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Selective spinal anaesthesia in ambulatory surgery

R. Palomba *, G. Sica, A. Liardo, G. Bardari, E. De Robertis, R. Tufano

Università degli Studi di Napoli 'Federico II', Cattedra di Anestesia e Rianimazione, Napoli, Italy

Abstract

Background and objectives: selective spinal anaesthesia (SSA) is preferable in day hospital surgery. The present investigation aims to confirm the usefulness and safety of this technique. Methods: 250 patients (ASA I–II, mean age 42 ± 3 years) scheduled for day-hospital surgery were enrolled in our study. The puncture was performed with the patients in a lateral position, the ill side down; for proctological surgery the puncture was performed in a sitting position. A 27G Whitacre needle was always used and 1% hyperbaric bupivacaine was administered in 30 s or more, preceded by a single dose of fentanyl (20 μg) injected very slowly. The position was maintained for 10 min. Hemodynamic parameters (SBP, DBP, HR) and pulsoximetry were recorded before anaesthesia (T_0), 5 min after subarachnoid injection (T_1) and then every 15 min (T_n) up to the completion of the surgical procedure. In the last 100 patients enrolled in our study haemodynamic data (CI, EF, SVRI, MAP,HR) were recorded by using a non invasive bioimpedenzometric method, before anaesthesia (T_a), after 15 min (T_b), 60 min (T_c) and 240 min (T_d). The postoperative course was evaluated from the end of surgery on, with regard to analgesic consumption and residual analgesic degree. The incidence of adverse effects was evaluated. Results: the level and degree of anaesthesia was excellent in 183 and good in 67 patients. SBP, DBP, HR and pulsoximetry showed an excellent stability during the study. Haemodynamic stability was confirmed by data obtained with bioimpedenzometry that showed significant variations in CI ($P < 0.001$), SVN ($P < 0.0001$) at T_b and T_c as to basal five values. Postoperative analgesia was excellent and the incidence of side effects very low. Conclusions: we believe that the method is suitable for day-hospital surgery because it is easy to execute and provides an excellent degree of surgical anaesthesia, cardiovascular stability, postoperative analgesia and patient safety. © 1997 Elsevier Science Ireland Ltd.

Keywords: Superselective spinal anaesthesia; Ambulatory anaesthesia; Circulatory effects

1. Introduction

'Day-hospital' surgery is often favoured due to several advantages concerning the rationalization of medical service costs, limitation of surgery patients overheads, reduction in waiting lists, greater availability of staff and beds for major surgical pathologies, social and psychological benefits for the patient and a reduction for patients in temporary disability and their absence from home and work [1]. The greater resort to this kind of surgery compels the anaesthetist to use techniques and drugs that join together high safety, shortage of side effects and fairly short times of recovery [2,3]. The aim of the present study was to evaluate the usefulness and safety, in ambulatory surgery, of tby selective spinal anaesthesia (SSA) carried out with 1% hyperbaric bupivacaine. In addition we considered the postoperative course with regard to side effects, pain symptomatology and the use of analgesic.

2. Materials and methods

The study protocol was approved by the Institutional Ethics Committee, and informed consent was given by patients.

250 patients (ASA I–II, mean age 42 ± 3 years, mean weight 69 ± 1.6 kg, mean height 164 ± 7.3 cm) scheduled for 'day-hospital' surgery were enrolled in our study. All the patients included in our protocol were

* Corresponding author. Present address: Istituto di Anestesia e Rianimazione, Via S. Pansini, 5, 80131 Napoli, Italia. Tel.: + 39 81 7463542.

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Table 1
Puncture level and anaesthetic dose in each kind of surgery

Surgery	No. of patients	Time (min)	Puncture level	Bupivacaine dose (mg)
Saphenectomy	78	84.2 ± 18	L_4-L_5/L_3-L_4	6
Hernioplasty	69	58.4 ± 16	L_2-L3/L_3-L_4	8
Varicocelectomy	43	31.6 ± 10	L_2-L_3	6
Proctological surgery	60	32.1 ± 7	L_4-L_5	6

studied between January and June 1995. Anaesthesia was carried out in the lateral position, the ill side down, performing the puncture at the interspace as appropriate to surgery. Only for proctological surgery, the puncture was performed with the patient in sitting position. A 27 G Whitacre needle was always used. One percent hyperbaric bupivacaine was administered in 30 s or more, preceded by a single dose of fentenyl (20 μg) injected very slowly (Table 1).

After injection, the lateral position was maintained for about 10 min until the anaesthesia level was stabilized. The patients undergoing proctological surgery were positioned for 10 min seated with lifted and bent legs.

Fluid therapy was carried out in all the patients only during surgery by infusing saline solution at the rate of 5 ml/kg per h. After surgery all the patients were allowed to drink.

Hemodynamic parameters (SBP, DBP, HR) and pulsoximetry were recorded before anaesthesia (T_o), 5 min after subarachnoid injection (T_1) and then every 15 min (T_n) up to the completion of the surgical procedure.

These data were statistically analyzed by one-way ANOVA.

Metameric level of anaesthesia and motor block were evaluated 10 min after the injection by means of pinprick test and Bromage score respectively. The resumption times of motility and ambulation were also assessed from subarachnoid injection on.

The postoperative course was evaluated from the end of the surgery on, with regard to analgesic consumption, during the first 12 h, and residual analgesic degree, by means of a visual analogue scale (VAS) every 20 min during the first 3 h.

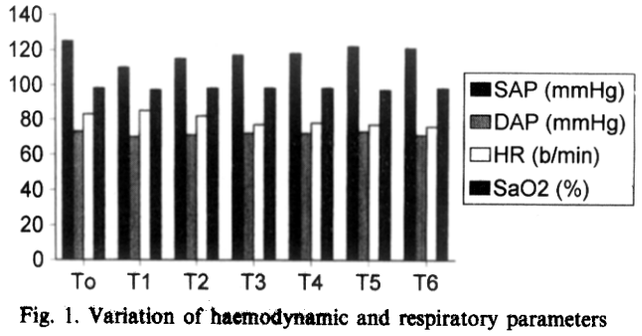

Fig. 1. Variation of haemodynamic and respiratory parameters

Statistical mean and S.D. of these data were computed.

Finally, the incidence of adverse effects (urinary retention, headache, nausea, pruritus, backache) was evaluated.

Hemodynamic evaluation was carried out in the last 100 patients enrolled in our study using a non-invasive bioimpedenzometric method (BoMed NCCOM3-R7). This method allowed us to survey the values of cardiac index (CI), ejection fraction (EF), peripheral vascular resistances (SVRI), mean arterial pressure (MAP) and heart rate (HR), before anaesthesia (T_a), after 15 min (T_b), 60 min (T_c) and 240 min (Td). Statistical analysis was performed by one-way ANOVA.

3. Results

The mean time required for surgery was 51.5 ± 25.0 min. Subarachnoid injection was easy to perform in 208 patients and more or less difficult, but always possible in the remaining patients. The level and degree of anaesthesia was excellent in 183 cases and good in 67. No additional systemic administration was ever necessary.

All patients began eating again 2 h after surgery and were discharged within 8 h, except five patients in whom two incidents of headache and three of urinary retention were noticed. Nausea was observed in 10 patients and was treated with ondansetron 4 mg i.v.

Pruritus was noticed in 15 patients. No other side effects were observed. Pulsoximetry and hemodynanmic data (SBP, DBP, HR) evaluation, carried out in all patients, showed an excellent stability of blood pressure and pulsoximetry at the considered times. A negligible

Table 2
Bioimpedenzometric haemodynamic data

	T_A	T_B	T_C	T_D
MAP (mm Hg)	90.3	91.9	90.7	90.5
HR (b/min)	77.2	74.8	71	75.3
CI (l/min per m^2)	4.13	3.48**	3.52**	4.11
SVRI (Fl Ohm/m^2)	1745	2152*	2137*	1757
FE	65.1	64.3	64.3	65.1

* $P<0.001$, ** $P<0.0001$.

Table 3
Anaesthesia level and anaesthetic block regression in the different kind of surgery

Surgery	No. of patients	Anaesthesia level	Block regression (min)
Hernioplasty	31	$T_{10}-L_3$	155 ± 30
	38	$T_{11}-L_4$	
Varicocelectomy	43	$T_{10}-L_3$	148 ± 34
Saphenectomy	47	$T_{12}-S_5$	160 ± 25
	31	L_1-S_5	
Proctological surgery	60	L_4-S_5	152 ± 32

not significant decrease in HR (10% vs. T_o) during the 1st h after the anaesthesia (Fig. 1) was observed.

Hemodynamic stability was confirmed by data obtained with bioimpedenzometry that showed significant variations in CI ($P < 0.001$), SVRI ($P < 0.0001$) at T_b and T_c as to basal values. At T_d all values went back to preoperative levels (Table 2).

Data relevant to anaesthesia level and motor block, in the different kind of surgery, are summarised in Table 3 and Table 4.

Mean recovery times of motility and ambulation were 97.4 ± 31 min respectively. Table 5 and Table 6 show data relevant to the postoperative course collected also by telephone) that concern residual analgesia (VAS score) during the first 3 h (Table 5) and the number of patients that requested additional analgesic (ketoralac 30 mg. i.m.) during the first 4, 8 and 12 h after surgery (Table 6).

4. Discussion

Elements of paramount importance for anaesthesia in 'day-hospital' surgery are:

1. Achievement of an early and efficient postoperative mobilization, made possible by excellent hemodynamic stability and prolonged postoperative analgesia.
2. Lack of consequences such as prolonged effect and side effects of anaesthesia.
3. Possibility of an early food intake.
4. Immediate communication with relatives.

Table 4
Motor block in the different kind of surgery

Surgery	No. of patients	Motor block (%)
Hernioplasty	24	100
	35	66
	10	33
Varicocelectomy	39	66
	4	33
Safenectomy	71	100
	7	66
Proctological surgery	9	33
	51	0

Although easy and quick to perform, spinal anaesthesia has not been used until a few years ago, because of frequent hypotensive crises, and prolonged motor block and post-dural puncture headache [4–6].

SSA anaesthetized only a restricted part of the body and required a reduced dosage of drugs, producing a less severe sympathetic block which is always hemodynamically well compensated. The excellent pressure stability noted in all patients agrees with these observations [7].

Subsequent hemodynamical study confirms this data and points out that it is achieved through excellent reciprocal compensation of the considered parameters.

Anaesthesia level was always reached during the 10 min of the 'fixed' decubitus and was always adequate to the operation. Motor block was never excessively widespread and always homolateral to the surgery side. A sella anaesthesia, in most cases followed by absence of motor block, was noticed in proctological surgery.

The short return to motility and ambulation are an important datum for ambulatory surgery, as well as the low incidence of side effects [2,3].

Above all, an insignificant incidence of headache was observed; the use of a traumatic needle allowed us to get through aura separating the fibres without dissecting them [8–10].

In our opinion, the high degree of postoperative analgesia due probably to the fentanyl addition made early ambulation possible.

All of these factors contributed to the rapid discharge of the patients in perfect condition. Most of them were able to begin working again soon after their release.

5. Conclusions

All the patients interviewed were satisfied with anaesthetic technique with regard to both the preoperative and the postoperative period.

Objectively we found the method to be suitable for day hospital surgery because it is easy to execute and provides an excellent degree of surgical anaesthesia, postoperative analgesia and patient safety.

Particularly favourable is the remarkable shortness of time required before the patient can feed and walk normally.

Table 5
Residual analgesia (VAS) during the postoperative first 3 h

	0	20 min	40 min	60 min	80 min	100 min	120 min	140 min	160 min	180 min
VAS (mean ± S.D.)	—	—	—	1.2 ± 0.2	1.5 ± 0.3	1.9 ± 0.2	2.2 ± 0.3	2.8 ± 0.4	3.1 ± 0.3	3.4 ± 0.2

Table 6
Number of patients that requested additional analgesic

	4 h	8 h	12 h
No. of patients treated with Ketorolac 30 mg i.m.	11	11+23	11+23+31

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