Egyptian Journal of Anaesthesia (2013) **29**, 97–101

Egyptian Society of Anesthesiologists

Egyptian Journal of Anaesthesia

www.elsevier.com/locate/egja
www.sciencedirect.com

Research Article

A randomized comparative study between selective walking spinal anesthesia and general anesthesia for anorectal surgeries in outpatient settings

Hossam I. Eldesuky [a,*], **Mohamed Ibrahim** [a,1], **Ashraf Ragab** [b,2]

[a] *Department of Anesthesiology, Faculty of Medicine, Zagazig University, Egypt*
[b] *Department of Anesthesiology, Faculty of Medicine, Cairo University, Egypt*

Received 18 September 2012; revised 8 October 2012; accepted 18 November 2012
Available online 27 December 2012

KEYWORDS

Ambulatory;
Anorectal;
Lidocaine;
Selective spinal anesthesia

Abstract *Background:* Spinal anesthesia is gradually increasing in ambulatory setting. The limiting factor to the more widespread use of spinal anesthesia in the outpatient setting refers to the effect of residual block. Selective spinal anesthesia (SSA) with low dose lidocaine was compared with modern general anesthesia (GA) technique in day care anorectal surgeries.
Objective: Our objectives in this study was to compare SSA with propofol and fentanyl based modern GA as regard to 1 – operating conditions 2 – patients' and surgeon's satisfaction, 3 – intraoperative, postoperative adverse events and 4 – recovery profiles in ambulatory anorectal surgeries.
Methods: Prospective randomized clinical study was conducted on 60 patients undergoing elective day case anorectal surgery. The patients were randomly allocated into one of two groups (GA and SSA groups) of 30 patients each. In GA group anesthesia was induced with intravenous fentanyl (2 μg/kg) and propofol (2–3 mg/kg). Airway was secured with I-gel supraglottic airway. Anesthesia was maintained by sevoflurane 1.5–2%, nitrous oxide 60% in oxygen mixture. SSA group patients received spinal anesthesia with lidocaine 20 mg and fentanyl 25 μg to a total volume of 3 ml with

* Corresponding author. Address: P.O. box 100, Tabouk, Saudi Arabia. Tel.: +20 1000232244, +966540688155; fax: +20 552344442.
E-mail addresses: eldesuky@yahoo.com.sg (H.I. Eldesuky), mibrahim72@windowslive.com (M. Ibrahim), aragabm3@hotmail.com (A. Ragab).
[1] Address: Palestine Square/Madina Road, P.O. Box 7692, Jeddah 21472, Jeddah, Saudi Arabia. Tel.: +20 1223777755, +966 565842048, +966 2 667 5000, +966 2 669 4896.
[2] Address: Palestine Square/Madina Road, P.O. Box 7692, Jeddah 21472, Jeddah, Saudi Arabia. Tel.: +966 507200280, +966 2 667 5000, +966 2 669 4896.

Peer review under responsibility of Egyptian Society of Anesthesiologists.

ELSEVIER Production and hosting by Elsevier

http://dx.doi.org/10.1016/j.egja.2012.11.004

sterile water for injection. Intraoperative, postoperative and home adverse events, time to ambulate, time to home discharge, patients' and surgeon's satisfactions were statistically compared between both groups.

Results: Both anesthetic techniques showed acceptable operating conditions and high rate of patients' satisfaction. Low pain intensity, shorter time to ambulate and home discharge in SSA compared to GA with a p value < 0.001. Intraoperative hemodynamic stability was reported in both groups. No major postoperative or home adverse events in both groups.

Conclusions: SSA with low dose lidocaine may be suitable alternative and competitive for modern GA in ambulatory anorectal surgery.

1. Introduction

Surgery of anal canal, such as for anal fistula and fissures need preservation of anal sphincter tone which may lead to the patient being maintained in a light plan of general anesthesia (GA) resulting in complications as laryngospasm and tachycardia. Conventional spinal anesthesia causes totally relaxed sphincter which interferes with sphincter manipulation, prolong the recovery time, ambulation and delays home discharge that is not suitable for ambulatory concept. The challenge today is to use spinal anesthesia which should be suitable, with rapid recovery and early home discharge with minimal postoperative or no side effects to be competed with modern ambulatory GA [1]. There are many techniques for selective spinal anesthesia (SSA) by different anesthetics to achieve sensory block suitable for surgery with minimal motor block [2]. Few studies used SSA lidocaine and fentanyl in anorectal surgeries. Walking spinal technique can be taken into wider practice [3]. Few and mild postoperative side effects allow SSA (low doses lidocaine and fentanyl) to be one of the best techniques for ambulatory anesthesia if compared with other techniques of SSA and with GA [4]. It is essential for the anesthetist to provide the best anesthetic care for ambulatory surgery to facilitate rapid return to daily work [2]. Newer anesthetic techniques may allow rapid recovery and the recovery phase I can be completed in OR and patients can bypass the post anesthesia care unit (PACU) as what is known as fast-tracking anesthesia [5]. The objective of this study is to compare the efficacy of 1 cc lidocaine 2% (20 mg) and fentanyl 25 μg in 0.5 ml intrathecally with propofol–fentanyl general anesthesia in terms of hemodynamic stability, surgical conditions and ability to bypass the post anesthetic care unit (PACU), earlier discharge home, patients' and surgeon's satisfaction.

2. Patients and methods

Prospective randomized clinical study from January 2009 to January 2010, in 120-bedded general hospital in Qatif area Kingdom of Saudi Arabia (KSA). Approval of hospital committee for research and ethics and written informed consent from each patient were obtained. Patients were scheduled for elective anorectal surgeries as anal fissure, anal fistula and hemorrhoidectomy. The study enrolled 60 patients were ASA physical status I and II, aged 20–50 years, and from both sex. Patients with any contraindications for spinal anesthesia as (coagulopathy, localized infection, and neurological diseases) were excluded from study. Patients were divided into two equal groups (GA and SSA groups) of 30 patients each. Patients in both groups received no premedication. GA group was assigned to receive fentanyl, propofol and inhalational sevoflurane and nitrous oxide and no neuromuscular blockade (NMB). SSA group received spinal anesthesia with lidocaine and fentanyl. Intravenous (I.V.) infusion of 500 ml lactated Ringer's solution was started on arrival to operating room (OR). Standard monitoring was started; heart rate (HR), mean arterial pressure (MAP), and hemoglobin oxygen saturation (SpO_2) were recorded at 2-minute (min) intervals during surgery. All operations were done by the same surgeon. Patients in GA group were induced by fentanyl 2 μg/kg IV and 2–3 mg/kg propofol IV. Airway was secured by I-gel supraglottic airway. Anesthesia was maintained by sevoflurane 1.5–2% and nitrous oxide 60% in oxygen mixture with no NMB. Fentanyl increments were given IV if needed during the operation. Sevoflurane and nitrous oxide were discontinued at the end of surgery and I-gel was removed. HR, MAP and SpO_2 were recorded before transferring the patients and on arrival to PACU. Patients of SSA group received subarachnoid block under complete aseptic precautions and skin infiltration by lidocaine 1% 2 ml. Block was performed in sitting position, mid line approach at L4-5 intervertebral space. A 25 gauge, Quincke–Babcock spinal needle was used and the bevel of the needle oriented caudally. Spinal solution was injected intrathecally over 10 s. Spinal solution was prepared using 1 cc lidocaine 2% (20 mg) and fentanyl 25 μg in 0.5 ml then completed to 3 ml by sterile water for injection. The solution was hypobaric and had specific gravity 1.002. Patients remained sitting for 1 min then supine with head down for 6–8 min to allow caudal spread of solution then patients were put in lithotomy position, with head down and pelvis up. Sensory level and motor block were assessed using pinprick and modified Bromage scale (0 = full movement, 1 = movement of knees only, 2 = movement of ankles only, and 3 = no movement), respectively, 5 and 10 min after lidocaine injection and at the end of surgery. The response to surgical stimulation was evaluated by Ordinal scale (none, mild, and severe). The assessments of operating conditions were done by the same surgeon using (poor, good, and excellent). Hypotension and bradycardia were defined as decrease more than 20% of baseline. All patients bypassed phase I recovery unit to phase II recovery unit where patients received oxygen by face mask if SpO_2 less than 92%. Postoperative HR, MAP, and SpO_2 were recorded. Pain was assessed by visual analog scale (VAS) (0 = no pain, and 10 = worse pain). Nausea, vomiting, Pruritus, urine retention, orientation to time, person and place, back, leg or buttock pain and any surgical bleeding were re-

corded. Time to ambulate and time to home readiness discharge were evaluated every 15 min. After 24 h, 3 days, 7 days and 30 days telephone interviews with all patients in both groups was done for evaluating satisfaction (poor, satisfied, very satisfied), regarding post dural puncture headache (PDPH) and manifestation of transient neurologic symptoms TNS.

3. Statistical analysis

The sample size of 30 patients per treatment group was calculated to achieve a power of 80% ($\alpha = 0.05$). The power value was evaluated with the Power and Sample Size package program. We compared the outcomes between the groups by calculating the P value for the null hypothesis of no difference using the x^2 test, Fisher's exact test, and the Mann–Whitney U-test when appropriate. Noncategorical data were expressed as mean ± SD, number and percentage within the same group. A P value < 0.05 was considered significant. The SPSS package for Windows (version 12) (SPSS Inc., Chicago, IL) was used.

4. Results

There were no statistically significant differences between the two groups in demographic characteristics (age, sex, height, weight and ASA status) with p value > 0.05 (Table 1).

Heart rate showed significant difference between both GA and SSA groups after inducing both anesthetic techniques (p value < 0.001). HR was (94.9 ± 5.3) and (78.6 ± 5.9) beat/min. in GA and SSA groups respectively. MAP also showed significant difference between the two groups (p value 0.01). MAP was 90 ± 6.0 and 85.5 ± 7.95 mmHg in GA and SSA groups respectively. There was no hypotension in both groups. No significant differences were observed between both groups in SpO_2 with p value > 0.05. SSA group achieved the ideal sensory block at level L1 (T10-L3) and achieved minimal motor block by scale from 0 to 1 on modified Bromage scale. There was no difference in the surgeon's satisfaction with operating conditions obtained by the two anesthesia methods (Table 2).

Postoperatively, all patients in both groups bypassed the postanesthesia care unit phase I and went directly to the phase II unit. The pain score by VAS was less in SSA group than GA group (3.0 ± 0.87 and 4.96 ± 0.8 respectively) with highly significant difference between both groups ($p < 0.001$). There were no significant differences between both groups as regards PONV, urine retention and disorientation ($p > 0.05$). SSA group showed Pruritus 5/30 (16.6%). Postoperative HR and MAP mean values in SSA and GA patients were 78.2 ± 4.7, 91.2 ± 5.9 beat/min and 86.8 ± 4.7, 80.7 ± 5.5 mmHg respectively with high significant ($p < 0.001$).

Time of recovery in phase II unit was shorter in SSA group than GA group. Time to ambulate in SSA patients was 3.7 ± 1.3 min and 16.1 ± 2.4 min in GA patients. Time to home discharge was 120 ± 11.4 min in SSA patients and 184 ± 44.3 min in GA patients with high significant differences ($p < 0.001$) (Table 3).

Adverse events at home were reported in 4(13.3%) patients in SSA groups complained mild PDPH on 3rd day that did not require hospital admission.

No backache or radicular symptoms consistent with a diagnosis of TNS were recorded. The degree of patient satisfaction in GA group was significantly higher than that in SSA group with $p < 0.05$ but none of patients in either groups reported a score ''poor''. All patients in both groups would choose same anesthesia again (Table 4).

Table 1 Patients' characteristics.

	GA $n = 30$	SSA $n = 30$	P value
Age (years)	33.6 ± 8.3	34.8 ± 8.3	0.56
Sex (M/F) (n)	21/9	22/8	0.77
ASA (I/II) (n)	25/5	23/7	0.51
Weight (kg)	65 ± 5	64 ± 6	0.48
Height (cm)	164 ± 6	163 ± 7	0.55

Values were presented by mean ± SD or numbers. ASA; American Society of Anaesthesiologists (physical status). F; female, M; male,
$P > 0.05$ no significant,
$P > 0.05$ compared with GA group.

5. Discussion

The idea of ambulatory anesthesia is to achieve rapid, safe recovery, no or little postoperative adverse events, optimal operating conditions, and high rate of patient's satisfaction. It depends on the choice of the best anesthetic technique, good selection of patients and the type of surgery [2]. Anorectal surgery needs preservation of the anal sphincter tone especially in fissurectomy and fistulectomy. It is may be interfered with the depth of anesthesia and leaded to intraoperative risk on the patients [6]. In the present study, the two anesthetic techniques appeared to reduce rectal sphincter tone but not complete relaxation without any risk on the patients, which matched with Maroof et al. [6]. In the present study, low dose lidocaine and fentanyl were used as SSA to achieve selective optimal sensory block with minimal motor block and to be compared with modern GA as ambulatory anesthesia. From the results of this study, it was reported that intra- and postoperative hemodynamic stability with SSA group was more than GA group which showed tachycardia with maintained MAP. It was related to the hypobaric solution that remained localized then shifted against gravity away from the area of injection and these matched with Moemen [7]. The use of low dose intrathecal fentanyl 25 μg in SSA group did not cause respiratory depression with maintained spo2 even in elderly patients as reported by Varrassi et al. [8]. Optimum sensory block was achieved below L1 in SSA patients group with minimal motor block because the use of hypobaric solution that might not change the final concentration of lidocaine in the CSF, but it can affect the distribution of lidocaine within the subarachnoid space when the patient was placed in lithotomy position with head down and pelvis up. No or minimal motor block because the low concentration of lidocaine was allowed the patients to move legs freely postoperative and shifted to stretcher without any help and ensured the idea of spinal walking in and out. Intrathecal opioids act synergistically with intrathecal lidocaine to enhance subtheraputic doses of lidocaine, which as a sole drug may not provide an adequate block as proved by Vaghadia et al. [9]. Both sensory and minimal motor blocks achieved acceptable operating condition for the surgeon as in the present study. Low pain score with SSA group in compar-

Table 2 Intraoperative parameters.

	GA $n = 30$	SSA $n = 30$	P value
HR	94.9 ± 5.3	78.6 ± 5.9	<0.001**
MAP	85.5 ± 7.95	90 ± 6.0	0.01*
SpO_2%	98.3 ± 1.1	98 ± 1.3	0.24
Sensory block	NA	L1 (T10-L3)	
Motor block	NA	0 (0–1)	
Acceptable operating Conditions (%)	100	100	

Value were presented by mean ± SD and percentage.
HR; Heart rate, MAP; mean arterial, SpO_2; peripheral oxygen saturation, NA; not applicable.
$P > 0.05$ no significance, $p < 0.001$ compared with GA group.
* Significant.
** High significance.

Table 3 Postoperative data in recovery unit.

	GA $n = 30$	SSA $n = 30$	P value
Pain (VAS)	4.96 ± 0.8	3.0 ± 0.87	<0.001 **
PONV (n, %)	8/30(26.6%)	3/30(10%)	0.09
HR (beat/min)	91.2 ± 5.9	78.2 ± 4.7	<0.001 **
MAP (mmHg)	80.7 ± 5.5	86.8 ± 4.7	<0.001 **
(SPO_2) (%)	97.9 ± 1.6	98.2 ± 1.3	0.42
Urine retention (n)	3/30	0/30	0.07
Pruritus (n, %)	0/30	5/30(16.6%)	0.02 *
Orientation (n)	30/30	30/30	1.0
Bleeding	0/30	0/30	–
Time to ambulate (min)	16.1 ± 2.4	3.7 ± 1.3	<0.001 **
Time to discharge home (min)	184 ± 44.3	120 ± 11.4	<0.001 **

Values were presented by mean ± SD, number, and p value. HR = heart rate, MAP = mean arterial pressure, min = minutes, PONV = postoperative nausea and vomiting, VAS = Visual analog scale.
* significant.
** high significant.

Table 4 Adverse events at home (1, 3, 7, and 30th) day.

	GA $n = 30$	SSA $n = 30$	P value
PDPH (n, %)	0/30	4/30(13.3%)	0.04*
TNS (n)	0/30	0/30	
Patient satisfaction			
Satisfied	8/30 (26.6%)	12/30 (40%)	$P < 0.05$*
Very satisfied	22/30 (73.3%)	18/30 (60%)	
Poor satisfied	0/30	0/30	
Choose same anesthetic? (%)	100	100	

Values were presented by number, percentage and p value.
PDPH = postdural puncture headache, TNS = transient neurologic symptoms.

ison with GA group provided good patient satisfaction, ensured optimal sensory block and helped in early discharge home as documented by Kortilla [10]. Postoperative nausea and vomiting (PONV) was 10% in SSA group when compared to 26.6% in GA group with agreement of Goel et al. [11], who reported that the risk of PONV was decreased 7% after low doses bupivacaine combined wish fentanyl. Low incidence and intensity of PONV with SSA group allowed early home discharge. Side effect of intrathecal fentanyl is Pruritus which is common and usually mild and easily treated with diphenhydramine. In the present study it happened but not dose dependent that is consistent with Yeh et al. [12]. In this study no urine retention was reported in SSA group in comparison with 10% in GA group which did not need urinary catheterization that did not match with Mulroy et al. [13], who reported high incidence of retention about 30% after lidocaine spinal but the voiding was occurred after short time. All patients in both groups were oriented to time, person, and place and no signs of bleeding and that matched with criteria of home discharge as modified postanesthesia discharge scoring system by Chung [14]. High significant differences between both groups as regard time to ambulate and time to home discharge, which more shorter in SSA group than GA group, are good indicators for rapid regression of motor block and these were

matched with Pamela et al. [15], and gave the advantage of SSA over modern GA by sevoflurane, propofol and even desflurane. Bypassing the phase I in PACU as in the present study because of hemodynamic stability, no respiratory depression, less pain, no retention of urine, less PONV, no bleeding and short time to ambulate ensured the full criteria of discharge and criteria of fast track anesthesia as White et al. [5]. These criteria also matched with guidelines for safe discharge after ambulatory surgery by Kortilla [10]. Less and mild PDPH at home by 13.3% as in the present study was accepted side effect and can be reduced by using smaller and finer needle as proved by Santanen et al. [16]. SSA using low doses lidocaine and fentanyl for gynecological laparoscopy was studied before by Pollock JE but lidocaine 5% caused transient neurologic symptoms (TNSs) and cauda aquina syndrome. [17]. No patients showed any leg or buttock pain as an indicator of TNS and these were mismatched with Ben-David et al. [18], who reported that TNS can be caused by lidocaine hypobaric 1% at dose of 50 mg by 33% and at dose of 20 mg by 4%. Slight lower degree of satisfaction in SSA group than in GA group may be from the anxiety and discomfort during spinal and/or surgical procedures.

We realized that if this study was done using blind approach with blinded observers about the anesthesia techniques performed, it would be better. Also cost effectiveness was not evaluated.

6. Conclusion

In this study we concluded that low dose spinal lidocaine and fentanyl can provide a walking spinal technique that is safe and achieve all criteria for ambulatory with fast tracking anesthesia. It is an accepted alternative to modern and new general anesthetics.

We are recommending future further studies on wide range of age groups especially elderly with co morbid diseases.

References

[1] Liu SS, Strodtbeck WM, Richman JM, Wu CL. A comparison of regional versus general anesthesia for ambulatory anesthesia: a meta-analysis of randomized controlled trials. Anesth Analg 2005;101:1634–6.
[2] Moemen EM. Recovery characteristics after ambulatory anesthesia and surgery. Eur J Anesth 2004;20:449–55.
[3] Dinesh M, Satya DG. Is spinal anaesthesia useful in day surgery? Anesthesia 2008;10(2):58–61.
[4] Korhonen AM, Valanne JV, Jokela RM. Intrathecal hyperbaric bupivacaine 3 mg + fentanyl 10 μg for outpatient knee arthroscopy with tourniquet. Acta Anaesthesiol Scand 2003;47:342–6.
[5] White PF, Fanzca A, Song D. New criteria for fast-tracking after outpatient anesthesia: a comparison with the modified Aldrete scoring system. Anesth Analg 1999;88:1069–72.
[6] Maroof M, Khan RM, Siddique M, Taliq M. Hypobaric spinal anesthesia with bupivacaine (0.1%) gives selective sensory block for anorectal surgery. Can J Anaesth 1995;42(8):691–4.
[7] Moemen EM. Selective spinal anesthesia. Eur J Anesth 2004;20:449–55.
[8] Varrassi G, Cellen D, Capogna G. Ventilatory effect of subarachnoid fentanyl in the elderly. Anaesthesia 1992;47:558–62.
[9] Vaghadia H, McLeod DH, Mitchell GWE. Small dose hypobaric lidocaine-fentanyl spinal anesthesia for short duration laparoscopy. Anesth Analg 1997;84:59–64.
[10] Kortilla K. Recovery from outpatient anesthesia: factors affecting outcome. Anaesthesia 1995;50:22–38.
[11] Goel S, Bhardwaj N, Grover VK. Intrathecal fentanyl added to intrathecal bupivacaine for day case surgery: a randomized study. Eur J Anaesthesiol 2003;20:294–7.
[12] Yeh HM, Chen LK, Lin CJ, Chan WH, Chen YP, Lin CS, et al. Prophylactic intravenous ondansetron reduces the incidence of intrathecal morphine-induced Pruritus in patients undergoing cesarean delivery. Anesth Analg 2000;91:172–5.
[13] Mulroy MF, Salinas FV, Larkin KL, Polissar NL. Ambulatory surgery patients may be discharged before voiding after short-acting spinal and epidural anesthesia. Anesthesiology 2002;97:315–9.
[14] Chung F. Recovery pattern and home-readiness after ambulatory surgery. Anesth Analg 1995;80:896–902.
[15] Pamela HL, Vaghadia H, Henderson C, Martin L, Michell GWE. Small-dose selective spinal anesthesia for short-duration outpatient laparoscopy: recovery characteristics compared to desflurane anesthesia. Anesth Analg 2002;94:346–50.
[16] Santanen U, Rautoma P, Luurila H, Erkola O, Pere P. Comparison of 27-gauge (0.41-mm) Whitacre and Quincke spinal needles with respect to post-dural puncture headache and non-dural puncture headache. Acta Anaesthesiol Scand 2004;48:474–9.
[17] Pollock JE. Neurotoxicity of intrathecal local anesthetics and transient neurological symptoms. Best Pract Res Clin Anaesthesiol 2003;17:471–84.
[18] Ben-David B, Maryanovsky M, Gurevitch A. A comparison of minidose lidocaine–fentanyl and conventional-dose lidocaine spinal anesthesia. Anesth Analg 2000;91:865–70.