The effect of ultrasound-guided popliteal block combined propofol target-controlled infusion on postoperative pain control after ankle & foot surgery

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Background and Goal of Study:

Patients usually experience a moderate to severe postoperative pain and require multiple doses of parenteral analgesics after foot and ankle surgery. Popliteal sciatic block (PSB) could provide sufficient anesthesia and reduces postoperative pain. Moreover, it may also avoid complications associated with general anesthesia and neuraxial block such as dental injury or urinary retention. The purpose of this study is to determine the effectiveness of PSB plus sedation on ankle and foot surgery when compared to general anesthesia plus opioids.

Materials and Methods:

Patients were randomly allocated into PSB group (popliteal sciatic block with propofol sedation) and GA group (general anesthesia). The patients in PSB group (n=32) received intravenous midazolam 2mg followed by ultrasound-guided popliteal sciatic nerve block with 0.5% ropivacaine 40 ml at induction room. Propofol target-controlled infusion (TCI) was also kept in PSB group with effect concentration (2.0-3.0 ug/ml) to provide moderate sedation during entire operation. The patients in GA group (n=35) were induced with propofol 2-3 mg.kg⁻¹, followed with sevoflurane inhalation. Laryngeal mask airway was inserted after achieving adequate anesthetic depth, and sevoflurane (2-4%) was used for intraoperative maintenance. Intraoperative opioids (morphine or fentanyl) was delivered for both groups when necessary. The demographic data, anesthetic parameters, and postoperative recovery (pain intensity, adverse events, analgesics use and satisfaction) were all recorded.

Results and Discussion:

Patient characters did not differ significantly between groups (Table 1). In PSB group, less patients required intra-operative opioids when compared to GA group (15/32, 47% vs. 35/35, 100%, p<0.001) (Table 2). Postoperative pain intensity was significantly lower in PSB group than GA group when arrival at post-anesthesia care unit (2.0 ±1.8 vs. 3.3 ±1.4, p <0.01). In postoperative anesthesia care unit (PACU), less patients required postoperative opioids in PSB group than GA group (9/31, 29% vs. 27/35, 77%, p<0.001). Patients in PSB group depicted better postoperative recovery profile than GA group. Less postoperative nausea vomiting was noted in PSB group when compared to GA group (5/31, 16% vs. 15/37, 43%, p=0.03) (Table 3).

Conclusion:

Ultrasound-guided popliteal sciatic block reduced postoperative pain and adverse events in patients undergoing ankle and foot surgery than general anesthesia.

Table 1. Patient characteristics between groups

	PSB group (n=32)	GA group (n=35)	P value
Gender (M:F)	4:28	9:26	0.17
Age (yr)	50.4±16.7	46.9±15.1	0.37
Weight (kg)	60.9 ±12.6	61.1±10.3	0.97
Height (cm)	157.9 ±8.3	160.5±8.9	0.23
ASA I/II/III(n)	7/21/4	6/23/6	0.81
Anesthesia period (min)	63.9±19.2	61.9±15.8	0.65
Operation period (min)	40.3±16.3	39.9±14.3	0.9

Table2. Opioids consumption and pain evaluation

	PSB group (n=32)	GA group (n=35)	P value
Opioids* consumption			
Perioperative n (%)	15(47%)	35(100%)	<0.001
At PACU n (%)	9(28%)	27(77%)	<0.001
Rescue dose n (%)	0(0%)	5(14%)	0.03
Equivalent fentanyl (mcg)	25±30	54±23	<0.001
Pain intensity (NRS) :			
Arrival at PACU	2.0±1.8	3.3±1.4	0.003
Discharge from PACU	1.6 ±1.3	2.3±1.1	0.01

* opioids included morphine, fentanyl and meperidine
NRS=numeric rating scale
PACU= post-anesthesia care unit

Table3. Intra-operative events and recovery profile

	PSB group (n=32)	GA group (n=35)	P value
Hemodynamic status arrival PACU			
Heart rate (bpm)	71.9±16	73.8±17	0.65
Mean arterial pressure (mmHg)	71.4±13	74.7±12	0.46
Adverse events			
Sore throat (n)	0(0%)	2(6%)	0.19
Nausea/Vomiting (n)	5(16%)	15(43%)	0.02
Dizziness (n)	4(13%)	9(26%)	0.23
Headache (n)	0(0%)	1(3%)	0.36
Free from adverse events (n)	24(75%)	21(60%)	0.11
Satisfaction	3.34±0.5	3.19±0.8	0.14

PACU= post-anesthesia care unit
Satisfaction: 1=poor, 2=fair, 3=good, 4=very good