Research Square

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# Ultrasound-Guided Bilateral Superficial Cervical Plexus Block Enhance the Quality of Recovery in Patients following Parathyroidectomy with Secondary Hyperparathyroidism

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**Research Article**

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# Abstract

**Background:**Parathyroidectomy has been proposed as method for reduction of PTH levels. We evaluated the effects of ultrasound-guided BSCPB on the quality of recovery following parathyroidectomy with secondary hyperparathyroidism.

**Methods:**Eighty-two patients undergoing parathyroidectomy with secondary hyperparathyroidism were randomly allocated to BSCPB group (ultrasound-guided BSCPB with 7.5ml of ropivacaine 0.5% on each side) and the CON group(normal saline).The primary outcome of QoR-40 score was recorded.Secondary outcomes including total consumption of propofol and remifentanil,the numbers of patient requiring rescue analgesia, the time to first require rescue analgesia, the incidence of PONV, and the VAS scores were recorded.

**Results:**The score in the pain and emotional state dimensions of QoR-40,and total QoR-40 score were higher in the BSCPB group than the CON group on POD1($P$=0.000).Compared with the CON group,the total consumption of propofol and remifentanil was significantly decreased in the BSCPB group ($P$=0.000).Compared with the CON group, the time to first require rescue analgesia was longer($P$=0.018),and numbers of patient requiring rescue analgesia were decreased in the BSCPB group ( $P$=0.000).The incidence of PONV was significantly lower in the BSCPB group than the CON group ($P$<0.05).The VAS scores in the BSCPB group were lower than the CON group in any time point after surgery ($P$=0.000).

**Conclusion:** Ultrasound-guided BSCPB with ropivacaine 0.5% can enhance the quality of recovery, postoperative analgesia, and reduce the incidence of PONV following parathyroidectomy with secondary hyperparathyroidism.

**Trial registration:** ChiCTR1900027185. (Prospective registered). Initial registration date was 04/11/2019.


# Background

Secondary hyperparathyroidism (SHPT) is a frequent metabolic disorder of calcium, phosphorus and vitamin D in patient with end-stage renal disease(ESRD), which results in mineral unbalanced and bone disorders, especially in dialysis patient[1].Various therapeutic agents including phosphate binders,calcimimetics, and less calcemic vitamin D analogues can enhance skeletal uptake of calcium and phosphate resulting in remineralization and improve bone structure and strength[2, 3].If PTH levels persistently elevate > 800 pg/ml (> 6months) and pharmacologic therapy remains nonresponsive, uremia patients with secondary hyperparathyroidism may be accepted parathyroidectomy[4]. For total or subtotal parathyroidectomy, surgical stimulus during the dissection of the gland is mostly gentle, local or regional anesthesia is sufficient, and both of the anesthesia can provide postoperative analgesia[5–7].However,the conventional anaesthetic technique for parathyroidectomy is total intravenous anesthesia with tracheal intubation and muscle relaxation[8].Additionally,end-stage renal disease affects the metabolism and excretion of opioid analgesics and muscle relaxant,which can defer postoperative recovery[9, 10]. Furthermore, Uhlmann et al[6].demonstrated that mild to moderate pain after parathyroidectom may be unsuitable for postoperative recovery programs.A previous study has showed that two-thirds of patients

undergoing parathyroidectomy require narcotic analgesics to relieve postoperative pain on the first day after surgery, while the incidences of postoperative nausea, vomiting, and apnea or respiratory depression also increase[11–13].

Therefore,the aim of this study was to investigate the effects of ultrasound-guided bilateral superficial cervical plexus block(BSCPB) combined with general anesthesia on recovery quality of patients following parathyroidectomy with secondary hyperparathyroidism.

## Methods

# Participants

This study was approved by the Ethics Committee of the Anqing Affiliated Hospital of Anhui Medical University.The study was prospective registered in the Chinese Clinical Trial Registry on November 4,2019 (ChiCTR1900027185).Before surgery,each patient signed an informed consent. The study conducted at the Anqing Affiliated Hospital of Anhui Medical University from November 2019 to October 2020.

Female or male patients aged 18-and 65-years-old,of American Society of Anesthesiologists (ASA) physical status □-□,scheduled to undergo total parathyroidectomy were eligible.Patients were excluded if they had platelet abnormality, coagulation abnormalities, anticoagulation,serious cardiovascular and cerebrovascular diseases, hypertension(predialysis diastolic blood pressure, DBP > 110mmHg), hyperkalemia, amino-amide local anesthetic allergy, local sepsis, or diaphragmatic motion abnormality and refusal to participate .

All eligible participants were randomised to the BSCPB group and the CON Group with a 1:1 allocation using computer-generated random number. Group assignments were kept in sealed envelopes, and only the nurse responsible for preparing the local anesthetic was allowed to open the envelope and the assigned drug. The assigned drugs according to group assignments in syringes which had no difference in appearance. The patients, data collectors (anesthesiologist) did not know the drugs used for bilateral superficial cervical plexus block. All of the patients were NPO since approximately 6 hour before surgery.

# Study Protocol

All surgeries were performed by three experienced surgeons.The patients were not given any preoperative medication. A dialysis was performed routinely within 24 hours before surgery. The arteriovenous fistula of long-term dialysis patient should be protected by medical staff during surgery. Noninvasive blood pressure (NBP), heart rate (HR), electrocardiogram (ECG) and peripheral pulse oximeter ($SPO_2$) values were monitored by using a multiparameter monitor (Philips MX500, Boeblingen, Germany).Intravenous catheter was inserted into the forearm without arteriovenous fistula, and ringer's solution was intravenously administered through the catheter at the rate of 3ml/kg/h.

As described by Tran et al.[14] all bilateral blocks were performed by the attending anesthesiologist who experienced in techniques including ultrasound and nerve block before the induction of anesthesia.Patients

were lying supine, and their heads were rotated to the opposite side of the block. The ultrasound probe and the skin of the blocked area were routinely sterilized.The high-frequency linear ultrasonic probe was placed on the posterior margin of sternocleidomastoid(SCM) muscle at the level of $C_4$.At the posterior corner of the SCM muscle, the superfcial cervical plexus was visualized as a hypoechoic structure. The 22-gauge needle was inserted under the SCM muscle with the in-plane technique.The needle position and location were confirmed by injecting 0.5-1ml of solution after negative aspiration of no blood and air, 7.5 ml ropivacaine 0.5% was administered on each side in the BSCPB group,while equal amount of normal saline was administered in the CON group. After being administered, no block-related side effects such as anesthetic toxicity, epidural block anesthesia, total spinal block anesthesia, recurrent laryngeal nerve blocked, phrenic nerve blocked, or Horner's syndrome were confirmed, then the induction of general anesthesia was performed.

General anesthesia was induced with midazolam (0.02mg/kg), propofol (2.0mg/kg), sufentanil (0.3μg/kg) and cisatracurium (0.15mg/kg), and anesthesia was maintained with propofol (50–80 μg/kg/min) and remifentanil (0.15–0.2μg/kg/min). Tracheal intubation was performed after adequate muscle relaxation. All of the patients were ventilated with an Aspire view anesthetic machine (GE Healthcare, Madison, WI, USA)in volume control mode. In two groups, the tidal volume (VT) was maintained at 8-10ml/kg, the respiratory rate (RR) was fixed at 10–12 breaths/min, the inspiratory to expiratory time ratio (I: E) was 1:2 and the inspired oxygen fraction ($FiO_2$) was 0.5 (balanced with air) throughout the anesthesia period. To maintain a controlled ventilation, cisatracurium was intermittently used for muscle relaxation. The depth of anesthesia was maintained with an infusion rate of propofol and remifentanil, according to the Bispectral Index values (BIS) and the hemodynamic parameters within 20% of the baseline. To prevent the occurrence of intraoperative awareness, the BIS values were kept between 45 and 60 in the both groups during surgery. Experienced surgeons preserved the anatomical integrity of motor nerves by visual identification and exposure both of the external branch of the superior laryngeal nerve and the recurrent laryngeal nerve, and the recurrent laryngeal nerve was prevented injury by intraoperative neuromonitoring during parathyroidectomy. All patients were retained the endotracheal tube and transferred to post anesthesia care unit (PACU).The endotracheal tube was removed after full recovery of consciousness and spontaneous ventilation,and the train-of-four (TOF) ratio at least 0.9. If the Steward recovery score was > 4 points, patient was escorted back to the ward from PACU.The administration of postoperative routine analgesia was IV infusion of parecoxib sodium 40mg at the end of surgery, followed by a IV infusion of parecoxib sodium 40mg every 12h for the next 24h. If the visual analogue scale (VAS) score at least 3 or patient requested for analgesia, IV infusion of tramadol 50mg was given as a rescue analgesic.

# Data Collection

Demographic and clinical characteristics including gender, age, height, weight, ASA physical status, RBC (red blood cell count), HGB(hemoglobin), PLT (platelet), APTT (activated partial thromboplastin time), PT(prothrombin time), TT (thrombin time), Fib (fibrinogen) were recorded.Preoperative and postoperative serum $K^+$ (potassium)concentration, serum $Ca^{2+}$ (calcium ion)concentration, serum phosphate concentration,and PTH level were recorded. Intraoperative fluid input and intraoperative blood loss were

recorded. Each patient was assessed using the global QoR-40 score on the day before surgery, and POD1.QoR-40 includes five dimensions: emotional state(9 items), physical comfort (12 items), physical independence (5 items), psychological support (7 items), and pain(7 items). Each item is assessed using a 5-point numerical rating scale.The score of QoR-40 ranges from 40 to 200.The recovery state is proportional to the score (40 = extremely poor recovery, 200 = all excellent recovery)[15].The first time to require rescue analgesia,the numbers of patient requiring rescue analgesia,and total consumption of tramadol during the first 24h after surgery were recorded. The total consumption of propofol and remifentanil was recorded. The incidence of PONV was recorded. The VAS score at 2, 4, 8,12and 24h after surgery was rated using a 10cm visual analogue scale (VAS: 0 = no pain, 10 = the most imaginable pain).

# Statistical analysis

Calculation of sample size was based on the global QoR-40 scores.A change of 10-point or more for QoR-40 signify a clinically important difference. In our pilot study, an overall standard deviation of 13 points was estimated and an α of 0.05, 37 patients would be required in each group (assuming a power of 80%). Anticipating a study drop-out rate of 10%, we included 41 patients per group.

Data analysis was performed using SPSS version 23.0 (SPSS Inc, Chicago, IL). Continuous variables were presented as Means(standard deviations,SD).Normally distributed variables were compared using the Student's *t*-test.The VAS scores were analysed using linear mixed model with a Bonferroni correction. Non-normally distributed variables were compared using the Mann– Whitney *U* test.The qualitative data were presented as number or percentage, and compared using the Chi-square test. *P* values of less than 0.05 were considered to be statistically significant.

## Results

A total of 89 patients were assessed for eligibility for the study, and 82 subjects were enrolled in the study (Fig. 1). 7 patients were excluded (reasons for exclusion are listed in Fig. 1). There were no significant differences in the both groups with respect to gender, age, height, weight, ASA class, RBC, HBG, PLT, APTT, PT, TT, Fib, serum $K^+$ concentration, serum $Ca^{2+}$ concentration, PTH level,and intraoperative fluid input,intraoperative blood loss,duration of anesthesia,duration of surgery. But compared with the CON group,the total consumption of propofol and remifentanil was significantly decreased in the BSCPB group ($P = 0.000$)(Table 1).As shown in Table 2 ,the score in the pain dimension of QoR-40(27.1 vs. 22.7, $P = 0.000$),and the emotional state dimension of QoR-40(37.7 vs. 33.3, $P = 0.000$),and total QoR-40 score (162.1 vs. 148.4, $P = 0.000$) were higher in the BSCPB group on POD1.Compared with preoperative level, serum calcium ion concentration, serum phosphate concentration,and PTH levels in both groups were significantly reduced after surgery ($P = 0.000$)(Table 3). Additionally, severe hypocalcemia occurred in five patients after surgery, and serum calcium ion concentration returned to normal level after intravenous infusion of calcium chloride. Compared with the CON group, the time to first require rescue analgesia was longer(15.4h vs.8.3h, $P = 0.018$),and the numbers of patient requiring rescue analgesia were decreased in the BSCPB group (20/41 vs. 36/41, $P = 0.000$) ,and postoperative total consumption of tramadol during the first 24h after surgery was lower($P = 0.000$) (Table 4).The incidence of PONV was significantly lower in the BSCPB group

(4.9%) than the CON group (24.4%) ($P < 0.05$),but no statistically difference in volume of drainage after surgery was observed in both groups (Table 4).The VAS scores in the BSCPB group were lower than the CON group in any time point after surgery ($P = 0.000$) (Table 5).No block-related side effects such as anesthetic toxicity, epidural block anesthesia, total spinal block anesthesia, recurrent laryngeal nerve blocked, phrenic nerve blocked, or Horner's syndrome were observed.

# Discussion

This study demonstrated that ultrasound-guided BSCPB with ropivacaine 0.5% combined with general anesthesia was effective in enhancing recovery quality in patients undergoing parathyroidectomy compared with single general anesthesia. And no block-related side effects such as anesthetic toxicity, epidural block anesthesia, total spinal block anesthesia, recurrent laryngeal nerve blocked, phrenic nerve blocked, or Horner's syndrome were observed.Furthermore, BSCPB could reduce the intraoperative total consumption of propofol and remifentanil, provide satisfactory analgesic effect within 24 hour after surgery,and reduce the incidence of PONV.

Some therapeutic agents such as calcimimetics,phosphate binders, and less calcemic vitamin D analogues are applied to treat secondary and primary hyperparathyroidism[2, 3]. If PTH levels persistently elevate > 800 pg/ml (> 6months), and pharmacologic therapy remains nonresponsive to them,uremia patients with secondary hyperparathyroidism may be required total or subtotal parathyroidectomy[4]. Currently,local/regional anesthesia and general anesthesia are performed in the thyroidectomy and parathyroidectomy[16]. For the above-mentioned two surgeries,the conventional anaesthetic technique is total intravenous anesthesia with tracheal intubation and muscle relaxation[8]. However, the end-stage renal disease can depress the metabolism and excretion of intravenous anesthetics,which delay postoperative recovery [9, 10]. Compared with general anesthesia,the advantages of local/region anesthesia can reduce the total consumption of intravenous anesthetics during surgery and lower postoperative pain[16].Thus, anaesthetic technique was chosen region anesthesia combined with general anesthesia in the study.

Patients experience mild to moderate postoperative incision site pain after thyroidectomy or parathyroidectomy, and opioid analgesics are prescribed to relieve the pain[5]. But inappropriate opioid usage patterns can increase drug-related adverse effects,risk for dependence and abuse, and perioperative complications,morbidity[17].Several studies have demonstrated that multimodal analgesia (MMA) can effectively relieve postoperative pain and reduce the consumption of opioid analgesics following orthopedic, thoracic, and gastric surgery[18–20].A previous study showed that MMA protocol including use of nonopioid multimodal agents, incorporating NSAIDs, is safe,and declined in prescription of postoperative opioid analgesics for patients undergoing thyroid and parathyroid surgery[21].Additionally,administration of local anesthesia before incision can prevent central sensitization and relieve postoperative acute pain. In view of the its ability to block the branches of superficial cervical plexus including lesser occipital, greater auricular, transverse cervical,and supraclavicularnerves,BSCPB has been performed in neck surgery. Mayhew et al. found that BSCPB can offer analgesic efficacy in the early postoperative period after thyroid surgery[22]. In the study,BSCPB was performed with ropivacaine 0.5%,and the drug is a long-acting local anesthetic. The results of this study showed that the VAS scores were lower in the BSCPB group than that in

the CON group within 24h after surgery,and the numbers of patient requiring rescue analgesia in the BSCPB group were less than the CON group.Compared with landmark-based technology, ultrasound-guided technology significantly improved the success rate of nerve block, and reduced the incidence of block-related side effects, mainly because ultrasound-guided technology enable real-time visualization of the anatomical structures, advancement of the needle within tissues, and distribution of the local anesthetic in the tissue during nerve block[14].Therefore, no block-related side effect was observed in our study.

The QoR-40 scale has been widely used and extensively validated measure to assess quality of postoperative recovery through specific and patient-rated questionnaire,and the scale contains 40 items and five dimensions including emotional state, physical comfort, physical independence, psychological support and pain.Each item is assessed using a 5-point numerical rating scale,and the score of QoR-40 ranges from 40 to 200[15, 23].A previous study showed that postoperative pain strongly affects QoR-40 score[24].In our study, the result showed that the score in the pain dimension of QoR-40 was higher in the BSCPB group than the CON group on POD1. And the results of our study had demonstrated that effective bilateral cervical plexus block could relieve postoperative pain for up to 24h after parathyroidectomy surgery.Meanwhile,the emotional state dimension and physical comfort of the QoR-40 were higher in the BSCPB group than CON group. A previous study showed that postoperative acute pain can affect emotional state,and satisfactory postoperative analgesia can improve postoperative emotional state[25].Thus,compared to CON group,the score of emotional state dimension was higher in BSCPB group might be attributed to higher score of pain dimension.The dimension of physical comfort mainly include nausea and vomiting.Opioid analgesics can increase the incidence of PONV and delay postoperative recovery[26, 27].However,compared with the CON group,the total remifentanil consumption during surgery,and postoperative tramadol consumption within the first 24h after surgery in the BSCPB group were significantly decreased.And the reduction of remifentanil and tramadol consumption may be related to analgesic efficacy of nerve block.Therefore,the incidence of PONV was lower in the BSCPB than CON group.

There were several limitations in this study. First, the length of stay in PACU and postoperative length of hospital stay were not recorded,though two indexes are traditional parameters to assess postoperative recovery[28].Second,end-stage renal disease can affect left ventricular function [29],but mortality and cardiovascular events were not evaluated;Third,after parathyroidectomy, serum calcium ion concentrations is decreased, and hypocalcemia may occur after surgery[30]. In our study, hypocalcemia with clinical symptoms occurred in five patients after surgery, and serum calcium ion concentration returned to normal level after intravenous infusion of calcium chloride.However,the effects of hypocalcemia on postoperative recovery were not evaluated. Finally, this study was a single-center clinical study, and the conclusions still need to be further supported by large sample and multicenter studies.

# Conclusions

Compared with single general anesthesia, ultrasound-guided BSCPB with ropivacaine 0.5% combined with general anesthesia is effective in enhancing the quality of recovery in patients undergoing parathyroidectomy with secondary hyperparathyroidism, and no block-related side effects are

observed.Furthermore, BSCPB can reduce the intraoperative consumption of propofol and remifentanil, provide satisfactory analgesic effect within 24 hour after surgery, and reduce the incidence of PONV.

# Abbreviations

SHPT
Secondary hyperparathyroidism; ESRD:End-stage renal disease;ASA:American Society of Anesthesiologists;DBP:Diastolic blood pressure;POD:postoperative day; CON:Control;BSCPB:bilateral superficial cervical plexus block;RBC:Red blood cell count;HGB:Hemoglobin; PLT:Platelet; PT:Prothrombin time; APTT:Activated partial thromboplastin time; TT:Thrombin time; Fib:Fibrinogen; NBP:Noninvasive blood pressure; HR:Heart rate; ECG:Electrocardiogram; $SPO_2$:Peripheral pulse oximeter values; VT:Tidal volume; RR:Respiratory rate; $FiO_2$:Inspired oxygen fraction;SCM:Sternocleidomastoid;PACU:Post anesthesia care unit;BIS:Bispectral index; TOF:Train-of-four; MMA:Multimodal analgesia;PONV:Postoperative nausea or vomiting; VAS:Visual analogue scale.

# Declarations

### Ethics approval and consent to participate

This study was approved by the Institutional Medical Ethics Committee of The Anqing Affiliated Hospital of Anhui Medical University. Written informed consent was obtained from all subjects before surgery. This study was prospective registered in the Chinese Clinical Trial Registry (ChiCTR1900027185). Initial registration date was 04/11/2019.

### Consent for publication

Not applicable

### Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author(Shengbin Wang, shbw1965@yeah.net ) on reasonable request.

### Competing interests

The authors declare that they have no competing interests.


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### Authors' contributions

SHH, SBW, and TS conceived the study design and drafted the study protocol. SHH, SBW, TS,SQX, XJ and LM all participated in the study design and coordination. SHH, TS, XJ and SQX contributed to data collection. SBW was the principal investigator and has overall responsibility for this study. SHH and TS performed the statistical analysis for the study protocol. SHH and SBW drafted and revised the manuscript. SHH, TS and SBW critically revised the manuscript. All authors have read and approved the final manuscript.

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31. CONSORT. - Statement.

# Tables

### Table 1

Demographic and Clinical Characteristics

| Variables | SCPB group (n=41) | CON group (n=41) | *P* value |
|---|---|---|---|
| Age (yr) | 54.5(8.1) | 53.4(6.1) | 0.688 |
| Weight (kg) | 57.8(6.5) | 61.1(5.4) | 0.331 |
| Height (cm) | 156.7(5.6) | 155.9(6.3) | 0.725 |
| ASA physical status(/)(n) | 15/26 | 18/23 | 0.326 |
| Gender, Female/Male(n) | 25/16 | 21/20 | 0.252 |
| RBC ($10\times10^{12}$/L) | 3.4(0.4) | 3.3(0.5) | 0.755 |
| HGB(g/L) | 106.4(15.5) | 102.6(15.6) | 0.503 |
| PLT($10\times10^{9}$/L) | 166.4(39.6) | 161.8(45.5) | 0.803 |
| PT(s) | 10.8(1.2) | 11.1(1.5) | 0.659 |
| APTT(s) | 29.7(5.4) | 31.2(4.2) | 0.487 |
| TT(s) | 17.6(0.8) | 17.3(1.3) | 0.470 |
| Fib(g/L) | 3.2(0.7) | 3.2(0.6) | 0.983 |
| Duration of anesthesia (min) | 96.1(24.3) | 90.0(25.6) | 0.551 |
| Duration of surgery(min) | 78.2(22.3) | 70.1(20.9) | 0.385 |
| Intraoperative fluid input(ml) | 166.9(49.1) | 165.0(45.9) | 0.968 |
| Intraoperative blood loss(ml) | 14.6(5.7) | 15.0(5.2) | 0.876 |
| Total consumption of propofol (mg) | 225.3(11.7) | 294.6(20.6) | 0.000 |
| Total consumption of remifentanil (micro g) | 533.4(59.9) | 580.1(76.1) | 0.000 |

Categorical variables were expressed as the Mean (SD) or numbers for all of the patients,with 41 cases in each group. SCPB group,superficial cervical plexus block.

## Table 2

Preoperative and POD1 Global QoR-40 Score

| | SCPB group（n=41） | CON group（n=41） | *P*-value |
|---|---|---|---|
| Preoperative | | | |
| Total QoR-40 Score | 155.9(11.7) | 154.1(11.5) | 0.452 |
| POD1 | | | |
| Emotional state | 37.7(3.1) | 33.3(2.1) | 0.000 |
| Physical comfort | 46.3(3.8) | 44.8(3.2) | 0.076 |
| Physical independence | 20.6(1.6) | 20.2(2.3) | 0.614 |
| Psychological support | 30.2(2.3) | 29.1(2.5) | 0.055 |
| Pain | 27.1(2.6) | 22.7(3.2) | 0.000 |
| Total QoR-40 Score | 162.1(6.2) | 148.4(7.8) | 0.000 |

Categorical variables were presented as the Mean (SD) for all of the patients, with 41 cases in each group. SCPB group, superficial cervical plexus block. POD1, Postoperative Day 1.

## Table 3

Preoperative and Postoperative Hematologic Laboratory Values

| Variables | SCPB group（n=41） | | *P* | CON group（n=41） | | *P* |
|---|---|---|---|---|---|---|
| | Preoperative | Postoperative | value | Preoperative | Postoperative | value |
| Potassium （mmol/L) | 4.6(0.5) | 4.5(0.4) | 0.893 | 4.5(0.4) | 4.7(0.4) | 0.325 |
| Calcium （mmol/L） | 2.6(0.2) | 2.1(0.2) | 0.000 | 2.5(0.3) | 2.1(0.2) | 0.000 |
| Phosphate （mmol/L） | 2.4(0.5) | 1.6(0.6) | 0.000 | 2.5(0.6) | 1.5(0.6) | 0.000 |
| PTH （pg/ml） | 1412.4(447.1) | 24.5(11.9) | 0.000 | 1274.1(275.8) | 27.9(15.5) | 0.000 |

Categorical variables were expressed as the Mean(SD)for all of the patients,with 41 cases in each group.Potassium, serum $K^+$ concentration; Calcium,serum $Ca^{2+}$ concentration;Phosphate,serum phosphate concentration; PTH,PTH levels.SCPB group, superficial cervical plexus block.

**Table 4**

Recovery Profile After Surgery

| Variables | SCPB group (n=41) | CON group (n=41) | *P* value |
|---|---|---|---|
| Time to first require rescue analgesia (h) | 15.4(1.9) | 8.3(1.2) | 0.018 |
| Numbers of patient requiring analgesia(n,%) | 20(48.8%) | 36(87.8%) | 0.000 |
| Postoperative tramadol consumption | 24.4(25.3) | 43.9(16.6) | 0.000 |
| Incidence of PONV(n,%) | 2(4.9%) | 10(24.4%) | 0.013 |
| Volume of drainage after surgery (mL) | 82.3(38.9) | 79.6(38.2) | 0.862 |

Categorical variables were presented as the Mean (SD) or numbers (proportions) for all of the patients,with 41 cases in each group.SCPB group, superficial cervical plexus block.

**Table 5**

VAS Pain Scores at Any Point Time after Surgery

| VAS scores | SCPB group(n=41) | CON group(n=41) | *P*-value |
|---|---|---|---|
| At 2h | 2.2(0.3) | 3.7(0.6) | 0.000 |
| At 4h | 2.5(0.4) | 4.0(0.7) | 0.000 |
| At 8h | 2.7(0.2) | 4.3(0.4) | 0.000 |
| At 12h | 2.4(0.4) | 4.0(0.2) | 0.000 |
| At 24h | 2.1(0.2) | 3.8(0.3) | 0.000 |

Categorical variables were presented as the Mean (SD) for all of the patients, with 41 cases in each group. SCPB group,superficial cervical plexus block.

# Figures

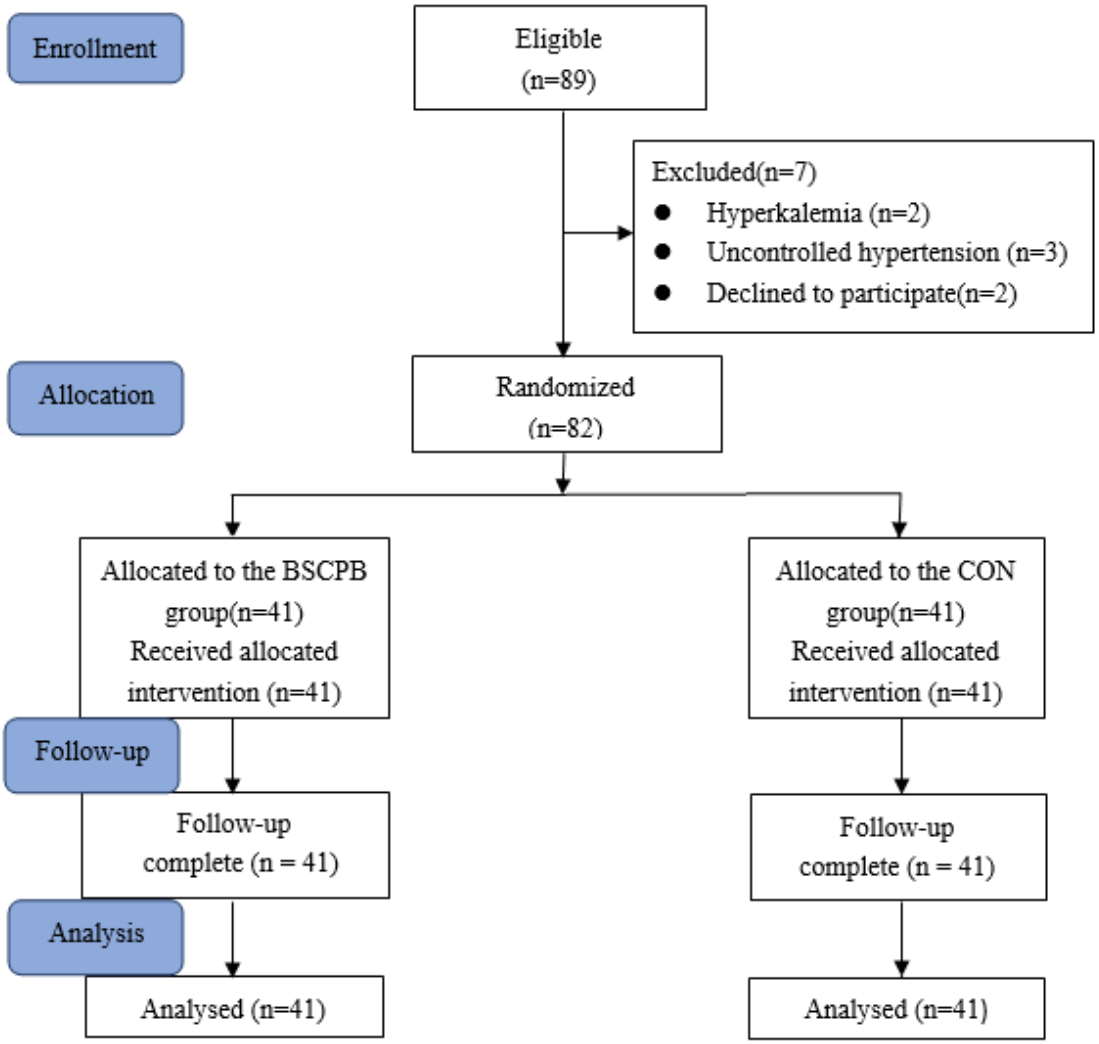


**Figure 1**

CONSORT flow diagram for the study.

# Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- BANED2001036CONSORTchecklist.doc