BETAMETHASONE ADMINISTRATION TO THE MOTHER AND PROBLEMS IN FOETO-PLACENTAL MONITORING

M. RONDINELLI, M. BERTASI, C. CAPOTI, L. DI LENARDO, M. ENRICHI

Department of Obstetrics and Gynecology, University of Padua (Italy)

SUMMARY

The administration of betamethasone to the mother in order to accelerate maturation of foetal lungs induces significant modifications in the foeto-placental hormonal secretion. Both the total estriol and unconjugated estriol present a sharp fall in the days immediately following the administration and a rise 10-12 days later, depending on a rebound effect. The HPL levels do not variate except for a progressive and constant rising due probably to better cardiocirculatory maternal condition with, consequently, a higher utero-placental blood-flow. All these phenomena increase when the administration of betametasone to the mother is repeated more then once. The AA. believe that the sharp fall of the estriol doesn't represent a danger for the foetus being only an effect of maternal and fetal adrenal depression. Consequently the AA. suggest to drive the management during and after the administration of betametasone to the mother on the basis of other foeto-placental functional tests, as cardiotocography. The results were analysed.

In the last decade many traeatments were suggested for preventing the Respiratory Distress Syndrome (R.D.S.) and consequently for improving the perinatal outcome. In 1972 Liggins and Howie ([21]) proposed to administrate glucocorticoids to the mother, 48-72 hours before the delivery, for accelerating the foetal biosynthesis of surfactant. The clinical use of this treatment in the high risk pregnancies showed a frequent decrease of the estriol level, probably due to a maternal and foetal adrenal despression ([18, 19, 29, 30]).

The aim of this study is to explain the effects of the betamethasone administration to the mother on the foeto-placental hormonal production.

MATERIAL AND METHODS

173 high risk pregnant women with gestational age between the 27th and 36th week were treated according to the Liggins and Howie's schedule.

Before the treatment, the immaturity of foetal lungs was verified by the Clements's test and/or L/S ratio. 4-5 days after the betamethasone administration these tests were repeated for evaluating the achieved pulmonary maturity of the foetus. If the test resulted negative too, the treatment was repeated after two weeks from the first-one.

Our serie is formed by 154 patients with a single drug administration; by 13 patients with two treatments and by remaining 6 that required three treatments.

In all cases the foeto-placental monitoring was carried out by 3 times a week-RIA of total estriol, unconjugated estriol, HPL; by daily NST and by weekly ultrasound measurements of the foetal parameters for evaluating the intrauterine growth rate.

For standardization, we expressed the values of single tests per cent in comparison with the mean values noticed before the treatment in each patient.

Results were statistically analysed.

RESULTS AND COMMENT

The per cent variations of the total estriol plasmatic levels are reported in fig. 1.

A significant decrease was manifest in 2 or 6 days after the administration of

Clin. Exp. Obst. Gyn. - ISSN: 0390-6663
VIII, n. 4, 1981

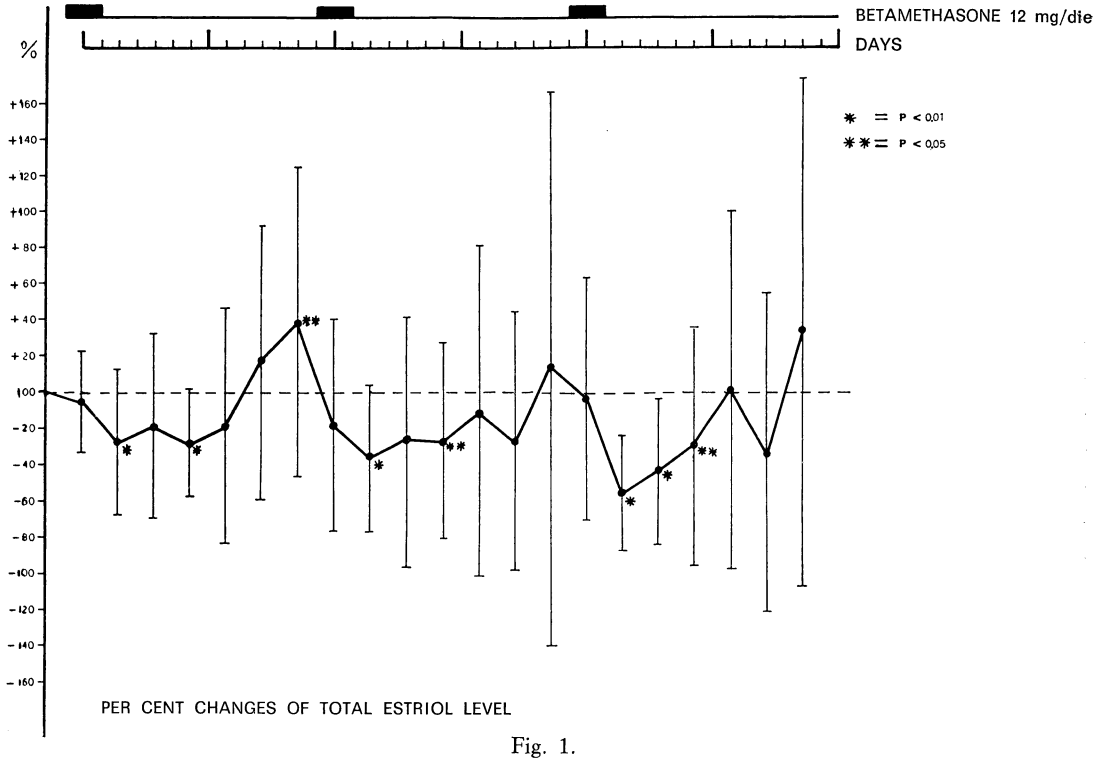

Fig. 1.

betamethasone to the mother. This decrease was more marked when the drug administration was repeated. Likewise, a significant increase of the total estriol plasmatic levels was noticed 12 days after the first treatment.

The maternal and foetal adrenal depression suggested by other Authors ([18, 19, 29, 30]) was confirmed by our results and a significant rebound effect was noticed only after the first treatment.

A similar trend was seen for the unconjugated estriol plasmatic levels (fig. 2). This phenomenon confirmes that also the foetal adrenals were depressed by the betamethasone administration to the mother.

A different trend was noticed for the HPL plasmatic levels (fig. 3).

Indeed, after the first betamethasone administration to the mother, the HPL plasmatic level was progressively going to a significant increase.

All these results demonstrate that the betamethasone administration to the mother doesn't depress the hormonal production of the placenta but, contrarywise it increases the placental hormonal biosynthesis by a probable improvement of utero-placental blood-flow.

The noticed decreases of total and unconjugated estriol should spring from a drop of precursors.

In this our serie, the effectivenes of the betamethasone administration to the mother for accelerating the foetal biosynthesis of surfactant was confirmed by the neonatal respiratory conditions.

During the betamethasone administration it would be better to perform the monitoring of the foetal conditions by not-hormonal tests but by electronic methods like NST and ultrasounds.

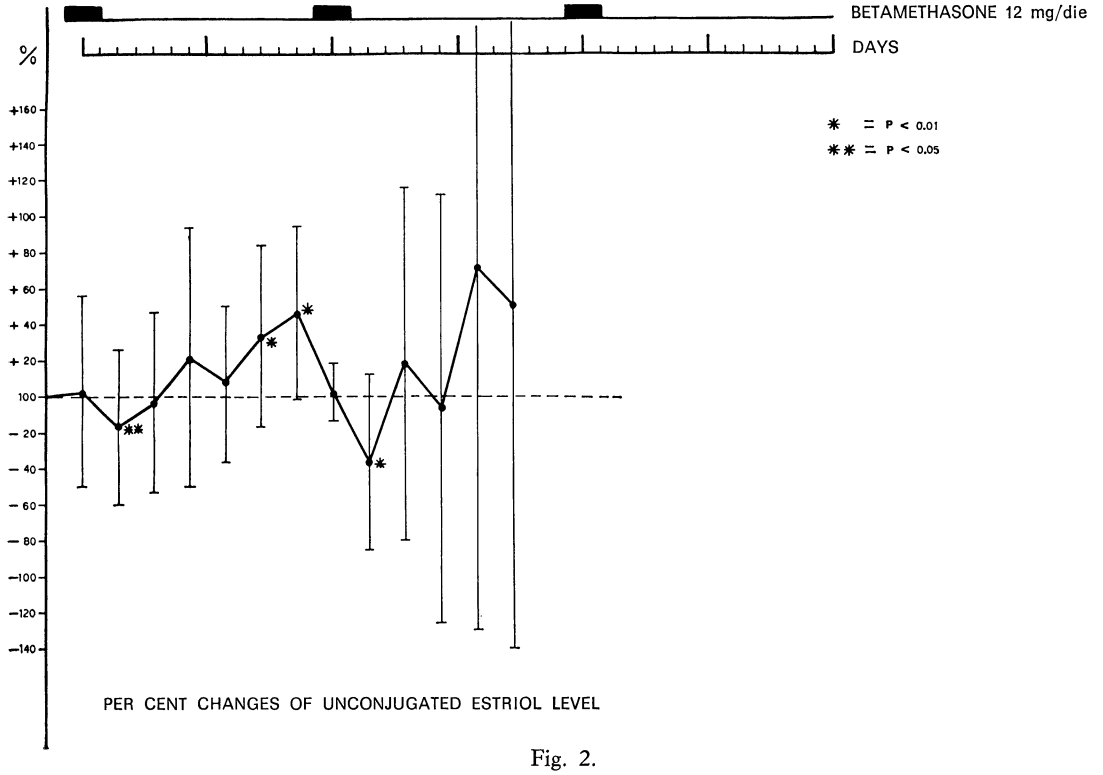
BETAMETHASONE 12 mg/die
DAYS
%
* = P < 0.01
** = P < 0.05
+160
+140
+120
+100
+ 80
+ 60
+ 40
+ 20
100
– 20
– 40
– 60
– 80
–100
–120
–140
PER CENT CHANGES OF UNCONJUGATED ESTRIOL LEVEL

Fig. 2.

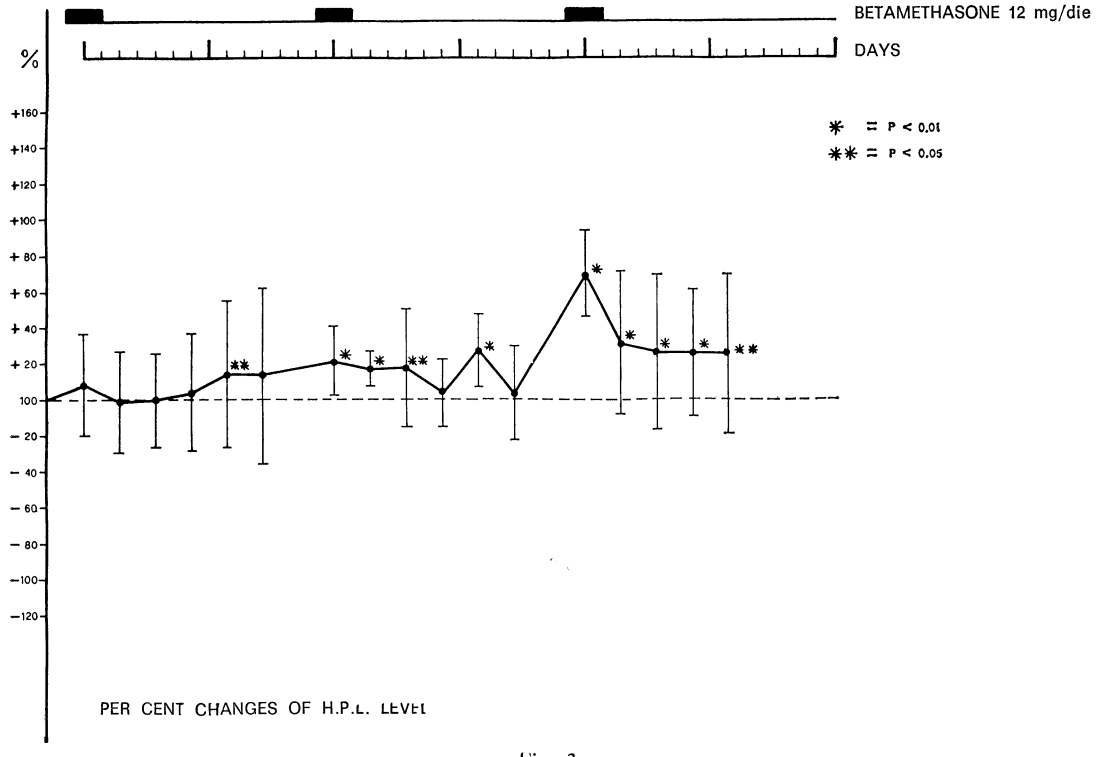
BETAMETHASONE 12 mg/die
DAYS
%
* = P < 0,01
** = P < 0,05
+160
+140
+120
+100
+ 80
+ 60
+ 40
+ 20
100
– 20
– 40
– 60
– 80
–100
–120
PER CENT CHANGES OF H.P.L. LEVEL

Fig. 3

BIBLIOGRAPHY

1) Abbou S., Morin P., Engelmann P.H.: *Rev. Fr. Gyn.Obst., 74*, 11, 1979.
2) Adamczewska K., Sawa H., Makasewicz J., Skublicki S.: *Ginekol. Pol., 49*, 731, 1978.
3) Boyle R. Y., Ov W.: *Clin. Perinatol., 5*, 283, 1978.
4) Brown E. R., Torday J. S., Taeusch H. W. Jr.: *Clin. Perinatol., 5*, 243, 1978.
5) Caspi E., Schreyer P., Weinraub Z., Reif R., Levi I., Mundel G.: *Brit. J. Obst. Gyn., 83*, 187, 1976.
6) Cuestas R. A., Lindall A., Engel R. R.: *N. Engl. J. Med., 295*, 297, 1976.
7) Depp R., Boehm J. J., Nosek J. A.: *Am. J. Obst. Gyn., 137*, 338, 1980.
8) Dluholucky S., Babic J., Taufer I.: *Brit. J. Obst. Gyn., 83*, 187, 1976.
9) Ekelund L., Arvidson G., Astedt B.: *Scand. J. Clin. Lab. Invest., 35*, 419, 1975.
10) Ekelund L., Arvidson G., Kullander S., Astedt B.: *Scand. J. Clin. Lab. Invest., 36*, 257, 1976.
11) Garcia Cazares S. J., Contestabile Del Mistro A., Espinosa de los Monteros A.: *Gin. Obst. Mex., 276*, 299, 1979.
12) Gonnet J. M., Clapies J., Marrot F.: *Bordeaux Med.*, II, 2123, 1978.
13) Hauth J. C., Parker C. R. Jr., Mac Donald P. C., Porter J. C., Johnston J. M.: *Obst. Gyn., 51*, 81, 1978.
14) Heetai R., Roopnarinesingh S.: *West Indian Med. J., 28*, 24, 1979.
15) Hollingsworth D. R., Belin R. P., Parker J. C. Jr., Moser R. J., Mac Kean H.: *Johns. Hopkins Med. J., 137*, 116, 1975.
16) Johnson J. W. C., Mitzner W., London W. T., Palmer A. E., Scott R., Kearney K.: *Am. J. Obst. Gyn., 130*, 905, 1978.
17) Karchmer S., Pinsker V. S.: *Gin. Obst. Mex., 44*, 223, 1978.
18) Kauppila A., Jouppila P., Karvonen P.: *Int. J. Gyn. Obst., 14*, 177, 1976.
19) Knoll V. E., Kayser A., Wisser H.: *J. Clin. Chem. Clin. Biochem., 16*, 621, 1978.
20) Levitz M., Jansen V., Dancis J.: *Am. J. Obst. Gyn., 132*, 363, 1978.
21) Liggins G. C., Howie R. N.: *Pediat., 50*, 515, 1972.
22) Mashiach S., Barkai G., Sack J., Stern E., Goldman B., Brish M., Serr D. M.: *Am. J. Obst. Gyn., 130*, 289, 1978.
23) Meriggi E., Parenti M. R.: *Minerva Gin., 32*, 175, 1980.
24) Meriggi E., Parenti M. R., San Lorenzo F.: *Minerva Gyn., 32*, 187, 1980.
25) Morrison J. C., Whibrew W. D., Bucovaz E. T., Schneider J. M.: *Am. J. Obst. Gyn., 131*, 358, 1978.
26) Morrison J. C., Whibrew W. D., Bucovaz E. T.: *Obst. Gyn., 52*, 410, 1978.
27) Pardi G., Bottino S., Como M. L., Colombo F., Vegni C., Marini A.: *Ann. Ost. Ginec. Med. Perinat., 99*, 95, 1978.
28) Pasetto M., Spitali R., Calugi A., Maturi M. R.: *Patol. Clin. Ostet. Ginecol., 7*, 78, 1979.
29) Pearson Murphy B. C.: *Am. J. Obstet. Gyn., 119*, 1112, 1974.
30) Reinisch J. M., Simon N. G., Karow W. G., Gandelman R.: *Science, 4366*, 436, 1978.
31) Renovanz H. D., Von Seefeld H.: *Prax. Klin. Pneumol., 32*, 443, 1978.
32) Schutte M. F., Treffers P. E., Koppe J. G.: *Ned. Tijdschr. Geneskd., 123*, 420, 1979.
33) Thornfeldt R. E., Franklin R. W., Pickering N. A., Thornfeldt C. R., Amell G.: *Am. J. Obst. Gyn., 131*, 143, 1978.
34) Vidyasagar D., Bhat R.: *Obst. Gyn. An., 6*, 223, 1977.
35) Weichsel M. E. Jr.: *Ann. Neur., 5*, 364, 1977.
36) Whitt G. G., Buster J. E., Killam A. P., Scragg W. H.: *Am. J. Obst. Gyn., 124*, 479, 1976.