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Editorial

Pediatric Thyroid Cancer: A Surgical Challenge

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Friedman and colleagues from various institutions such as Minsk, Belarus; Brooklyn, New York; Hong Kong; and Australia have reported a very impressive and large study of complications of thyroid surgery in childhood papillary thyroid carcinomas [1]. This clearly represents one of the largest series of surgery in pediatric thyroid cancer affected by the Chernobyl nuclear accident. The authors have divided their patients into 3 groups: one affected by external radiation therapy for other pediatric tumors, Chernobyl-affected pediatric thyroid cancer, and post-Chernobyl pediatric thyroid cancer. Even though they have not shown the difference in overall complications in these groups, it appears that the Chernobyl group has more diffuse thyroid cancer with high incidence of central and lateral lymph node metastasis. This is a different group of pediatric thyroid cancer than we commonly see in the United States, presenting either as a solitary thyroid nodule or a lymph node in the neck. Even though overall biological behavior of Chernobyl-affected pediatric thyroid cancer remains unclear, it is apparent from several publications that there is a higher incidence of nodal metastasis, frequent recurrences, and higher incidence of distant metastasis [1]. The authors have concluded that total thyroidectomy and bilateral, central, and lateral neck dissections for children and adolescents with papillary thyroid carcinoma was associated with substantial postoperative complications. They also concluded that it was associated with better prognosis for young patients with thyroid cancer.

The authors have added that prophylactic compartment-oriented lymph node dissections could be the management protocol in experienced hands. Clearly, pediatric thyroid cancer surgery is much more complicated than for adults with higher risk of complications, both in relation to nerve injury and temporary and permanent hypoparathyroidism. A young individual with bilateral recurrent laryngeal nerve injury may suffer from the surgical complications rather than the disease itself. Appropriate surgical resection and removal of entire gross tumor is very critical in thyroid cancer. Obviously, one needs to be cognizant about higher incidence of complications, particularly with locally aggressive thyroid cancer and prophylactic or therapeutic central compartment dissection, especially if it is performed on both sides [2]. This is one of the largest series of pediatric thyroid cancer that honestly discusses complications that clearly raise concerns about pediatric thyroid cancer surgery.

It is very important that these patients be referred to a center of excellence dealing regularly with pediatric thyroid cancer. The identification of the recurrent laryngeal nerve, parathyroid glands, and their preservation may be quite difficult to an inexperienced hand. The authors have reported permanent surgical morbidity in 14% of patients who underwent total thyroidectomy, as well as bilateral central and lateral neck dissections [1]. Interestingly, they have concluded that the factors associated with permanent complications included nodal metastasis with extranodal extension, more than 4 positive lymph nodes in the central compartment, presence of distant metastases, and age of each patient at the time of surgery. This is important information in relation to pediatric thyroid cancer.

The authors have also reported that patients undergoing radical surgery had better relapse-free survival rates. Referring to the complications of the entire group, the authors reported 141 patients who developed complications. Seventy-seven were transient, and 77 were permanent. In transient complications, 80% had hypoparathyroidism, and 12% had recurrent laryngeal nerve palsy. There were 2 patients with bilateral nerve injury [1]. Even though we do not have the details for these 2 patients, we are very concerned about the long-term outcome of these patients. They have correlated the risk factors for permanent surgical morbidity as: younger age, larger tumors, widespread nodal disease, and the presence of distant metastasis [1]. We are not convinced the relation between presence of distant metastasis and surgical morbidity. Interestingly, none of the patients in this large series died of thyroid cancer, which goes along with the general data of thyroid cancer in the pediatric age group.

They have also reported that the patients undergoing extensive surgery had better relapse-free survival. It is associated with better prognosis in young patients. Debate about extent of thyroidectomy and extent of neck dissection continues to be a major subject of controversy, especially in adults and also in children. The new American Thyroid Association guidelines have referred to the appropriate considerations, based on the extent of disease [3,4].

The pathological information in this manuscript is quite interesting. The authors have reported 32% of the patients with papillary/follicular pathology. Solid component was noted in 35%, lymphatic permeation in 92%, and vascular invasion in 22% [1]. Interestingly, extensive desmoplastic reaction was noted in 38% of

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the children.

The clinical features reported by the authors include that 36% of patients have unilateral carcinoma. However, only 11% of the patients had no nodal disease. Ipsilateral nodal metastasis was noted in 60% and bilateral in 11%. Extranodal disease was noted in 33%. Minimal extrathyroidal extension was noted in 52%, while distant metastasis at presentation was noted in 14% [1].

One of the major issues in thyroid cancer is further recurrences either in the central compartment or in the lateral neck disease. The reported incidences vary from 10% to 30%. However, most of the time, it remains unclear whether this is a persistent disease or recurrent disease after an extended disease-free interval. Our experience has revealed that a majority of these are persistent diseases, which were either not identified at the time of initial surgery or remained unresected. The areas where the recurrences are common are in the depth of paratracheal area, retro-jugular area, level V nodal region, or high jugular lymph nodes near the digastric musculature. The authors have concentrated their manuscript on extent of thyroid surgery and neck dissection and complications.

The biological impact of Chernobyl-induced thyroid cancer and its clinical behavior remains unclear, even though many would think this is likely a more aggressive disease. Whether specific molecular testing would help understand this biology remains somewhat unclear. Interestingly, the authors have reported only 5 patients with Chyle leak. Our overall experience of neck dissection has been higher incidence of Chyle leak, which results in continued morbidity in relation to recovery from thyroid surgery [5]. Vocal cord evaluation in children may be difficult, especially fiberoptic laryngoscopy. Cross sectional imaging studies, such as a CT scan with contrast, may be difficult in children who may need to be sedated. This may lead to under evaluation of the extent of the disease, especially in critical areas. The authors have reported higher incidence of distant metastasis in relation to Chernobyl-induced thyroid cancer.

We are somewhat concerned about the follow-up strategy the surgeons have used in their manuscript. The follow-up information data were collected from regional address bureaus and Departments of Public Health. The authors have mentioned that continual I-131courses were given to patients with evident local recurrence or distant metastasis. This approach appears to be somewhat confusing, especially whether continual use of I-131 is of any help or if appropriate evaluation should be made for surgical resection (if possible). The authors have honestly described their complications in this series, which clearly is higher compared to adult thyroidectomies. This may be related to higher incidence of central compartment nodes, leading to nerve injuries and hypoparathyroidism. We would think the surgical morbidity is related to the surgical procedure and the extent of the disease in the central compartment, rather than presence of distant metastasis. Interestingly, the authors have reported parathyroid glands detected in the surgical specimens in 19% of the patients [1]. This is probably the standard number seen today, especially with extensive search by the pathologists for peri-thyroid and intra-thyroid parathyroid glands. We do not think the presence of 1 or 2 parathyroid glands in pathology would lead to permanent hypoparathyroidism, unless other glands are also devascularized.

One needs to be extremely concerned about operating on pediatric patients for thyroid cancer to avoid surgical morbidity, which is long lasting. The complications related to nerve injury or parathyroid problems can be quite devastating to the growth of children and associated problems of maintaining normocalcemia as they grow. If a patient has one paralyzed vocal cord, managing the disease on the other side may be a major undertaking and concern in long-term follow up. Management of pediatric thyroid cancer is clearly a major concern for thyroid surgeons, and a referral should be made to an appropriate institution where there is a reasonable experience of operating on pediatric thyroid cancer patients. We would like to take the opportunity to congratulate the authors for their honest reporting and adding more information both to Chernobyl-related pediatric thyroid cancer and overall management of pediatric thyroid cancer.

Conflicts of interest statement

None declared.

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