

Surgical treatment for differentiated thyroid cancer

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This subject has many contentious aspects. For the vast majority of patients, outcome is excellent irrespective of the extent of surgery. The low number of recurrences and deaths has made prospective trials difficult; as such, very few exist. The aim of surgery is to rid the patient of macroscopic disease, reduce the chance of recurrence and minimise surgical morbidity. Achieving a balance between these aims is critical. In addition, the surgeon must consider whether radioactive iodine is to be recommended. In low-risk cases this is rarely indicated, whereas in high-risk patients it is used almost universally. Risk stratification is therefore critical. In high-risk patients with nodal or distant metastases, total thyroidectomy will be performed to eradicate disease in the thyroid and prepare the patient for radioactive iodine. For low-risk patients with a single focus of disease limited to the thyroid, a thyroid lobectomy can be offered. This has the significant advantage of protecting the contralateral RLN and parathyroid glands. This approach is now considered appropriate unless there are high-risk features of disease. In terms of the neck, when metastatic disease is present, a therapeutic compartment-orientated neck dissection should be performed to remove disease from the central or lateral neck, depending on the site of involvement. The role of elective neck surgery when no disease in the nodes is detected preoperatively is far more controversial. Lateral neck dissection carries significant morbidity and, despite high rates of occult metastases in PTC, has been abandoned. The reason for this is that, even in patients who are thought to have occult metastases, very few progress to clinically meaningful disease. In contrast, the morbidity of central neck dissection is lower, and the compartment has to be opened during a thyroidectomy. In addition, salvage surgery in the central neck carries a high risk to the RLN and parathyroid glands. For these reasons elective central neck dissection has been popular in the last few decades. However, increased recognition that performing such surgery in all patients with PTC leads to high rates of morbidity and the lack of evidence that outcomes improve as a result of more aggressive surgery have led to a move away from this practice. At this point, patients who are considered at highest risk of having occult metastases in the central neck (those with extrathyroid extension, for example) are considered most likely to benefit from elective surgery. It is not recommended routinely in low-risk patients. Many patients will only be diagnosed with their thyroid cancer following a diagnostic lobectomy. In this setting, risk

- risk, further surgery is unlikely to be beneficial and active surveillance should be considered. This approach, pioneered in Japan, has been adopted in a number of centres for PTCs <1 cm as only 30% of patients develop tumour growth that requires intervention. Larger tumours and younger patients are at higher risk and radioactive iodine may be recommended, in which case completion thyroidectomy may be required. Given the complexity of decision making in thyroid

cancer and the different groups involved (surgeons, endocrinologists, radiologists, cytologists, pathologists and nuclear medicine physicians), all cases should be discussed in a multidisciplinary setting. Thyroxine Following surgery , thyroid cells (both normal and malignant) can be suppressed using high doses of thyroxine. This was once considered routine for all differentiated thyroid cancers during follow-up. Again, risk stratification has modified the approach to these patients. Following surgery , patients can be considered high or low risk. For those patients at high risk from disease, thyroxine will be prescribed at levels that suppress TSH without making the patient biochemically hyperthyroid. In contrast, low-risk patients may be considered for thyroxine replacement at physiological levels. In this patient group, a balance of benefit (remember these patients have extremely low rates of recurrence or death) versus risk must be made. In particular, long-term TSH suppression can result in cardiac arrhythmia and osteoporosis. As such the multidisciplinary team should consider all risks during follow-up to strike this balance. Radioiodine ¹³¹I can be given to deliver tumoricidal doses of radioactivity directly to thyroid tissue, both benign and malignant. In the setting of thyroid cancer, all normal tissue should be removed (total thyroidectomy) along with any gross neck disease (neck dissection) in order for any residual microscopic disease or distant metastases to receive an optimal dose. Radioiodine treatment is not an alternative to surgical resection for resectable disease. In order to effectively drive the radioiodine into cells, high levels of TSH are required. This can be achieved by rendering the patient hypothyroid (off thyroxine) or by using recombinant TSH, which is injected prior to radioiodine administration. Following radioiodine administration, an uptake scan is performed. This demonstrates areas of iodine uptake in the whole body and can be used to identify any metastatic disease not recognised on initial imaging. This information is useful for risk stratification following initial therapy . Outside the setting of primary treatment, radioiodine treatment may be considered in cases of recurrence. Multiple doses can be used to treat unresectable disease or distant metastases. Most differentiated thyroid cancers will concentrate iodine. However, with advancing patient age and particularly if disease is multiply recurrent the tumour will lose iodine avidity . This is called radioiodine refractory disease. Such cases may be considered for external beam radiotherapy , although this is uncommon. - Thyroglobulin is a tumour marker produced by normal thyroid cells and most differentiated thyroid cancers and offers an extremely accurate method of following patients postoperatively . If a lobectomy has been performed the level will not be undetectable, but trends can be used to monitor for recurrence. Following total thyroidectomy , the aim is to have an undetectable thyroglobulin. Patients who achieve this point are at extremely low risk of recurrence. Serial thyroglobulin measurement (6- to 12-monthly) combined with ultrasonographic assessment of the neck can then be used to monitor patients during follow-up. If an undetectable level is not achieved, the thyroglobulin can be followed. If it increases, imaging should be performed to look for gross recurrent disease. Resectable disease should be addressed surgically , and normally further radioactive iodine would be indicated. The role of radioactive iodine in a rising thyroglobulin without structural disease is controversial.

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