, on a obtenu un incrément d'oestrogènes urinaires complets dans les urines des premières 24 h. excédant 100%, avec une moyenne de $147,6\% \pm 46,6$ S.D. (Fig' 1).

On avait convenu qu'un incrément dépassant 100% pouvait être considéré comme normal. Dans ces 12 cas, les valeurs

des déterminations d'oestrogènes dans les urines quotidiennes sont restées dans les limites normales (Tab. I)! Dans 4 des cas de grossesse pathologique, l'excrétion d'oestrogènes des urines quotidiennes et l'incrément d'oestrogènes après administration de DHEA-S ont été inférieurs à la normale (Tab. II).

Dans 24 cas, l'excrétion d'oestrogènes des urines quotidiennes a été normale ou à la limite des normes, mais l'incrément après administration de DHEA-S n'a jamais atteint 100% (Tab. III).

Les 5 derniers cas ont présenté une excrétion basse d'oestrogènes des urines quotidiennes, mais un incrément normal après administration de DHEA-S (Tab. IV).

Ce groupe a rassemblé des cas de pathologie foetale où la synthèse de DHEA-S par les glandes surrénales du fœtus a été probablement insuffisante, tandis que la fonction placentaire était normale.

En conclusion, nous considérons que le test de DHEA-S intraamniotique présente un degré d'infailibilité très élevé et peut être plus significatif que le test de DHEA-S intra-veineux maternel analogue parce qu'ayant recours à l'administration intra-amniotique, on peut obtenir un incrément plus élevé d'oestrogènes synthétisés par le placenta et excrétés dans les urines maternelles.

Le test peut être utilisé dans les cas de grossesses à risque où les valeurs d'oestrogènes de l'urine restent contestables, particulièrement quand on suspecte un distress foetal, bien que les valeurs d'oestrogènes de l'urine se situent dans les limites normales.

Mots-clés: dehydroepiandrosterone-sulphate, fonction foetoplacentaire, intra-amniotique.

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