BETA-ENDORPHIN LEVELS AND GENERAL ANAESTHESIA FOR CAESAREAN SECTION

Preliminary report

F. L. GIORGINO (*), M. MEGA (*), A. AGNELLO (*), E. VINCENTI (**)

(*) Obstetric and Gynaecologic Clinic

(**) Institute of Anaesthesiology and Resuscitation
University of Padua (Italy)

SUMMARY

Plasma beta-endorphin levels were studied before induction of general anaesthesia for caesarean section and during some phases of surgery.

A very high increase of beta-endorphin occurred following induction of anaesthesia. However fifteen minutes after fetal extraction a tendency of the beta-endorphin levels to decrease was noted. Some medical treatment, such as antiasthmatic medication with glucocorrticoids and beta-mimetic treatment for controlling uterine hyperactivity, seemed to interfere with pituitary response.

INTRODUCTION

Many reports have been carried out in the last years on the beta-endorphin levels in various obstetrical conditions ([1,2,3,4,5,6]). However the correlations between analgesia/anaesthesia and beta-endorphin response in obstetric surgery has not yet been well investigated ([7,8]). Therefore we believe that it is very interesting to study the beta-endorphin levels of normal parturients undergoing caesarean section at different surgical times.

MATERIAL AND METHODS

Eight patients (mean age 27 ± 2.6 years) were submitted to elective caesarean section for obstetrical causes such as uterine inertia, cephalopelvic disproportion or iterative section.

Two of them were treated with medical regimen: the first one was infused with $beta_2$-mimetic drug in order to control uterine hyperactivity; the second one was treated with non steroidal antiasthmatic drug and with synthetic steroids.

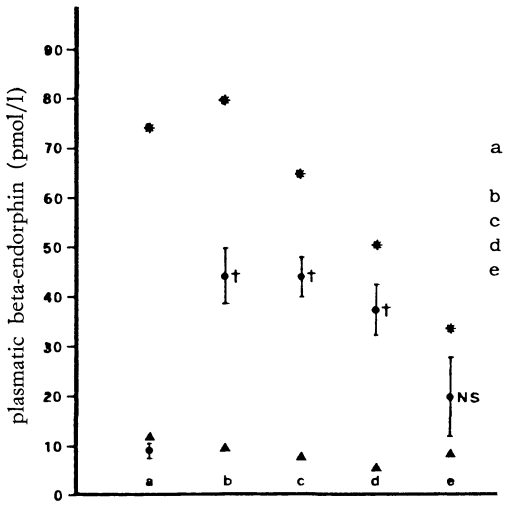
General anaesthesia was induced with thiopental (5 mg/kg), succinylcholine (1.5 mg/kg), N_2O (66%) and pancuronium (0.08 mg/kg) and it was completed with fentanyl (5 mcg/kg) and dehydrobenzperidol (0.2 mg/kg) following fetal extraction. Uterotonic drugs such as synthetic oxytocine or ergometrine were administered afterwards according to clinical needs.

Maternal blood samples were collected before anaesthesia, just after induction, at delivery, 15 minutes after delivery and finally 24 hours later. Umbilical cord samples were taken at fetal extraction. The glass tubes containing EDTA were centrifugated for 15 minutes at 3×10^3 rpm. The plasma was stored at -20 °C and assayed within four weeks. Human beta-endorphin was measured as previously described ([1]).

RESULTS AND DISCUSSION

Fig. 1 shows beta-endorphin levels of the not medically treated patients (control group) undergoing caesarean section in comparison with other two patients submitted to medical treatment before surgery.

A very high increase of beta-endorphin was noticed following the induction to general anaesthesia performed with thio-



a = before induction of anaesthesia
b = induction of anaesthesia
c = delivery
d = 15 min after delivery
e = 24 hours after delivery

● Patients without medical treatment (6 cases)
▲ Patient treated with synthetic steroids
❊ Patient treated with beta-mimetics

† = $p < 0.01$

Fig. 1. — Maternal beta-endorphin levels during elective caesarean section.

pental, succinylcholine and nitrous oxide. However a slight decrease of beta-endorphin levels occurred fifteen minutes after the administration of fentanyl-dehydrobenzperidol.

Finally beta-endorphin levels observed 24 hours after surgery were not significantly different from basal values.

It is interesting to note that the parturient affected with asthmatic disease and treated with synthetic steroids (betamethasone 2 mg/day) did not show variations during surgical times. It is very easy to think that chronic corticosteroids administration may have blocked the pituitary response to surgical stress.

The other parturient treated with beta$_2$-mimetic drugs for controlling uterine hyperactivity showed very high basal values. The subsequent beta-endorphin levels were always higher than control group.

We have no element for sustaining the hypothesis that a medical treatment with beta-mimetics may be related to the pituitary response through an activation of the pathways involved in stress.

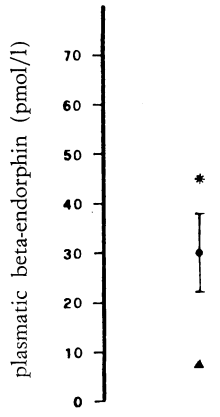
Fig. 2 shows the data of plasmatic umbilical cord values of beta-endorphin. It seems that a connection exists between maternal and fetal beta-endorphin levels.

In conclusion, we may affirm that:

a) the current induction of the general anaesthesia in caesarean section is not protective for a very good control of the surgical stress;

b) chronic administration of glucocorticoids is able to block the increase of beta-endorphin normally observed during the induction of anaesthesia;

c) the use of beta-mimetic drugs may be related to very high levels of beta-endorphin;



● Newborns delivered by mothers of the control group
▲ Newborn delivered by mother submitted to medical treatment with steroids before surgery
❊ Newborn delivered by mother submitted to medical treatment with beta-mimetics before surgery

Fig. 2. — Neonatal beta-endorphin levels (Mothers submitted to elective caesarean section).

d) finally, beta-endorphin, levels in umbilical cord seem to be similar to the maternal ones.

BIBLIOGRAPHY

1) Mega M., Giorgino F. L., Tambuscio G., Bonivento A.: *Clin. Exp. Obst. Gyn., 8,* 151, 1981.

2) Genazzani A. R., Facchinetti F., Petraglia F., Monittola C., D'Ambrogio G., Santucci S., Nasi A., Angioni G., Pulighedu P., Facchini V., Bagnoli F.: *Beta-endorfina e capacità gestazionale.* In: *In tema di capacità gestazionale,* Monduzzi, Bologna, 67, 1982.

3) Giorgino F. L., Bonivento A., Siliotti F., Casagrande L., Mega M.: *Atti XXXV Congresso SIAARTI,* Giron G.P. & Vincenti E. (eds.), Padova, vol. II, 547, 1983.

4) Mega M., Vincenti E., Bonivento A., Giorgino F. L., Dal Mutto V.: *Analgesia epidurale con oppiacei in travaglio di parto e beta-endorfinemia.* VII Riunione Gruppo Studio Medicina Fetale, Monduzzi, Bologna, 503, 1983.

5) Kubista E., Huber J., Knogler W., Grunberger W., Philipp K.: *Geburtsh. u. Frauenheilk., 44,* 322, 1984.

6) Petraglia F., Facchinetti F., Sordelli S., Parrini D., Hayeck G., De Leo V., Bagnoli F., Genazzani A. R.: *Livelli plasmatici di beta-endorfina in vari tipi di travaglio di parto.* In: *Riproduzione umana in un mondo che cambia.* LXI Congresso SIGO, Medicon, Milano, vol. I, 48, 1982.

7) Abboud T., Noueihed R., Khoo S., Hoffman D., Varakian L., Henriksen E., Goebelsmann U.: *Am. J. Obst. Gyn., 146,* 927, 1983.

8) Dubois M., Pickar D., Cohen M., Gadde P., McNamara T. E., Bunney W.: *Anesthesiology, 57,* 468, 1982.