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Comparison of total endoscopic thyroidectomy with conventional open thyroidectomy for treatment of papillary thyroid cancer: A review

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REVIEW

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ABSTRACT

Background
Recent advance of endoscopic techniques has allowed surgeons to perform thyroidectomy via an incision placement at hidden places which lead to better cosmetic acceptability compared with conventional open thyroidectomy.

Aims
This study was conducted to summarize the current evidence that compare open thyroidectomy with endoscopic thyroidectomy in treatment of papillary thyroid cancer.

Methods
An electronic literature review, including PubMed, Google Scholar, and EBSCO that examining randomized trials of endoscopic thyroidectomy (ET), conventional open thyroidectomy (COT), and management of papillary thyroid carcinoma was carried out.

Results
The review included eight randomized studies that compare total endoscopic thyroidectomy versus conventional open thyroidectomy in treatment of papillary thyroid cancer. The findings showed endoscopic thyroidectomy had statically significant cosmetic appearance, less amount of blood loss and occurrence of transient hypocalcaemia than conventional open thyroidectomy in form of cosmetic outcome, amount lower blood loss.

Conclusion
The current review showed that, ET has a better cosmetic outcome and lower blood loss compared with COT. While COT was associated with significantly low operation time, hospital stay, drainage time, amount of drainage fluid and transient recurrent laryngeal nerve (RLN) palsy.

Key Words
Total endoscopic thyroidectomy, conventional open thyroidectomy, papillary thyroid cancer

What this review adds:

1. What is known about this subject?
Thyroid surgery has evolved towards minimal incisions and endoscopic approaches.

2. What new information is offered in this review?
In term of safety, ET was similar to COT for the treatment of thyroid cancer. The tumour recurrence rates and the level of surgical completeness in ET are similar to those obtained for COT.

3. What are the implications for research, policy, or practice?
Application of ET for PTC patients should be directed carefully. Further research that include long-term follow-up is necessary to confirm these findings.

Introduction

Papillary thyroid carcinoma (PTC) is defined as epithelial malignancy with follicular cell differentiation showing a set of distinctive nuclear features. PTS has been reported to be the most common thyroid carcinoma with the best-known prognosis.[1,2] PTS arises mostly during middle age with three folds increased risk among females than males with median age at presentation 50 years.[3]

Primary management choices of PTS rely on preoperative risk assessment which may include clinical, imaging, and cytological data. Location, extent of recognizable tumour and the risk that unidentifiable disease foci are also factors that affect management choice.[4]

Conventional open thyroidectomy (COT) include excision of the tumour through a skin incision in the anterior neck has good direct exposure to facilitate safe dissection and a quick operation with low morbidity and minimal mortality but also result in a incision on the neck leaving scar that compromises a patient's cosmetic appearance.[5,6]

Recent advance of endoscopic techniques has allowed surgeons to perform thyroidectomy via an incision placement at hidden places with a smaller incision resulting in non-evident scars and better cosmetic acceptability.[7] Endoscopic thyroidectomy (ET) has recently attracted broader interest from doctors creating variable surgical approaches with successful results as endoscopic ET, endoscopic resection of the thyroid gland via breast access approach and other minimally invasive endoscopic surgery.[8,9] Each approach has different importance and disadvantages with regard to the exposure of the surgical field, instrumentation, learning curve to competency, and preservation of critical structures.[10]

Method

An electronic literature review, including PubMed, Google Scholar, and EBSCO using the following terms in different combinations: endoscopic thyroidectomy, conventional open thyroidectomy, and management of papillary thyroid carcinoma. We included all studies that directly compared the outcomes of TET with COT for treatment of patients with PTC. Randomized clinical trials (RCTs) were included in the dataset. Studies that did not compare TET to COT, or conduct statistical analyses of the clinical data and non-randomized clinical trials were excluded, as were duplicate publications, narrative reviews, and opinions pieces.

Results

The search of the mentioned databases returned a total of 103 studies that were included for title screening. 57 of them were included for abstract screening, which lead to the exclusion of 33 articles. The remaining 24 publications full texts were reviewed. The full-text revision lead to the exclusion of 16 studies, and eight were enrolled for final data extraction.

Lee et al.[11] found similar changes over time in both groups. However, endoscopic thyroidectomy patients showed greater improvement in emotional function at one month and physical function at three month, while pain increased more in the patients who underwent endoscopic thyroidectomy at 1 month (p=0.042).

Min et al.[12] found that; patients, young female rather than male, and with a limited size of thyroid cancer, tended to favour endoscopic surgery to open surgery. In the meantime, there were no clinically important variations in postoperative complications. No recurrence or death cases have been observed during brief follow-up times.

Chung et al. reported 3.18 days as the mean hospitalization time following open thyroidectomy and 3.04 days after endoscopic thyroidectomy. No major variations in postoperative TG levels, hypocalcaemia or permanent vocal cord palsy have been identified. Transient vocal cord palsy existed in 2.5 percent of patients with open thyroidectomy and 25.2 percent with endoscopic thyroidectomy (p<0.0001) but vanished within 3 months. Cosmetic findings after endoscopic thyroidectomy were excellent.[13]

Jiang et al (2020) reported that; TET is seen to be relatively similar to COT in terms of surgical comprehensiveness and adverse effect rate, while TET helped to reduce percentages of transient hypocalcaemia (p<0.05), lower numbers of recovered lymph nodes (p<0.05), and improved cosmetic satisfaction (p<0.05). COT was associated with shorter running time (p<0.05) and reduced transient RLN palsy (p<0.05).[14]

Koh et al. found that was more prevalent among younger patients and females. The lobectomy and unilateral central compartment neck dissection were done more commonly in ET with smaller mean tumour size. Extra-thyroidal extension, multiplicity and lymphatic invasion was more common in OT. ET had longer mean surgical time while OT had greater number of retrieved lymph nodes. Transient hypocalcaemia incidence was significantly higher in OT, but the incidence of permanent hypocalcaemia and transient/permanent recurrent laryngeal nerve (RLN) injury were similar in both groups.[15]

Lee et al. found that; COT had shorter operation time than ET. No significant differences in tumour size were recorded number of retrieved lymph nodes or postoperative hospital stay. ET patients experienced more pain than COT patients. Patients underwent ET operation were very satisfied with mean follow-up period 54.3 months.[16]

Cong et al. reported no significant differences between ET and OT in terms of retrieved lymph nodes, blood loss, transient hypocalcaemia, permanent hypocalcaemia, permanent RLN palsy, hematoma or bleeding and seroma. Rates of recurrence were comparable whereas the proportions of stimulated thyroglobulin levels measured after completion of thyroidectomy and radioactive iodine therapy were less in the ET than in the OT.[17,18]

Discussion

Endoscopic technique is generally considered to be less invasive with rapid recovery comparable to COT surgery. Although some physicians claim that endoscopic thyroid operation is more invasive and has a longer recovery than traditional thyroid surgery.[19] ET theoretically is a difficult operation. Tan et al.[20] reported that ET has a longer operation time, more post-operative pain, and more severe injury than conventional procedure although it is scar-less in the neck. He also reported a risk of conversion to open surgery in certain patients who undergo ET.

ET has been reported to have longer duration of drainage than in OT (P<0.00001) and high level of heterogeneity as well (P=0.01) in three studies.[21-23] Two studies out of these three reported that significance of the result was unchanged (P<0.00001), but no heterogeneity existed across the studies.[21.23] Chung et al.[24] reported that 25.2 per cent of ET patients had transient hypocalcemia but only 1.0 per cent had permanent hypoglycemia. He also reported that ET is considered safer alternative to open thyroidectomy. Another study reported incidence of permanent hypocalcemia after conventional open thyroidectomy is 0 per cent to 13 per cent.[25] Numerous other studies reported rates of permanent hypoparathyroidism at 3.2 per cent to 8.0 per cent.[26,27] Other researches assessed the volume of drainage defined a larger amount of drainage in the ET group with high level of heterogeneity among the studies (P<0.00001).[28.29] Other previous study found that ET is associated with reduced blood loss (P<0.00001) and better cosmetic satisfaction (P<0.00001) than although OT has operation time (P=0.03) and lower hospital costs (P=0.0010). ET and OT did not show significantly difference in of drainage volume, complication rate, including for transient recurrent laryngeal nerve palsy, transient hypocalcemia, postoperative hypothyroidism, and recurrent hyperthyroidism.[9]

Regarding other complications, no heterogeneity existed across studies and no significant differences between the ET and OT groups were observed for postoperative hematoma, bleeding or seroma.[17] Another study reported that major complications of ET include injury to the recurrent laryngeal nerve and parathyroid gland.[30]

Conclusion

The current review showed that, ET has a better cosmetic outcome and lower blood loss compared with COT. While COT was associated with significantly low operation time, hospital stay, drainage time, amount of drainage fluid and transient recurrent laryngeal nerve (RLN) palsy.

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CONFLICTS OF INTEREST

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