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Original article

Interest of video-assisted minimally invasive surgery in primary hyperparathyroidism

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ABSTRACT

Introduction: Surgery is the only radical and definitive treatment for primary hyperparathyroidism. Exploration of the four parathyroid sites is giving way to minimally invasive techniques. The present study sought to compare two minimally invasive parathyroidectomy techniques, by classical cervicotomy (MIP-C) and by video-assistance (MIP-VA), in terms of success rate, complications rate, operating time, and patient and community physician satisfaction.
Materials and method: A non-randomized retrospective comparative study included 112 patients presenting with primary hyperparathyroidism with identified parathyroid adenoma, operated on between January 2005 and October 2010. The two groups were constituted according to the surgeons' habitual practice: 54 cases of MIP-VA and 58 of MIP-C.
Results: Results for MIP-VA and MIP-C were respectively: success, 96.3% vs. 100% ($P = 0.09$); mean scar size, 1.47 vs. 3.43 cm ($P < 0.01$); hypocalcemia, 2 vs. 3 cases ($P = 0.1$); theater time, 94.25 vs. 76 min ($P = 0.02$); and postoperative stay, 1.08 vs. 1.37 days ($P = 0.07$). Patient satisfaction was comparable between groups, while 93.3% of community physicians found MIP-VA preferable to MIP-C, although only 39.3% had known the MIP-VA technique.
Conclusion: With efficacy, morbidity and patient satisfaction comparable to classical surgery, MIP-VA significantly reduced cervicotomy size and hospital stay. Community physicians considered it to be preferable to MIP-C.

1. Introduction

Primary hyperparathyroidism (PHP) is the main cause of hypocalcemia, with incidence around 25/100,000/year in the general population [1]. The most frequent etiology is single sporadic parathyroid adenoma. Surgery is the only radical definitive treatment, indicated in all cases of complex PHP and in most so-called asymptomatic forms [2]. Exploration of the four parathyroid sites was long considered to be the reference technique [3], but this systematic bilateral surgery is giving way to minimally invasive techniques based on preoperative location and targeted surgery at a single site. The minimally invasive targeted approach is performed as classical open surgery via the usual cervicotomy (MIP-C). More recently, endoscopes coupled to video-endoscopy have enabled the development of video-assisted minimally invasive parathyroidectomy (MIP-VA), via a very short incision adjusted to the size of the adenoma [4]. The technique seems as safe and effective as MIP-C, and may improve functional outcome and patient satisfaction. The present study sought to compare the two approaches in terms of success, complications, operating time, hospital stay, and patient and community physician satisfaction.

2. Materials and methods

2.1. Population

A non-randomized retrospective comparative study included 112 patients operated on for PHP between January 2005 and October 2010 in a university hospital center. Analysis of pathology lab records retrieved 152 patients. Cases of secondary multiple parathyroid hyperfunctioning ($n = 13$), parathyroid adenoma undetected on preoperative imaging ($n = 7$), parathyroid carcinoma, type-II multiple endocrine neoplasia ($n = 2$), and associated thyroid surgery ($n = 18$) were excluded.

The first 7 cases of MIP-VA (before 2005) were excluded, to allow for the learning curve.

The two groups, MIP-C and MIP-VA, were constituted according to the surgeons' usual practice, 3 performing MIP-VA and

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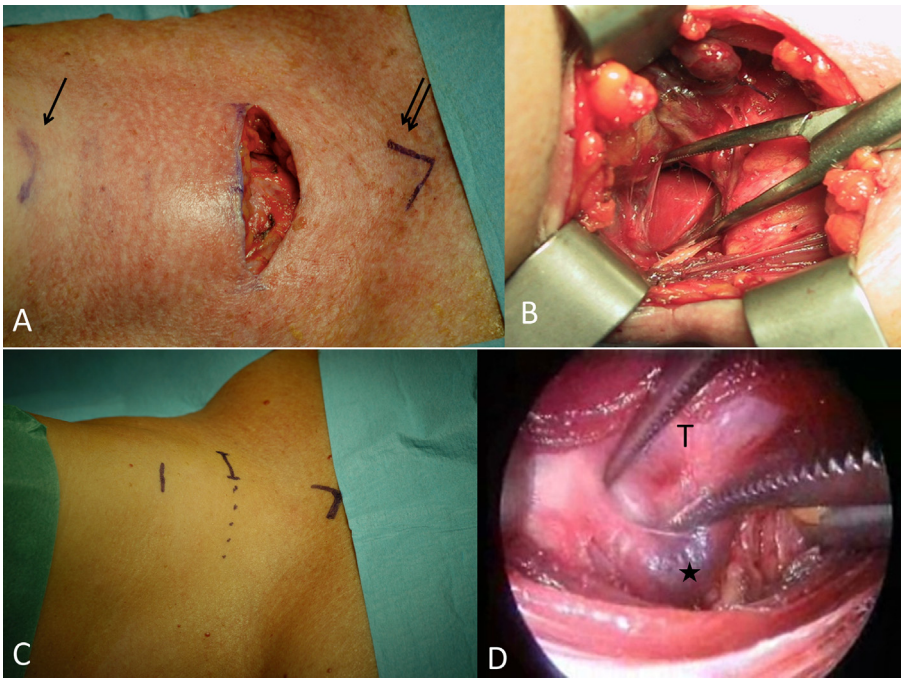

Fig. 1. Minimally invasive parathyroidectomy techniques by classical cervicotomy (MIP-C): A. Incision line (single arrow: thyroid cartilage notch; double arrow: sternal fork). B. Location of right inferior parathyroid adenoma in the thyroid cavity. C. Video-assisted minimally invasive parathyroidectomy (MIP-VA): A. 1–2 cm incision. D. Adenoma dissection under video-endoscopy.

2 MIP-C. There were thus 54 cases (48.2%) of MIP-VA and 58 (51.8%) of MIP-C.

2.2. Surgical technique

All patients were operated on under general anesthesia, except for one under local anesthesia with sedation. In MIP-C (Fig. 1A and B), standard cervical surgery instrumentation was used, with Farabeuf retractors. Laryngeal recurrent nerve monitoring (NIM 2.0 Medtronic®, MN) was performed in 69% of cases, depending on the surgeon's habits. A 3–4 cm medial basicervical incision was made; the skin, cutaneous muscle of the neck and subhyoid muscles were minimally dissected while allowing access to the thyroid. The thyroid lobe was retracted medially and the medial thyroid vein was ligated. The recurrent nerve was not systematically located. The adenoma was located and removed. Drainage was implemented in 50 cases (86%).

In MIP-VA (Fig. 2A and B), a 1–2 cm incision was made, laterally as for a classical incision. Under visual control, the subhyoid muscles were transfixed until the thyroid cavity was reached. A 4 mm endoscope with 25° angulation was introduced. Leroux-Robert retractors were used to retract the carotid axis laterally and the tracheal axis medially. Thin Dessi bipolar forceps were used for microcoagulation during dissection. Recurrent nerve monitoring was implemented in 53 cases (98%). The recurrent nerve was systematically located. The adenoma was located, progressively dissected, and removed after coagulation or clipping of the pedicle. No drainage was used.

Whichever the type of surgery, frozen-section examination was systematic, to confirm the parathyroid nature of the specimen.

Surgery was performed with full admission either on the eve or in the morning of the operation. Postoperative stay was recorded. Calcemia and intact parathyroid hormone (PTHi) were assayed in the morning of postoperative day 1; discharge was decided on according to calcemia, drainage volume if applicable, and absence of complications.

2.3. Data collection

Data were rendered anonymous and collated on an Excel spreadsheet (Microsoft Corp., CA).

Surgical and hospital data were collected from medical files: age; gender; preoperative parathyroid hormone (PTH) and creatine levels; type of surgery (MIP-C or MIP-VA); operating time (from incision to leaving theater); recurrent nerve monitoring or not; any technical cross-over and its reasons; parathyroid adenoma size; postoperative calcemia; PTH at day 1, 3 months and 1 year; postoperative hospital stay (nights); and complications (hematoma, recurrent nerve palsy, surgery site infection, hypocalcemia). Patients were considered not under control if corrected calcemia exceeded 2.60 mmol/L at 3 months. Laryngeal endoscopy was systematically performed immediately after surgery or at the postoperative check-up. A satisfaction questionnaire was sent by mail with a prepaid addressed reply envelope at a mean 19 months (SD, 13 months) after surgery. It comprised 7 questions, with a printed

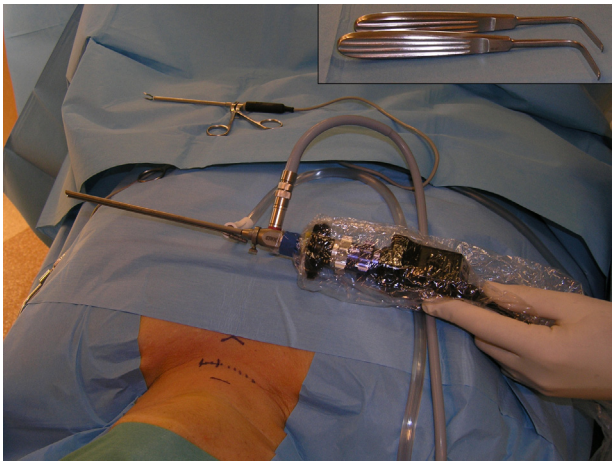

Fig. 2. Equipment for video-assisted minimally invasive parathyroidectomy (MIP-VA): Leroux-Robert retractors in sealed pack.