Clinical Study

Safety and success of parathyroidectomy under local anaesthesia with the classical anterior cervical approach

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Abstract

Objectives: Parathyroidectomy is a fairly common procedure in referral centres all over the world. We evaluated the feasibility of performing parathyroidectomy under local anaesthesia instead of general anaesthesia, from the point of view of safety, success and postoperative complications.

Methods: Between 2006 and 2008, 22 patients aged 22–74 years (mean, 55.3 ± 11.3 years) underwent parathyroidectomy for primary hyperparathyroidism under local anaesthesia at Notre-Dame Hospital, Montreal, Canada. All the patients had a Sestamibi parathyroid scan to localize the hypersecreting gland(s). Diagnosis was confirmed by a rapid test for parathyroid hormone and the final histopathological findings.

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Results: The procedure was successful in 21 of the 22 cases. One patient required re-exploration under general anaesthesia in subsequent surgery. One gland was removed from 20 patients and three from only one patient. The diagnosis was an adenoma in 15/22 patients, hyperplasia in 2/22 and undetermined in 4/22.

The operating time was 20–60 min (mean, 32.5 min). No post-operative haematomas or recurrent laryngeal nerve injury was reported. Pain control and patient tolerance and cooperation were achieved in all cases.

Conclusion: Parathyroidectomy can be performed safely under local anaesthesia, with a high success rate and reduced operative time as well as fewer postoperative complications.

Keywords: Local anaesthesia; Parathyroidectomy; Primary hyperparathyroidism

Introduction

Primary hyperparathyroidism is a relatively common condition. Surgical intervention is still considered the standard treatment; however, the procedure has undergone several modifications to simplify and improve its accuracy, with a recent tendency to perform localized partial parathyroidectomy instead of the classical complete resection of three and a half glands. Partial parathyroidectomy reduces unnecessary surgical exposure, time and complications. New advances in diagnostic radiology and localization techniques, including nuclear medicine, have improved preoperative preparation and intraoperative guidance.

In view of the relative ease of parathyroidectomy in high-volume referral centres when performed by experienced surgeons, there is underutilization of local anaesthesia and minimal invasive techniques, which would avoid the complications of general anaesthesia, allow gradual introduction of ambulatory 1-day surgery and at the same time reduce the length of hospital stay, with all its costs.

We describe our experience in the use of local anaesthesia for patients with primary hyperparathyroidism in order to demonstrate the benefits and to encourage more studies on this topic.

Materials and Methods

Between July 2006 and May 2008, 22 consecutive patients underwent parathyroidectomy under local anaesthesia at Notre-Dame Hospital, Montreal. There were 19 males and 3 females, with a mean age of 55.3 ± 11.3 years (range, 22–74 years). All were operated on by the same surgeon. All the patients had primary hyperparathyroidism, with normal renal function. Each patient was evaluated medically in the preanaesthesia clinic. The score in the physical status classification system of the American Society of Anesthesiology (ASA score) was II for 21 patients and III for only one patient.

A Sestamibi scan was done routinely to localize the hypersecreting gland(s), and intact parathyroid hormone was assessed before and after surgery to assess the success of the surgery. The procedure was considered successful if (a) the intraoperative hormone level had fallen to 50% of the preoperative level, (b) histopathology confirmed the diagnosis, and (c) the patient's calcium level normalized during follow-up.

As per the regulations of the Department of Anaesthesia, an anaesthetist was available as a precaution if the block failed or if the patient required intubation. The dose of local anaesthetic (1% lidocaine and 25% bupivacaine hydrochloride in a 50:50 ratio) was measured carefully to ensure the maximum safe dose (7 mg/kg lidocaine and 2.5 mg/kg bupivacaine), and the amount administered was recorded for each patient. Nursing staff recorded the operating time.

Each patient received a routine superficial cervical block. Subsequently, they were injected with a mixture of lidocaine and bupivacaine in a 1 ml:1 ml ratio without epinephrine. The mean dose of the local anaesthetic mixture was 7.5 ± 6.3 ml (range, 4–28 ml), divided into superficial and deep doses depending on the patient’s response to a pre-incision sharp stimulus.

Differences in the parathyroid hormone level were reported at each time. The final pathological results, including type of abnormality and number of glands, were used as the criteria for the success or failure of the procedure. Results are expressed as means ± standard deviation (SD), and statistics were carried out with SPSS v. 14.

Results

The operating time ranged from 20 to 60 min (mean, 32.5 ± 16.2 min) (Figure 1). Most cases were completed within 20–30 min. One well-localized parathyroid gland was removed from 20 patients. In one case, full exploration and removal of three glands was necessary because of clinical suspicion; the time required for this procedure was no more than 30 min, the amount of local anaesthetic was only 8 ml, and final histopathology supported the clinical suspicion, suggesting hyperplasia. Fifteen patients had final diagnoses of adenoma, two

![Figure 1: Length of surgery.](image)
had a parathyroid with evidence of hyperplasia, and in four patients there was a clear picture of a hypersecreting parathyroid, which was difficult to identify as an adenoma or hyperplasia. A single patient had a normal parathyroid.

The procedure was considered successful in 21 of the 22 patients, with recurrence to general anaesthesia for only one patient. The remaining 21 patients tolerated the cervical exploration well. None of the patients developed systemic manifestations of toxicity, post-operative haematoma or recurrent laryngeal nerve palsy. The length of post-operative hospital stay was 24–48 h (mean ± SD, 36 ± 6).

In one patient, the procedure failed, and she required subsequent re-exploration and parathyroidectomy under general anaesthesia 3 months after the initial procedure.

Discussion

Performance of parathyroidectomy under local anaesthesia gave encouraging results, with failure in only one patient and complete, successful excision in the other 22. The tolerance of the procedure was surprisingly high—100% in our series. It is extremely important to ensure the full cooperation of patients in order for the surgeon to carry out the procedure safely.4,5 Our explanation for the success of the procedure includes lengthy pre-operative counselling about the safety and efficacy of the technique and the relatively short duration of surgery. No cases of haematoma, recurrent laryngeal nerve injury or systemic manifestation of local anaesthesia toxicity were reported.

The use of local anaesthesia instead of the conventional general anaesthesia, which requires intubation and mechanical ventilation, has been tried successfully in many procedures, with increasing acceptance internationally. Parathyroidectomy is no exception; however, occasional difficulty in localizing the hyper-secreting gland(s), uncertainty about complete resection and proper selection of patients are still to be considered if parathyroidectomy under local anaesthesia is practised on a large scale. The exclusion of patients with secondary hyperparathyroidism was an advantage of our study as compared with others that included such patients. More scenarios might therefore be necessary, such as that reported by Shindo et al.6

Our results are comparable to those of other studies, such as the series of Shindo et al.,6 who also observed no recurrent laryngeal nerve palsy; they reported two patients with hypocalcaemia and only one patient with minor bleeding. The absence of pneumothorax or pneumomediastinum, which was reported by some authors,6 is probably due to our strict classical anterior approach, avoiding blind deep infiltration.

The failure of the procedure in one patient, who had an equivocal parathyroid Sestamibi scan, reinforces the importance of careful selection of patients with precisely localized disease on the preoperative Sestamibi scan.7

The combination of 1% lidocaine and 0.25% bupivacaine is widely used in surgical practice,8 as it has the double advantage of providing a quick onset of action (due to the lidocaine) and good post-operative pain control.

In a teaching hospital with a general surgery residency programme, it is not always easy to provide proper training on selected cases. We had an adequate number of patients because the hospital is a regional referral centre with a large annual volume of patients.

We recommend that parathyroidectomy be performed under local anaesthesia on a wider range of patients and that more patients with both primary and secondary hyperparathyroidism be recruited in order to assess the safety of this procedure in large multi-centre studies in order to reproduce these encouraging results and to avoid errors related to small samples.

Conclusion

Parathyroidectomy can be performed safely under local anaesthesia, provided that the diseased gland is well localized preoperatively in otherwise healthy patients, with good results and a high cure rate.

References