I.V. CLONIDINE FOR POST-EXTRADURAL SHIVERING IN PARTURIENTS: A PRELIMINARY STUDY

G. CAPOGNA AND D. CELLENO

SUMMARY
We have studied the efficacy of i.v. clonidine to suppress post-extradural shivering in parturients. Forty healthy parturients who received extradural block for labour (n = 20) or for Caesarean section (n = 20) and who required treatment for shivering after delivery were allocated randomly to two groups. Group I received i.v. clonidine 30 μg diluted in saline to a total volume of 5 ml (therapeutic solution). This bolus was repeated every 5 min if the initial therapy produced no improvement, up to a maximum dose of 90 μg. Group II received saline 5 ml (placebo solution), repeated every 5 min if the initial bolus produced no improvement, up to a maximum of three boluses. After 15 min of observation, patients in group I received the placebo solution and those in group II received the study solution. All patients who received clonidine improved, and 75% ceased to shiver within 5 min after only one dose of clonidine 30 μg. In contrast, none of the patients treated with saline improved. When patients in the placebo group received clonidine, improvement occurred. Arterial pressure, heart rate, core and peripheral temperature and oxygen saturation did not differ significantly between and within the groups before and after administration of clonidine. We conclude that a small dose of i.v. clonidine may be useful to suppress post-extradural shivering in parturients. (Br. J. Anaesth. 1993; 71: 294-295)

KEY WORDS

METHODS AND RESULTS
After Ethics Committee approval, informed consent was obtained from healthy parturients who received extradural block for labour or Caesarean section. Only patients who required therapy for post-extradural shivering after delivery were included in the study. All the patients had shivering accompanied by subjective sensations of cold and discomfort.

Patients who delivered spontaneously (n = 20) received extradural analgesia with 0.125% bupivacaine and 1:800000 adrenaline. Those who delivered by Caesarean section (n = 20) received extradural anaesthesia with an alkalinized solution of 2% lignocaine with 1:200000 adrenaline. In all patients, extradural block was well established and hypotension, if it occurred, was controlled with an i.v. infusion of ephedrine.

Local anaesthetic solutions and i.v. fluids were stored and administered at room temperature; the ambient temperature was 20.3 °C.

Patients were allocated randomly to two treatment groups. Group I received i.v. clonidine 30 μg diluted in saline to a total volume of 5 ml (therapeutic solution). This bolus was repeated every 5 min if the initial therapy produced no improvement, up to a maximum dose of 90 μg. Group II received saline 5 ml (placebo solution), repeated every 5 min if the initial bolus produced no improvement, up to a maximum of three boluses. After 15 min of observation, patients in group I received the placebo solution and patients in group II received the study solution.

Only complete inhibition of shivering was considered to be an adequate response to the therapy. Both the patients and the anaesthetist who gave the i.v. solutions and evaluated the patient’s response were unaware of the contents of the syringe.

Heart rate (HR) and pulse oximetry were displayed continuously and arterial pressure (AP) was recorded every 2 min using an automatic device (Cardiocup II, Datex, UK) for 30 min and at 5-min intervals for additional 30 min after completion of the study. Tympanic membrane (core) and oral temperatures were measured with thermocouples having a rapid response and an accuracy range of ±0.1 °C (Mon-A-Therm, Inc., St Louis, MO).

Hypotension was defined as a 20% reduction in arterial pressure in relation to baseline or a systolic pressure less than 100 mm Hg.

Chi-square analysis was performed for frequency
CLONIDINE FOR POST-EXTRADURAL SHIVERING IN PARTURIENTS

Fig. 1. Number of patients with shivering before (time 0) and after the administration of the study solutions. Patients received i.v. clonidine 30 μg or saline. If after this initial bolus shivering was not suppressed, the therapy (clonidine or saline) was repeated every 5 min to a maximum of three boluses. After 15 min, patients who received clonidine were given saline and vice versa with the same procedure. Group I = Clonidine/saline (● = Cesarean section; □ = vaginal delivery). Group II = Saline/clonidine (● = Cesarean section; □ = vaginal delivery).

All the patients were normotensive and complained of shivering and discomfort requiring therapy before administration of the study solutions. The administration of clonidine inhibited shivering after 15 min in all patients, and in 75% of them, shivering ceased within 5 min after only one dose of clonidine 30 μg. In contrast, none of the patients treated with saline improved. When patients in the placebo group received clonidine there was an improvement (fig. 1).

In the group of patients who received saline before clonidine, there was a non-significant trend towards a greater total dose of clonidine necessary to suppress shivering.

There were no significant changes in AP, HR, core and peripheral temperature and oxygen saturation during the study between and within the groups before and after administration of clonidine. None of the patients receiving a single bolus of clonidine 30 μg had hypotension. One patient who received a total dose of clonidine 90 μg had moderate hypotension which responded to i.v. fluids. This patient belonged to the Cesarean section group and had, at the time of hypotension, a sensory level of analgesia above T2.

COMMENT

Clonidine is an α₂-adrenoceptor agonist used as an antihypertensive drug. It possesses potent spinal and central antinociceptive properties. Clonidine has many effects on the central nervous system, including a reduction in body temperature.

Other workers observed a reduction in the number of episodes of postoperative shivering after continuous infusion of clonidine 7 μg kg⁻¹ over 120 min in patients undergoing aortic surgery [3]. The intraoperative administration of a continuous infusion of clonidine 5 μg kg⁻¹ over 3 h reduced oxygen uptake and the intensity of mean muscular tremor after major abdominal surgery [4]. A single bolus of clonidine 150 μg i.v. inhibits postoperative shivering after general or extradural anaesthesia in 90–95% of patients [1, 2]. Unfortunately, the administration of such a large dose may be associated with a significant decrease in mean arterial pressure [1, 2].

In our study, in the majority of patients we gave only 30 μg of clonidine and this dose was sufficient to suppress shivering without any haemodynamic change. The mechanism of action of such a rapid suppression of shivering after i.v. administration of a small dose of clonidine is not known.

Experimentally, hypothalamic thermoregulatory effects have been demonstrated for noradrenergic agonists such as clonidine [5]. Clonidine may exert an inhibitory action on the hypothalamus by decreasing noradrenaline synaptic release through α2 receptors located at presynaptic axon terminals [6].

Our preliminary findings suggest that low-dose i.v. clonidine may be useful in abolishing severe post-extradural shivering in parturients. Larger studies are needed to evaluate the benefits of this method.

REFERENCES