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Role of Prophylactic Thyroid Neck Dissection in Papillary Thyroid Cancer

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ABSTRACT

Background: the utility and efficacy of prophylactic central neck dissection with total thyroidectomy for treatment of differentiated thyroid cancers has been debated in the literature over the past few decades. Proponents of prophylactic central neck dissection support its routine use with the notion that it reduces local recurrence, increases accuracy in TNM staging and reduces surgical morbidity associated with reoperation. Conversely, those against the use of routine prophylactic central neck dissection argue there was no clear evidence which showed a reduction in recurrence or added benefit to survival, while the procedure increased the risk for complications and morbidity. This article discussed the role of prophylactic central neck dissection in the setting of thyroid cancer and reviewed recently published literatures to evaluate efficacy and safety of this procedure.The papillary thyroid carcinoma (PTC) is the most common disorder with favorable prognosis around the world. PTC has 90% survival rate, but the most important challenge was the lymph node metastases that would result in disease recurrence. There is a debate about the utility of prophylactic central neck dissection in the area of PTC. The available studies for performing PCND showed a difficulty in predicting its outcomes, but PCND could provide potential reduction in the recurrence rates and risks of performing another surgery in the neck. This review discussed the PCND advantages compared to its long term outcomes and morbidity.

Keywords: papillary thyroid carcinoma (PTC), prophylactic central neck dissection (pCND), metastases, lymph node.

INTRODUCTION

Differentiated thyroid cancer (DTC) is a major and most popular endocrine malignancy with a high prevalence among other types of cancers around the world [(1)]. The papillary thyroid carcinoma (PTC) represents about 85% of thyroid cancers and bout 35% of PTC patients had macrometastatic cervical lymph node metastases[(2, 3)].

Other studies showed an average of 60 % of PTC patients developed cervical lymph node metastases in the central compartment [(4-6)]. In spite high mortality rates of cancer, the 5-10 years survival rate of PTC patients was above 90% [(7)].

Total thyroidectomy (TT) surgery was the main corner stone in treatment of PTC, but about 15% of patients underwent total thyroidectomy would develop nodular recurrence, thus nodal metastases is an ideal prognostic factor for disease recurrence [(8, 9)].

The addition of prophylactic central neck dissection to the total thyroidectomy is a treatment of choice for preventing neck metastases and recurrence of nodules [(10-12)]. But this is still a debate in DTC patients with clinically node-negative because of there is a lack in the studies concerning this issue [(6, 13)].

Also, the American Thyroid Association (ATA) Guidelines for DTC patients recommended the addition of prophylactic central-compartment neck dissection (PCND) in PTC patients with clinically uncomplicated central neck lymph nodes (cN0) or clinically complicated lateral neck nodes (cN1b)[(14)].

Definition of central Neck Dissection (CND)

Till now there is an inconsistent definition of what CND is and what itcontains (15, 16).The ATA described the central compartment as a lymph node compartment bounded from the superior part by the hyoid bone, from the inferior part by the innominate artery and from the lateral part by the common carotid arteries[(15, 16)].

Also, it is bounded from the anterior and posterior parts by the superficial and deep layer of the deep cervical fascia. Also, as for the nodal groups, it included the pre- and para-tracheal, as well as prelaryngeal lymph node basin [(17, 18)].

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Significance of PCND

The central compartment is the most common site for nodal metastases in PTC patients, thus removing the lymph nodes is supposed to reduce the recurrence rate [14, 19].

Effects on Survival

The survival rate of PTC patients was greater than 90% for more than 10 years, thus the impacts of PCND was difficult to be evaluated due to the long term of survival and the length of follow up required for the study. However, a retrospective long term study showed that the survival rate after performing PCND with TT was significantly higher (98%) when compared to 92.5% in those patients who underwent TT alone thus PCND is suggested to increase the survival rate [20].

Effects on Local Recurrence

The PCND was supposed to eliminate the nodal recurrence in the central compartment for PTC patients by removing the metastatic positions and histological analysis of the suspected lymph nodes for identification of metastases [14, 21]. Also, a significant reduction in the nodal recurrence by 35% was observed by **Lang *et al.*,**[19] when performing TT associated with PCND in comparison with TT alone. Another study proposed the same results, but for short term survival rate (5 years) and indicated the impact of PCND in reducing the rates of recurrence [13]. However, after addition of radioactive iodine ablation (RAI) therapy, the reduction in the recurrence showed no significant difference either between TT with PCND group or TT alone group [20].

Other studies also showed that there was no significant difference in recurrence rate in TT group combined with PCND than TT alone group [5, 22-24].

Outcomes of PCND

Many studies referred to the complications of PCND during performing TT [25, 26]. The risks of hematoma, hypoparathyroidism and recurrence of laryngeal nerve injury are major complications of PCND like those consequences of total thyroidectomy with rates less than 1-2% suggesting that PCND is of no value [27].Also, other studies showed that the risks of temporary hypoparathyroidism are potentially increased after addition of PCND to TT [5, 19, 28, 29]. However, the complications of the surgery could be minimized with a specialist to avoid the risks of division and manipulations of parathyroid vasculature during dissection [26, 30]. In addition, the bilateral dissection was significantly associated with higher complications rates than ipsilateral type associated with a higher complication rate including permanent hypoparathyroidism[31, 32].

Other risks for PCND are the high morbidity rates and recurrent laryngeal nerve palsy which would result in threatening of life as well as the paralysis of the vocal cord [33].

The complications of PCND could be prevented or lessened by taking care of the operation procedures and having good visualization of recurrent laryngeal nerve during the dissection. Also, the closure should be carried out using sharp dissection instead of electrocautery that would result in spread of injury and thermal [34].

Also, a study showed that the utility of prophylactic CND for PTC patients with no value on recurrence or other complications of TT [35].

In addition, the use of PCND was supposed to be restricted to high risk patients with an experienced surgeon because its efficiency isin adequate to compensate its complications [36].

CONCLUSION

There is still a debate surrounding the issue of adding PCND to TT for clinically uncomplicated central neck lymph nodes (cN0) or clinically complicated lateral neck nodes (cN1b). Also, the ATA presented many contradictions for emerging PCND in routine TT surgery for PTC patients, but its recommendations is based on the risks and stages of tumor. Many studies declared that there was a tendency toward using PCND for decreasing the risks of recurrence than in patients without PCND. Thus, PCND could be used for decreasing the recurrence rate, identification and removing of metastases.Also, using an ipsilateral unilateral pCNDwould result in decreasing the disease recurrence and balance the surgical morbidity. On the other hand, the advantages of PCND couldn't compensate its outcomes in other studies. More prospective studies with large population size are needed for assessing the long term benefits of PCND.

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