

Propofol-based Fast-track for Ambulatory Surgery

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The purpose of this study was to provide data of propofol-based total intravenous anesthesia (TIVA) for ambulatory surgery in developing a fast-track technique. One hundred and forty-two patients scheduled for elective surgery were studied : mean (SD) age 42.21(16.23) years, male to female 72 : 70, mean (SD) body weight 60.75 (11.67) kg and American Society of Anesthesiologists (ASA) physical status I / II/ III 66/38/38. Mean (SD) thiopental induction 225 (55.69) mg was maintained with mean (SD) propofol 199.64 (86.26) mg for mean (SD) anesthetic time 29.02 (11.21) minutes. Various narcotics were used : fentanyl 73.48 ± 24.38 µg for 123 cases, morphine 3.27 ± 1.10 mg for 10 cases, remifentanyl 492 ± 105.26 µg for 7 cases and pethidine 23.33 ± 2.88 mg for 2 cases. Midazolam was given 2.70 ± 1.05 mg. Patients were positioned in supine, lithotomy or lateral decubitus. One-fourth were PS III with a diagnosis of chronic renal failure and renal transplants coming for incision and drainage of perianal abscess. The mean (SD) wake-up time was 36.02 (17.69) seconds. Only one case (chronic renal failure) had severe hypotension after induction. Anesthetic agents and ideas of fast-track anesthesia were discussed.

Keywords : Propofol, Fast-track, Ambulatory, Total intravenous anesthesia, TIVA

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Ambulatory surgery can be managed with either general or regional anesthesia. To accomplish the goal of ambulatory surgery, anesthesia has to consist of ultrashort-acting agents, rapid and smooth emergence, and without postoperative complications to shorten hospital stay. With an increasing number of patients presenting for ambulatory surgery from 40% in 1986 to 65% nowadays⁽¹⁾, there is an emphasis on recovery and shorter hospital stay with minimal side effects. Since postoperative nausea and vomiting, pain and cardiovascular events are major risk factors that delay hospital stay and need multimodal therapy⁽²⁾ which requires mainly medical personnel that costs more than 95% of the unit cost. The trend to even refine anesthetic techniques like total intravenous anesthesia (TIVA) and new drugs for cost savings has been intensively studied. Fast-tracking is a new recovery paradigm commonly referred to as transferring patients from the operating room directly to phase II recovery area, thus bypassing the

postoperative care unit (PACU)⁽³⁾. Regional lumbar anesthesia with long-acting local anesthetics is not suitable for fast-track. Although using lower doses of the agents combined with lipophilic opioids can facilitate earlier recovery, patients are hard to discharge home in the presence of tingling sensation. There are many techniques of general anesthesia both inhalation and intravenous such as mask, laryngeal mask, and endotracheal intubation. The authors chose to study some TIVA regimen for ambulatory surgery to see if it could replace regional anesthesia and support fast-track concept.

Material and Method

After informed consent and permission by the hospital committee, the study was carried prospectively and descriptively on 142 outpatients to undergo anorectal surgery, lower body incision and drainage (I&D) and gynecological surgery. Operations also included those which could be done under simple mask inhalation or monitored anesthesia care like mass excision and endoscopy. Our TIVA regimen was thiopental induction 3-5 mg/kg, intermittent propofol

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maintenance 20-30 mg, supplemented with narcotics eg. fentanyl, remifentanyl or morphine and midazolam. Anesthetic duration and recovery time were recorded. Complications, the same anesthesiologist and surgeon rating were noted.

Data were analyzed with Microsoft® Excel 97 version 8.0 and reported as count or mean \pm SD where appropriate.

Results

One hundred and forty two patients had characteristics like Table 1.

One chronic renal failure patient with rectum tear had severe hypotension after induction with thiopental and fentanyl. One patient with diagnosis of inflammatory atypia of the cervix who underwent colpo-laser under MO 2 mg and midazolam 2.5 mg woke up immediately after the procedure. Another with perianal abscess undergoing I&D and fistulectomy under fentanyl 50 μ g without midazolam woke up well too.

Discussion

Ambulatory surgery was confined only to healthy patients ASA physical status (PS) I or II, operation time less than an hour and without major fluid shift or blood loss. Nowadays the advancement of perioperative care and surgical skill permits a more aggressive operation on sicker patients and longer time period under ambulatory anesthesia without sacrificing the patient safety. TIVA has been a popular technique for such cases, mainly because it lets the patient wake up very smoothly especially with propofol. One-fourth of our patients were PS III due to chronic renal failure and renal transplant with diagnoses mostly of recurrent perianal abscess or leg gangrene. Anesthetic time ranged from 10 to 60 minutes while wake-up time ranged from 0 to 60 seconds. Since medical personnel in PACU cost most, there has been an idea to bypass PACU immediately after operation or fast-track. It dawned on us to try our TIVA as a pilot for fast-tracking anesthesia and the authors realized its worth in the private hospital where the patient pays the price.

Induction with thiopental could lessen the pain from later propofol, let alone the cheap cost. But since it does not have a potent amnestic effect, the authors supplemented with a small dose of midazolam without causing any lingering effect on wake-up. It has been suggested to BIS monitor for awareness⁽⁴⁾ during the operation, an estimated 1 in 500 general

Table 1. Patient characteristics (n = 142)

Age (year)	42.21 \pm 16.23
Sex M/F	72/70
BW (kg)	60.75 \pm 11.67
PS I / II/ III	66/38/38
Thiopental (mg)	225.00 \pm 55.69
MO (mg)(n=10)	3.27 \pm 1.10
Fentanyl (μ g)(n=123)	73.48 \pm 24.38
Remifentanyl (μ g)(n=7)	492.00 \pm 105.26
Pethidine (mg)(n=2)	23.33 \pm 2.88
Midazolam (mg)	2.70 \pm 1.05
Propofol (mg)	199.64 \pm 86.26
Anesthetic time (min)	29.02 \pm 11.21
Wake-up time (sec)	36.02 \pm 17.69

BW = body weight, PS = Physical status, MO = morphine

Table 2. Patient diagnoses (cases)

hemorrhoid	57
perianal abscess	32
genital lesions	12
leg lesions	10
fistula in ano	9
colonic lesions	6
buttock lesions	4
ischio-rectal abscess	3
rectal lesions	3
urological lesions	3
axillary lesions	2
anal fissure	2

NB: some patients had more than 1 diagnosis

Table 3. Types of surgery (cases)

hemorrhoidectomy	57
I&D*	30
fistulectomy	13
debridement	7
colonoscopy	6
amputation	5
O&D**	4

NB: some patients underwent more than 1 type of operation and miscellaneous was not shown

* incision and drainage ; ** open and drainage

anesthesia ranging from vague dreams to overhearing the operative room conversation⁽⁵⁾. A variety of narcotics were used due to some conditions in the private hospital: 123 fentanyl, 10 MO, 7 remifentanyl and 2 pethidine. The authors used remifentanyl in 2 cases of renal transplant patients, 1 case of prolapsed mitral valve and another one of PS III. There was a study of synergistic effect between remifentanyl and

propofol⁽⁶⁾, also the combination showed more hemodynamic stability and less myocardial regional wall abnormalities during carotid endarterectomy than fentanyl with isoflurane⁽⁷⁾. However, the cost was 9 times higher. Intraoperative MO in the dosage of 0.15 mg/kg was studied to compare with remifentanyl but found out to provide less postoperative analgesia and risked respiratory depression or apnea⁽⁸⁾. One case of remifentanyl was supplemented with MO 2 mg. It was suggested that since remifentanyl has an ultrashort-acting analgesic effect, a combination of both remifentanyl and MO can provide better postoperative analgesia⁽⁹⁾. Propofol was intermittently bolused according to clinical grading throughout the operation and the dose turned out to be slightly higher than the standard dose for infusion of 6 mg/kg/hr. It has more antiemetic effect than sevoflurane⁽¹⁰⁾ and other inhalations⁽¹¹⁾, thus shortening the recovery period. Propofol has a bronchodilating effect from many mechanisms and Arain SR et al found no difference between generic and non-generic preparations in terms of increased respiratory system resistance⁽¹²⁾. The authors used 1% Fresofol (Fresenius) without metabisulfite preservative and did not come across any bronchospasm. Weksler et al compared 4 preparations of propofol in dilated and curettage (D&C); there was no statistical significance in terms of efficacy, side effects and cost⁽¹³⁾. Only a small number of complications were encountered and considering the ASA PS of the patients, it ensured that this technique is safe enough. Invasiveness of operations was from superficial like excisional biopsy of scalp lesion to gangrenous limb amputation. The anesthesiologist and the surgeon rated the technique as good to very satisfactory with the patient in supine, lateral decubitus or lithotomy position. The authors did not use muscle relaxants at all. In that case, it was suggested to use only short-acting or low dose of medium-acting agents to facilitate early recovery and opioid-propofol or topical anesthesia was enough for direct laryngoscopy and intubation⁽¹⁴⁾.

To bypass phase I PACU, the authors should have 1) improved screening and education of suitable patients, 2) refined PACU bypass criteria; combined Aldrete and PADSS (postanesthesia discharge scoring system), 3) use of SAFE (short acting and fast emergence) anesthetic agents, 4) strategic post-operative nausea and vomiting prophylaxis, 5) increased use of regional blocks, 6) better equipment like BIS and nerve stimulator and

7) integrated work between anesthesiologist and nurses⁽¹⁵⁾.

Conclusion

Due to a push of expenses, TIVA has been developed into fast-track anesthesia for ambulatory surgery which has covered more and more sicker patients. To bypass PACU, anesthetic management should strictly focus on short-acting agents and wake-up conditions not to jeopardize the patient. The authors studied propofol based-technique with various narcotics and presented data to show that it worked well with rapid, smooth emergence and without postoperative complications. Other ancillary means to avoid complications and allow faster discharge were discussed.

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การใช้ Propofol เป็นยาสลบหลักสำหรับ Superficial และ Ambulatory Surgery

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บทนำ : การศึกษานี้มีวัตถุประสงค์เพื่อศึกษาว่า propofol สามารถใช้เป็นยาสลบหลักในการระงับความรู้สึกโดยการบริหารยาทางหลอดเลือดดำเพียงอย่างเดียว (Total intravenous anesthesia) ในการผ่าตัดผู้ป่วยนอก (ambulatory surgery) จะมีประสิทธิภาพและประสิทธิผลเป็นอย่างไร โดยหวังผลว่าผู้ป่วยสามารถกลับบ้านได้อย่างรวดเร็วปราศจากผลแทรกซ้อนใด ๆ จากการระงับความรู้สึกด้วยวิธีนี้

วิธีการและผลการศึกษา : ผู้ป่วยจำนวน 142 ราย มารับการผ่าตัดชนิด elective บริเวณ superficial หรือบริเวณก้น อายุเฉลี่ย \pm SD = 42.21 ± 16.23 ปี เพศชาย : หญิง 72 : 70 น้ำหนักเฉลี่ย 60.75 ± 11.67 กิโลกรัม มี ASA, physical status 1/2/3 = 66/38/38 ทุกรายจะได้รับการระงับความรู้สึก โดยการให้ยาฉีดทางหลอดเลือดดำ เริ่มนำสลบด้วย thiopental 225 ± 55.69 มก. ระงับความรู้สึกขณะผ่าตัดด้วย propofol โดยมีขนาดยาเฉลี่ย 199.64 ± 86.26 มก. ร่วมกับ fentanyl 73.48 ± 24.38 ไมโครกรัม (123 ราย), morphine 3.27 ± 1.10 มก. (10 ราย) ramifentanil 492 ± 105.26 ไมโครกรัม (7 ราย) pethidine 23.33 ± 2.86 มก. (2 ราย) และ midazolam 2.70 ± 1.05 มก. สำหรับการ sedation ผู้ป่วยจะถูกจัดให้นอนในท่าหงาย, lithotomy หรือตะแคง 1 ใน 4 ของผู้ป่วยมี physical status 3 เป็นไตวายเรื้อรัง และได้รับการผ่าตัดปลูกถ่ายไตแล้ว มารับการผ่าตัดระบายหนองจากโรคฝีที่ก้น การผ่าตัดสามารถดำเนินไปได้อย่างรวดเร็วทุกราย ระยะเวลาการระงับความรู้สึก 29.02 ± 11.21 นาที 1 ราย มีความดันเลือดตกมากหลังจากเริ่มนำสลบ ระยะเวลาฟื้นคืนเรียกลืมตาเฉลี่ย 36.02 ± 17.69 วินาที ไม่พบภาวะแทรกซ้อนใด ๆ จากการศึกษานี้

สรุป : การใช้ propofol เป็นยาสลบหลักสำหรับการระงับความรู้สึกชนิดบริหารยาทางหลอดเลือดดำเพียงอย่างเดียว สำหรับการผ่าตัด superficial หรือบริเวณก้นนั้นเป็นวิธีการหนึ่งที่น่าสนใจได้ วิธีนี้สามารถทำในผู้ป่วยนอกได้ดี เนื่องจากผู้ป่วยจะฟื้นคืนได้รวดเร็วและสามารถกลับบ้านได้ภายในเวลาอันสั้น