

Bilateral superficial cervical plexus block as sole anesthesia for parathyroid surgeries in chronic kidney disease patients



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ABSTRACT

Chronic kidney disease (CKD), especially in stages III, IV, V patients presenting for surgical removal of parathyroid glands, has special concerns regarding anesthesia. Their renal disease restricts the choice of drugs that can be used for general anesthesia induction and management. Bilateral superficial cervical plexus block (SCPB) under ultrasound guidance can be an alternative mode of anesthesia in parathyroid surgeries in these patients. The aim of the present case series was to evaluate the effectiveness of bilateral SCPB in CKD (stages III, IV, V) patients undergoing parathyroid surgeries in terms of hemodynamic stability, intraoperative and post-operative analgesia, and surgeon's satisfaction. In the present case series, USG-guided bilateral SCPB was performed under aseptic precautions and 10 mL of local anesthetic was injected on each side. Effect was confirmed with wet swab and blunt pin prick. Then, patient was handed over to the surgeon. Continuous hemodynamic monitoring was done and time of first rescue analgesia was noted. Bilateral SCPB proved to be a good alternative mode of anesthesia for CKD (stages III, IV, V) patients undergoing parathyroid surgeries.

Key words: General anesthesia; Chronic kidney disease; Parathyroid surgeries; Superficial cervical plexus block

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INTRODUCTION

Kidney is an organ that plays an important role in the regulation of endocrine function and in the maintenance of homeostasis.¹ Renal diseases bring imbalance in this regulation and may result in secondary endocrine disorders.² One such condition is secondary hyperparathyroidism, commonly parathyroid adenoma in patients with chronic renal disease, especially in stages III, IV, V patients.³ Patients usually remain asymptomatic but may have normocalcemia/hypocalcemia because of parathormone dysregulation. Definitive treatment is the surgical removal of one or both of the parathyroid glands.³

Anesthesia planning is crucial in these patients as they are usually elderly and kidney disorder mandates greater

precautions to be taken. General anesthesia with or without regional anesthesia has been commonly used for neck surgeries but in patients with chronic kidney disease (CKD) stages III, IV, V, metabolism of many general anesthesia drugs gets altered and delayed that may sometimes worsen patient's outcome from anesthesia and have post-operative side effects such as post-operative nausea vomiting, sedation, and pain, for relatively longer duration.⁴

Superficial cervical plexus block (SCPB) is a field block given at the mid-point of posterior border of the sternocleidomastoid muscle to temporarily and reversibly block nerve supply in the neck and shoulder region.⁵

In this case series study, we have given bilateral SCPB for parathyroid surgeries in CKD patients as sole

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anesthesia with the purpose of maintaining intraoperative hemodynamics within normal limit, adequate post-operative analgesia along with amelioration of side effects related to general anesthesia during the peri-operative period that in turn helps in smooth and early recovery.⁶

Aims and objectives

Primary objective was to study the efficacy of bilateral superficial cervical plexus block in parathyroid surgeries. Secondary objective was to assess the surgeon Satisfaction Score and duration of postoperative analgesia.

MATERIALS AND METHODS

After obtaining approval from the Institutional Ethics Committee, a case series of CKD patients undergoing parathyroidectomy under sole bilateral SCPB was started. All the included patients in the study were informed about the procedure and choice of all the other anesthesia options available in detail in their local vernacular languages and then written consent was obtained for regional anesthesia.

Patients of either gender, having CKD, lying between 18 and 65 years in age, belonging to ASA physical status 3 and above, posted for parathyroidectomy were included while those who refused to participation, had psychiatric or mental disorder, allergic to the local anesthetic drugs, and those having any contraindication for the SCPB were excluded from the study.

In pre-anesthetic checkup, patient's stabilization in view of electrolyte imbalance and associated chronic health condition like hypertension if any was advised and followed and xylocaine sensitivity test was performed. A day before surgery, bedside pre-anesthetic workup was done. Patients were advised for adequate nil by mouth (NBM) with hydration to be maintained through judicious intravenous fluid during NBM period. Pre-operative dialysis was done in patients who were already on dialysis and who had electrolyte imbalances. Adequate sleep and relaxation were ensured.

In operation theater, after re-confirming consent, NBM status, hydration, and surgery, patients were connected to multipara monitors and baseline vitals such as heart rate, blood pressure, electrocardiogram, and SpO₂ were recorded and noted. Simultaneously patency of intravenous access was checked and normal saline was started at 4–6 mL/kg 20 min before the induction of anesthesia keeping in mind the volume compensation with the drug.

Patients were briefly re-counseled about the anesthesia procedure. Appropriate antibiotics were given after giving the test dose under vigilant monitoring. To reduce

the agitation and making patient comfortable, 30 µg i.v fentanyl was given along with injection dexmedetomidine 30 µg and injection loxicard 1.5 mg/kg. After making the field sterile under all aseptic precautions, USG-guided bilateral SCPB was performed in all patients in the supine position.⁵ The branches of the superficial cervical plexus (C1-C4) emerge from behind the posterior border of the sternocleidomastoid muscle (Figure 1). After confirming the location of plexus under USG, 10 mL of LA solution (5 mL 2% lignocaine-adrenaline and 5 mL 0.5% bupivacaine) was injected after negative aspiration for blood (Figure 2).

The efficacy of block was assessed by spirit-soaked cotton swab and blunt tip needle in the desired dermatomes. After confirming the desired effect, the patient was handed over for the surgery. Preparation for the conversion to

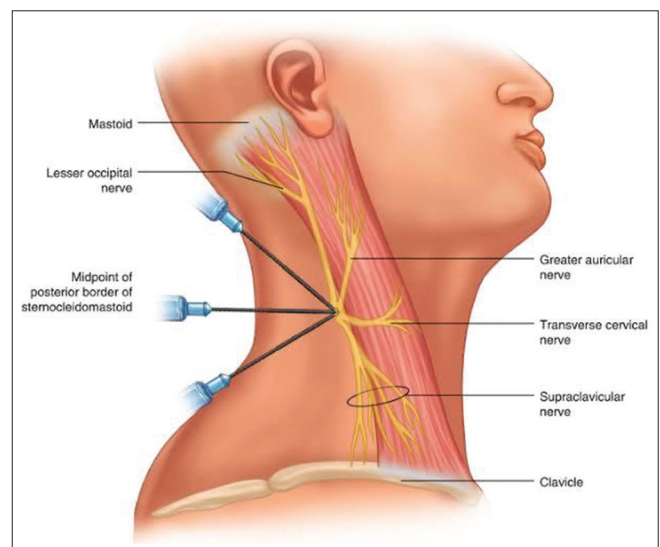


Figure 1: Anatomical landmarks for superficial cervical plexus block

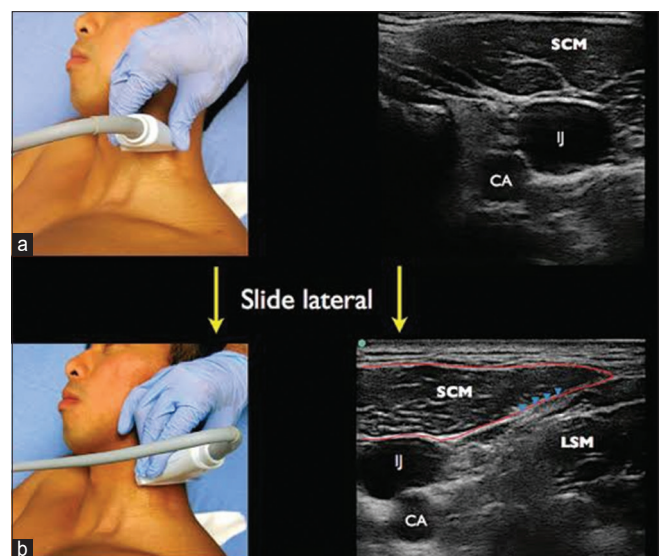


Figure 2: Sonoanatomy of Superficial Cervical Plexus Block

general anesthesia was kept ready in case of failed block. Supplemental oxygen through nasal cannula at 2 L/min was given throughout the surgery. Continuous vital parameters monitoring was done throughout the surgery and after baseline values, readings were noted immediately after the block and then at 5-min interval till 30 min and then at 35, 40, 45, 60, 90, 120, 150 min, and the consciousness of the patient was assessed in between. Intravenous fluid input and urine output charting was done throughout the intraoperative period and adequacy was maintained. After completion of surgery, patients were shifted to the post-operative care unit.

At the end of surgery, Surgeon Satisfaction Score⁷ was noted by asking questionnaire to the surgeon and time of rescue analgesia was noted in the post-operative period.

Time of rescue analgesia⁸

The time of rescue analgesia is considered as the time from completion of surgery till the first request for the analgesia made by the patient.⁸ In our study, i.v paracetamol 10 mg/kg was given as rescue analgesia.

RESULTS

All the patients were statistically non-significant regarding demographic parameters (P>0.05) as shown in Table 1.

In our study, we have found surgeon satisfaction score⁷>4 in all the cases, which is considered as satisfactory.

Time of rescue analgesia (in hours) was 5.02±11.32 which is satisfactory.

In the present case series, during the interoperative period, hemodynamic parameters such as blood pressure, pulse rate, and SpO₂ remained within 20% of baseline values. All the patients were comfortable throughout the surgery except 1, that had to be converted to general anesthesia and was excluded from the study because of agitation as mentioned in Table 1.

DISCUSSION

CKD patients presenting for surgical removal of the parathyroid gland have special concerns regarding anesthesia. Their renal disease restricts the choice of drugs that can be used for general anesthesia induction and management.

Furthermore, delayed metabolism of drugs that are used during general anesthesia cause problems during emergence and in post-operative period.

Regional anesthesia, i.e., SCPB, can be used as a safe alternative in these patients because of its advantages such as avoidance of poly-pharmacy and airway manipulation, lessens post-operative ventilation requirement, provides post-operative analgesia, and decreases post-operative nausea vomiting over general anesthesia.⁹

S. No.	Age/sex	ASA grade	CO-morbid conditions	Weight (Kg)	Diagnosis	Surgery	Surgeon satisfaction score (0/6)	Time of rescue analgesia (h)
1	63/F	III	CKD-3, Uncontrolled DM and HTN	62	Adenoma	BP	5	4
2	52/F	III	CKD-4, HTN	78	Ca PT	BP	6	5
3	45/F	III	CKD-3	55	Adenoma	UP	5	5.5
4	63/F	III	CKD-4, Uncontrolled HTN	57	Adenoma	BP	5	4
5	54/F	III	CKD-4	60	Ca PT	BP	6	4.5
6	58/M	IV	CKD-5	74	Adenoma	UP	5	6
7	60/F	III	CKD-4	58	Ca PT	BP	5	5.5
8	51/F	IV	CKD-5	65	Ca PT	BP	5	4.5
9	57/M	III	CKD-4	80	Adenoma	UP	6	4
10	64/F	III	CKD-4	75	Ca	BP	5	5
11	58/F	III	CKD-4	55	Adenoma	BP	5	5.5
12	50/M	III	CKD-4	68	Adenoma	UP	5	5
13	61/F	IV	CKD-5	60	Ca PT	BP	6	5
14	49/F	IV	CKD-5	52	Adenoma	BP	6	6
15	55/F	III	CKD-3	55	Adenoma	UP	5	4.5
16	59/M	III	CKD-4	70	Adenoma	UP	5	5
17	48/F	III	CKD-4	50	Adenoma	BP	5	5.5
18	56/M	III	CKD-3	67	Ca PT	BP	6	6
19	55/F	III	CKD-5	54	Adenoma	UP	6	5
20	49/F	III	CKD4	57	Adenoma	BP	5	5.5
21	52/M	III	CKD-4	59	Adenoma	BP	5	4.5
22	57/F	IV	CKD-5	52	Adenoma	UP	6	5

CKD: Chronic kidney disease, PT: Parathyroid, UP: Unilateral parathyroidectomy, BL: Bilateral parathyroidectomy

SCPB may be associated with complications such as intravascular injection into a vein or artery, local anesthetic systemic toxicity, hematoma formation, and infection.¹⁰ Ultrasound guidance helps to reduce some of the complications. A thorough vigilance is required throughout the procedure.

Black et.al.,⁴ in their study, they have compared general anesthesia with regional anesthesia and found no difference in outcome regarding anesthesia, but the patients showed lesser post-operative nausea vomiting and better analgesia in post-operative period. They also found that there was no difference in the surgical success rate, morbidity or length of hospital stay between the two groups.

Summary

In our study, after taking informed written consent from patients, 22 patients having CKD posted for parathyroid surgeries requiring anesthesia were included.

Study results showed that SPCB helps in better maintenance of intraoperative hemodynamic parameters, avoids risks and disadvantages related to general anesthesia, thus helps in avoiding its complications, provides satisfactory post-operative analgesia, fastens recovery, and lessens stay in hospital or intensive care unit.

Limitations of the study

The present case series is a single center study conducted on limited study participants.

Further studies on this topic with greater sample size and at multiple centers need to be done to substantiate our results.

CONCLUSION

On the basis of this case series, it can be concluded that bilateral SCPB under ultrasound guidance can be used as sole anesthesia mode for parathyroid surgeries in CKD patients who, otherwise, are at increased risk of general anesthesia.

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Authors Contribution:

KA- Literature survey, implementation of study protocol, data collection, data analysis, preparation of figures; **NS-** Definition of intellectual content, literature survey, concept, design of study, clinical protocol; **AS-** Statistical analysis and interpretation, manuscript revision, manuscript preparation, manuscript revision, submission of article; **MB-** Literature survey, review manuscript, coordination.

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