Minimally Invasive Video-Assisted Thyroid Surgery in Children: A Single Center Ten-Years Experience

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Background

During last years, improved tools for diagnosis in thyroid pathologies in childhood together with a wider and more accurate use in ultrasound techniques have lead to consider minimally invasive video-assisted thyroidectomy (MIVAT) as having several advantages over conventional thyroid surgery, with a less painful post-surgery course and a better aesthetic result. In USA, MIVAT is probably the most commonly approach for minimally-invasive thyroid surgery. In general, MIVAT indications include: 1) thyroid nodules with diameter ≤ 35 mm; 2) papillary thyroid carcinoma with diameter ≤ 30 mm without ultrasound evidence of lymphnodes involvement. Although MIVAT approach in children has been already described, extensive data in pediatrics are lacking.

Objective and hypotheses

Endpoints of our study were to evaluate technical success of MIVAT defined as completion and efficacy of the procedure and the related complications (such as transient or permanent hypoparathyroidism, transient or permanent recurrent laryngeal nerve injury, postoperative hemorrhage) in a cohort of children affected by both benign and malignant thyroid diseases during the last 10 years.

Patients and methods

32 children (24 females, 8 males; age range: 4.37-17.7 years; mean age 13.82 ± 3.19) were submitted to MIVAT thyroidectomy for benign (n= 21; 15 F, 6 M) and malignant (n= 11; 9 F, 2 M) thyroid disease. Among patients submitted to surgery for multinodular goiter and single nodules, the major diameter was 18.32 ± 10 mm (range: 6 - 35 mm). In the MIVAT technique patient is placed in a supine position (without neck hyperextension); the length of the incision was 2 cm (2 cm above sternal notch); a 30° 5 mm endoscope is introduced through the incision and the operation is then performed using a specifically kit (Figures 1, 2 and 3).

Surgical procedures included Total Thyroidectomy (TT) in 19 pts; TT plus central neck lymphadenectomy (TT+CNL) in 3 pts. Hemithyroidectomy (HT) in 10 pts. Completion thyroidectomy (CTT) needed to be performed in 3 pts initially treated by HT as definitive therapy for carcinoma (WDC).

- TT was performed for definitive therapy of hyperparathyroidism (n= 7), multinodular goiters (n= 6), WDC (n= 4), pheochromocytoma of medullary carcinoma (MTC) in positive oncogene RET mutation (n= 1), MTC (n=1).
- TT+CNL was performed for therapy of MTC (n=1) and WDC (n= 2).
- HT was performed for a single benign nodules (n= 7) and WDC (n= 3), than followed by a CTT.

Results

Among all pts, transient RLN injury was registered in one patient (3,1 %). Transient hypoparathyroidism occurred in 6 patients (18,7 %) and permanent hypoparathyroidism in 2 patients (6,2%) affected by Graves' disease (one of them with micropapillary carcinoma). Surgical complications are listed in table 2 and 3.

Table 1: Type of surgery, age, sex, thyroid diseases.

<table>
<thead>
<tr>
<th>Groups</th>
<th>TT</th>
<th>TT+CNL</th>
<th>HT*</th>
</tr>
</thead>
<tbody>
<tr>
<td>N patients</td>
<td>19</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Age at surgery</td>
<td>13,33 ± 3.5</td>
<td>15,69 ± 3.64</td>
<td>14,19 ± 2,24</td>
</tr>
<tr>
<td>Sex (M/F)</td>
<td>5/14</td>
<td>1/2</td>
<td>2/8</td>
</tr>
<tr>
<td>Multinodular goiters</td>
<td>6</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>WDC</td>
<td>4</td>
<td>2</td>
<td>0*</td>
</tr>
<tr>
<td>MTC</td>
<td>1</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>Hyperparathyroidism</td>
<td>7</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>MTC Phrygipapitis in oncogene RET mutation</td>
<td>--</td>
<td>--</td>
<td>1</td>
</tr>
<tr>
<td>Single benign nodules</td>
<td>--</td>
<td>--</td>
<td>7</td>
</tr>
</tbody>
</table>

Conclusions

These data show that MIVAT technique is safe and effective in the treatment of benign and malignant thyroid diseases in childhood; it can be used on a regular basis by a surgical team with a specific experience in thyroid surgery. The percentage of peri- and post-operative complications seem to be lower than conventional thyroid surgery. Hemithyroidectomy does not show any adverse event; permanent hypocalcemia was observed only in TT. The greater number of complications related to parathyroid injury has been observed in MIVAT TT performed for malignancies.

A collaborative team (expert thyroid endocrine surgeons and endocrinologists) is necessary in order to minimize complications related to thyroid surgery in children.

References