COMPARATIVE STUDY BETWEEN PATIENTS TREATED WITH TRANSCUTANEOUS ELECTRIC STIMULATION AND CONTROLS DURING LABOUR

E. VINCENTI (*), A. CERVELLIN (**),
M. MEGA (**), B. TAMBUSCIO (*),
D. DE SALVIA (**), A. GRAZIOTTIN (**),
B. CASTAGNOLI (**), B. MOZZANEGA (**),
D. MARCHESONI (**)

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

SUMMARY

Hourly variations of pain intensity in labour were evaluated in patients treated with transcutaneous electric stimulation (TES) and controls all sharing the same characteristics.

The differences between the two groups were found to be highly significant. Particularly, our study pointed out that the efficacy of TES relatively increases as labour progresses.

Transcutaneous electric stimulation (TES) was first employed by Augustinsson and Coll. ([1]) in 1977: they used in labour an original apparatus "ad hoc" projected.

In the same year the School of Padua began to make use of TES ([2, 3]) with the purpose of studying, besides its application possibilities, the endogenous factors (cultural, social, psychological) which could influence the antalgic efficacy of the new technique ([4]).

All these factors were considered, to have a more homogeneous composition of the two groups we studied.

The aim of this work was, in fact, to further inquire and more deeply analyse the quantitative aspects of TES-induced pain relief, in comparison with controls.

MATERIAL AND METHODS

TES was applied by the use of a Travisens TNS stimulator as previously described ([2, 3, 4]).

The clinical search was carried out on 49 healthy patients in labour: 35 were TES-treated, 14 served as controls (tab. 1).

After the membrane rupture every patient was infused with synthetic oxytocin at a mean rate of about 5 mU/min and monitorized by cardiotocography.

Table 1. — *Cases and general data.*

	TES (35 cases)	Control (14 cases)
Primiparae (case no.)	24 (69%)	9 (64%)
Multiparae (case no.)	11 (31%)	5 (36%)
Age (years ±SD)	26.3±5.2	27.4±5.6
Weight (kg ±SD)	69.4±7.2	69.0±6.4
Labour Ist stage lenght (min ±SD):		
Primiparae	402±140	392±119
Multiparae	250± 77	264±154
Scholarship (case no.):		
High	28 (80%)	10 (71.5%)
Low	7 (20%)	4 (28.5%)
Attendance to courses of psychoprophylaxis (case no.)	8 (23%)	2 (14%)
Desired pregnancy (case no.)	30 (86%)	10 (71%)

Table 2. — *Pain intensity evaluation reported by TES-treated and control patients, hourly in labour and at delivery.*

	Hour of labour	1st	2nd	3rd	4th	5th	6th	7th	delivery
TES	Average pain	1.66	2.20	2.27	2.38	2.45	2.90	3.00	4.10
	Pain SD	1.00	0.61	1.01	0.84	0.68	0.99	0.00	0.07
	Case number	35	35	30	28	21	10	5	35
Control	Average pain	3.28	4.07	4.75	5.50	5.85	7.00	7.75	8.14
	Pain SD	1.85	1.89	2.30	1.95	1.77	0.00	0.49	1.09
	Case number	14	14	12	10	7	5	4	14
	Student's t	3.10	3.63	3.60	4.89	4.96	13.09	19.38	13.84
	p	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Starting from a cervical dilatation of about 3 cm, each patient was invited to hourly express an evaluation of the pain perceived during contractions, basing on a conventional 9 point-scale (from 1 to 3: light pain; from 4 to 6: moderate pain; from 7 to 9: severe pain) ([2]).

A complete questionnaire of personal and obstetric data was compiled ([4]), also to verify the homogeneous composition of the two groups of patients.

RESULTS

Table 2 shows the data on pain intensity reported by TES-treated and control patients during the 1st and 2nd stage of labour; the same data are graphically expressed in fig. 1.

All the differences we found are statistically significant and show that TES-

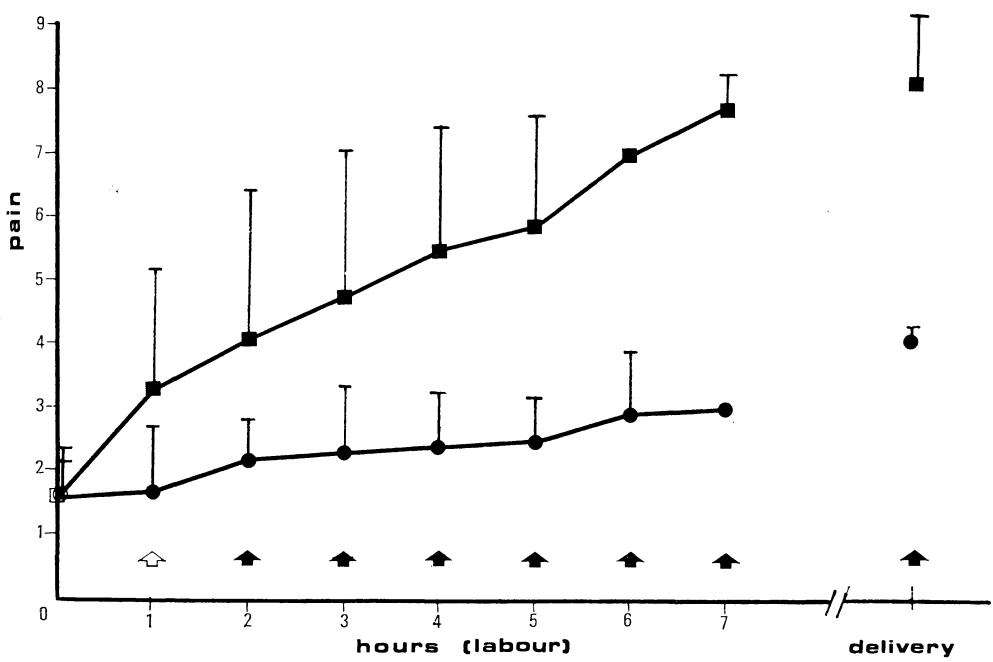

Fig. 1: — Pain intensity reported by TES-treated (●) and control (■) patients during labour. ⇧ $p < 0.01$; (▲): $p < 0.001$.

efficacy increases in time as labour progresses when treated subjects are compared to controls; in fact, while the inferior curve (TES-treated patients) follows an almost horizontal line indicating that pain intensity is practically unchanged during the whole labour, the superior curve (control patients) steadily rises to higher levels of pain intensity.

It is important to say that, during TES treatment, the residual pain only derives from the sub-umbilical abdominal region, as painful stimulations from the lumbar region are quite abolished.

This treatment, at last, was found once more to be absolutely harmless for the fetus/newborn ([1, 2, 3]).

DISCUSSION

Current psychoanalytic trends ([5]) laid stress on the enormous importance of the woman's conscious participation in her own labour, both in view of the future development of her personality, and for a positive beginning of the relation between mother and child. The very need of satisfying these exigences, without forgetting anyway the importance of lessening the well-known peripheral sensorial components of pain, enhances the actual interest for the methods of peripheral obstetric analgesia.

In fact, as they lower the sensorial component of pain, they prevent the priming of the vicious circle pain-fear-pain ([6]). Moreover, as they don't compromise consciousness and let the patient have an active role in her own labour and fully collaborate in its 2nd stage, they allow the mobilization of psychical-growth forces and the immediate positive beginning of the relation between mother and child, which finds in the delivery its starting-point ([7]).

After the preliminary attempts to better define its application possibilities and limits, TES carried out during labour and delivery finds nowadays a more accepted role among the techniques of analgesia in Obstetrics.

Even if its efficacy cannot be compared to the one of more reliable methods ([8]), the good degree of pain relief (hypoalgesia) ([1, 2, 3, 4, 9, 10]), confirmed and better explained by our results, together with the lack of maternal and fetal risk of any kind ([1, 2, 3, 4, 9, 10, 11]) suggest this method to be mainly applied when anaesthetists who can perform a correct continuous epidural anaesthesia are not available ([12]).

We think, in fact, that the easy applicability of this method is the main requisite to promote a wider diffusion of it to centres where pain is not yet duly considered.

BIBLIOGRAPHY

1) Augustinsson L. E., Bohlin P., Bundsen P., Carlsson L. A., Forssman L., Sjoberg P., Tyreman N. O.: *Pain*, *4*, 59, 1978.
2) Vincenti E., Tambuscio B., Giusti F., Giron G. P., Grella P., Mega M., Marchetti M., Onnis A.: *Clin. Exp. Obst. Gyn.*, *4*, 31, 1977.
3) Vincenti E., Tambuscio B., Giusti F., Giron G. P., Grella P., Mega M., Marchetti M., Onnis A.: *Atti 58° Congr. Naz. Soc. Ital. Ost. Gin.*, Taormina-Catania, 22-25 Ott. 1977, p. 439.
4) Vincenti E., Graziottin A., Giusti F., Giron G. P.: *Dolore*, *2*, 49, 1980.
5) Deutsch H.: "Psicologia della donna", vol. 3, Universale Scientifica Boringhieri, Torino, 1977.
6) Read G. D.: "Childbirth without fear". Harper, New York, N. Y., 1944.
7) Graziottin A., Vincenti E., Tambuscio B.: *Atti 8° Congr. Naz. Soc. Ital. Med. Psicosom.*, Venezia, 21-24 Maggio 1981, vol. 1, pp. 436-443.
8) Giron G. P.: "Il blocco peridurale continuo in travaglio di parto". SEMES Ed., Padova, 1981, p. 5.
9) Gitsch E., Kubista E., Kucera H.: *Clin. Exp. Obst. Gyn.*, *6* (suppl. 2), 3, 1979.
10) Marsiletti G. C., De Negri G., Calderale L., Spinelli A., Vendramin M. L., Zanini F.: *Clin. Exp. Obst. Gyn.*, *6* (suppl. 2), 25, 1979.
11) Grella P., Moschino A.: *Clin. Exp. Obst. Gyn.*, *6* (suppl. 2), 1979.
12) Bonica J. J.: "Obstetric analgesia and anaesthesia, 2nd ed., World Federation of Societies of Anaesthesiologists, Amsterdam, 1980, p. 74.