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Tramadol via oral administration and superselective spinal anaesthesia in 'one-day surgery'

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Abstract

The analgesic efficacy and tolerance of tramadol, particularly via oral administration, were evaluated in 180 patients (age range 18–69 years), undergoing ambulatory surgery and superselective spinal anaesthesia. The patients were divided into three groups (A, B and C). 40 drops of tramadol were administered to the subjects of group A 30 min before surgery; the same dose was administered to the patients of group B after surgery; no supplementary analgesia was administered to the group C. Intraoperatively, the respiratory and cardiovascular parameters were monitored in each group. Intraoperatively and postoperatively the degree of analgesia was evaluated by using a visual analogue score (VAS) and a four step verbal scale (FSVS). The results showed a significantly superior and prolonged analgesic effect in the groups treated with tramadol, particularly if it was administered before surgery. Furthermore an excellent profile of drug tolerance with no significant side effects, especially respiratory depression, were observed. © 1997 Elsevier Science Ireland Ltd.

1. Introduction

The well known additive analgesia, obtained from the combination of local anaesthetics with opioids, is often used to alleviate intra- and postoperative pain via epidural or intrathecal instillation but its effectiveness should not be overly exploited in ambulatory surgery.

The use of local anaesthetics in superselective spinal anaesthesia is suitable to 'one day surgery' but the simultaneous use of opioids may result in dangerous disadvantages,including, especially, respiratory depression.

This study was designed to assess the analgesic efficacy, safety and duration of action of tramadol, a new synthetic opioid, which, considering its potency, has comparatively few of the disadvantages associated with other opiates.

Its antinociceptive potency and profile may derive from its combined opioid binding activity and inhibition of monoamine uptake. The antinociceptive activity of tramadol is mediated by a double mechanism:

1. It is a weak agonist for all types of opioid receptors with higher selectivity for $^{\mu}$-receptors.
2. It causes inhibition of neuronal noradrenaline uptake and serotonin release; these are transmitters in descending inhibitory pathways which enhance analgesia.

As reported in literature, it is suggested that the analgesic activity and clinical attributes of tramadol are a consequence of non-opioid as well as opioid mechanisms [1]. Each component independently contributes to the overall analgesic activity and thus, in concert, results in a significant reduction in the side-effects profile typically associated with opioids. So the analgesic efficacy and potency of tramadol have not been associated with clinically significant side-effects such as respiratory or cardiovascular depression, constipation, sedation urinary retention [2,3].

2. Patient and methods

One hundred and eighty patients (108 males and 72 females, age range 18–69 years, ASA I–II) were included in this randomized double blind study. The

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Table 1
Patients' decubitus, puncture level and dose of anesthetic in every kind of surgery

	Decubitus	Puncture level	Dose of hyperbaric bupivacaine
Hernioplasty	Lateral position	T12-L1/L1-L2	8 mg (0.8 ml)
Varicocelectomy	Lateral position	T12-L1	8 mg (0.8 ml)
Saphenectomy	Lateral position	L2-L3	6 mg (0.6 ml)
Proctological surgery	Seated	L4-L5	6 mg (0.6 ml)

surgical procedures performed were hernioplasty (58), saphenectomy (42), varicocelectomy (33), proctological surgery (47). Their duration was not more than 100 min. Criteria for selection of cases were:

1. Absence of any cardiac, respiratory, renal or other pathologies that may affect the parameters for clinical evaluation of cardiorespiratory performance.
2. Absence of mental illness.
3. The patients must not be on psychotropic drugs likely to influence the sensation of pain.

The patients were divided into three treatment groups. Group A was made up of patients treated with tramadol (40 drops = 100 mg) 30 min before surgery, and with placebo at the end of the operation; Group B included patients that received the same analgesic in the same dose at the end of surgical suture, and placebo 30 min before surgery; Group C was composed of patients treated only with placebo.

The surgery was carried out by superselective spinal anaesthesia with pencil point needle (Whitacre 25–27 G). The dose of local anaesthetic and patient's decubitus were different and related to the surgery type (Table 1).

Intraoperatively, heart rate, ECG and SaO_2 were monitored continuously and non-invasive blood pressure was noted every 10 min. Pain relief was measured by using a four step verbal scale (0 = no pain; 1 = slight pain; 2 = moderate pain; 3 = severe pain) every 15 min. The respiratory (SaO_2) and cardiovascular parameters (SAP, DAP, HR) were recorded every 10 min for statistical analysis.

SaO_2 was monitored post-operatively (at 30 min, 60 min, 3 h, 6 h, 12 h) and analgesia was scored using a visual analogue scale and four step verbal scale. Side-effects were evaluated intra-and postoperatively.

Statistical analysis was performed using Student's t-test and analysis of variance for one factor for parametric data. The χ^2-test and comparison of percentages were used for qualitative data.

3. Results

All three groups were homogeneous with regard to age, weight, sex, ASA, type and duration of surgery (Table 2). Intraoperative blood pressure and heart rate showed a little decrease in comparison with their baseline values in each group, but it was not statistically significant [Figs. 1–3]; SaO_2 was stable (97–99%) and pain relief was excellent in all three groups (FSVS = 0/1)[Fig. 4]. No side-effects were observed. Postoperatively, during the first 2 h after surgery, pain relief was very good (VAS < 3; FSVS = 0/1) and it was comparable in the three groups. Nevertheless a statistically significant increase of VAS and FSVS values was observed from the 3rd h on in the Group C and from the 6th h on in the Group B. VAS and FSVS values were firmly stable at low levels in the Group A. 20% of patients of group C required further analgesia at the 3rd h and 18% of patients of group B required it at the 6th h. They received ketorolac 30 mg i.m.

As regards the side-effects, there were two cases of vomiting in the patients of Group A, and one case of nausea and one case of drowsiness in the patients of Group B, but no negative effects on respiratory or cardiovascular parameters were observed at therapeutic doses.

4. Discussion

Our studies showed that tramadol is very effective, well tolerated and a safe analgesic in the relief of postoperative pain. Particularly, the combination of tramadol with superselective spinal anaesthesia appeared interesting to us in ambulatory surgery. The additive analgesia, obtained from the combination of local anaesthetics with opioids, is often used to relieve intra-and postoperative pain. This synergic action is due to their different mechanism. The local anaesthetics inhibit the conduction of the stimulus in the nerve by

Table 2
Patients' data and kind of surgery in three groups

	Group A	Group B	Group C
Number of patients	61	58	61
Age (years)	Range 18–69		
Sex (m/f)	35/25	35/23	37/23
Body weight (kg)	69 ± 11	68 ± 9	70 ± 10.5
ASA (I/II)	41/20	39/19	41/20
Duration (min)	55 ± 29	60 ± 28	58 ± 31

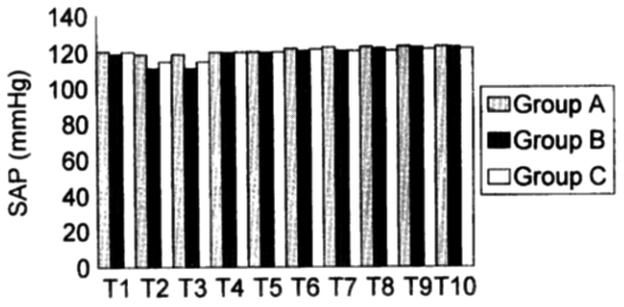

Fig. 1. Variations of SAP in three groups at different times.

Fig. 2. Variations of DAP in three groups at different times.

means of blocking the channels of sodium. Opioids reduce the release of the neurotransmitters at the axonal ending of the pain receptors at presynaptic level, and induce hyperpolarization of the membrane of the posterior spinal cord neurons at postsynaptic level.

Nevertheless, the potent analgesic drugs in common use (pethidine, pentazocine) are known to match their analgesic properties with some degree of respiratory or circulatory depression, adverse effects which limits their use in ambulatory surgery. On the contrary, tramadol, particularly when administered orally, as with drops, proved capable of providing significant pain relief in a short time, a long duration of analgesia and optimal compliance, because there were no clinically significant adverse effects, such as respiratory depression, which could interfere with the ambulatory patient's outcome [4]. Furthermore, the analgesic effect was better and was obtained using lower doses of the drug when tramadol was administered before the surgical trauma, probably because the abnormal postoperative neuron sensitivity induced by the surgical tissue damage was prevented.

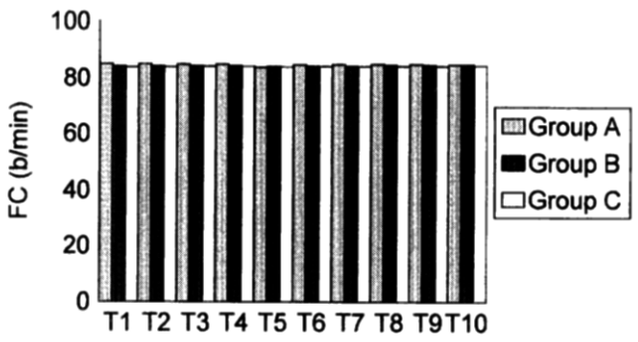

Fig. 3. Variations of FC in three groups at different times.

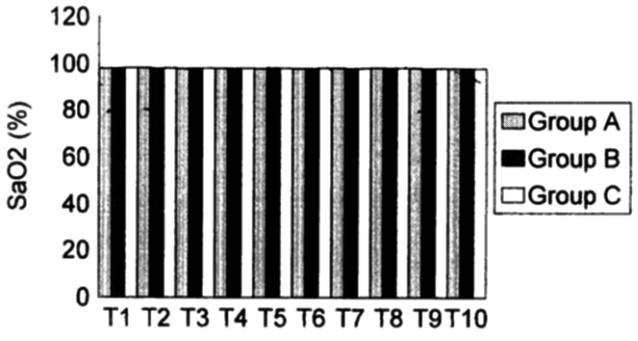

Fig. 4. Variations of SaO_2 in three groups at different times.

5. Conclusion

This study confirms that tramadol is a very effective, potent and well tolerated analgesic for postoperative pain, especially in cases where cardiocirculatory and respiratory depression are undesirable.

The absence of hypnotic effects further increases its value since patients are able to cooperate in promoting a quick and safe outcome.

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