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# Differentiated Thyroid Cancer in Children (Retrospective Study of 6 Cases)

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**Abstract:** Thyroid carcinoma in childhood has a low incidence; the most common is the papillary thyroid carcinoma. The treatment is still contra versed. Tumoral staging is advanced, compares to adult patients (multifocal disease, pulmonary metastases, tumor characteristics, lymph node metastasis). The thyroid carcinoma has a good prognosis with a low mortality rate. The optimal treatment for children and adolescents with papillary thyroid carcinoma is still debated. However such agressive treatment is associated with an increased risk of surgical complications including hypocalcemia and dommage to the recurrent laryngeal nerve (10-15%). A less agressiv treatment is associated with a higher risk of recurrence (20-40%). Our work is a retrospective study about 7 patients treated in our service. Treatment consisted of a total thyroidectomy with lymph node dissections out and I 131 after that the initial surgery were realised. Surgery complications are lower for surgeons with a long experience.
**Keywords:** Cancer, thyroid, differentiated, child.

## INTRODUCTION

Differentiated thyroid cancers (CDT) are malignant epithelial tumors of the follicular strain. In children and adolescents they are rare tumors, apart from exposure to radiation as was the case in 1986 in Ukraine after the Chernobyl disaster.

They represent 1.5% of all tumors before 15 years and 7% of tumors of the head and neck [1-3]. The maximum peak frequency is between 7 and 12 years old. The papillary histological type remains predominant [1, 3]. The treatment is based on surgery, radioactive iodine and suppressive hormone therapy for TSH. The prognosis is generally favorable even in case of significant initial extension and even after local relapse, with a 20-year survival greater than 90%. The possibility of late recurrence after initial treatment suggests lifetime monitoring [4]. The purpose of our work is to highlight the pediatric and clinical features of thyroid cancer in children and adolescents, and to evaluate the response to treatment, as well as the prognosis across a series of 6 case.

## MATERIALS & METHODS

Through a retrospective study, we report six cases of children with differentiated thyroid cancer who had been operated on the pediatric visceral surgery "A" at the RABAT Children's Hospital. We compare our data with those known in the literature.

## RESULTS

The average age of this series was 11 years 8 months with extremes ranging from 6 years to 15 years. We note that more than 83% (5 out of 6) of patients are older than 10 years. The sex ratio of this series notes a female predominance 1/5 (1 boys for 5 girls). (Figure 1) None of these children had a prior history of cervical or family irradiation of thyroid pathologies.

The circumstances of discovery were diverse (Figure 2):

- In 66% of the cases (4 cases out of 6), this was an isolated thyroid nodule.
- In 1 in 6 children, the clinical presentation was cervical swelling corresponding to lymphadenopathy.
- 1 case occurred for a papular lesion.

1 case of cancer was associated with hyperthyroidism. No cases of hypothyroidism associated with cancer have been found. No distant visceral metastasis and in particular no pulmonary metastasis were found at the time of diagnosis.

The cervical and thyroid ultrasound performed in all our patients showed an isolated nodule or hypertrophy of the thyroid gland with or without cervical lymphadenopathy. In one case the ultrasound was normal.

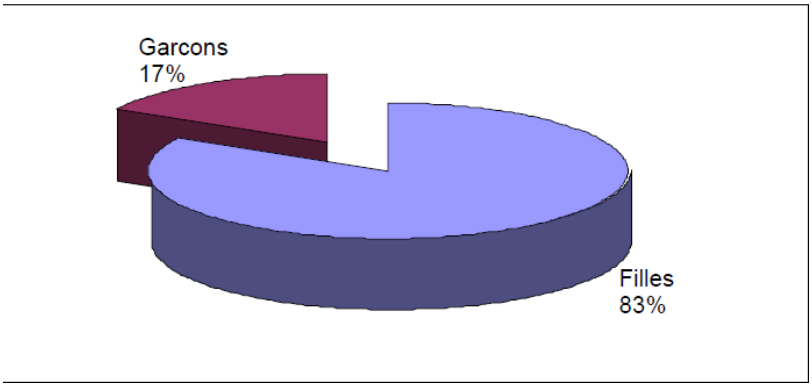


**Fig-1: Distribution of all patients by sex**

| Malade | Age | Sexe | Signes Cliniques évocateurs | Scintigraphie Thyroïdienne | Traitement | Anatomo pathologie |
|---|---|---|---|---|---|---|
| 1 | 6ans | M | Nodule cervical | Nodule froid inféro et médio externe gauche | Isthmo-lobectomie gauche | papillaire |
| 2 | 11ans | F | lésion papuleuse | hypertrophie du lobe droit | Lobectomie droite | Vésiculaire |
| 3 | 15ans | F | Nodule thyroïdien | Nodule isthmo-lobaire droit | Thyroïdectomie totale en 2 temps | Vésiculaire variante papillaire |
| 4 | 12ans | F | adénopathie cervicale | hypertrophie du lobe gauche | Thyroïdectomie totale en 2 temps+curage | Papillaire |
| 5 | 12ans | F | nodule cervical | Normale | Thyroïdectomie totale en 1 temps+curage | Papillaire |
| 6 | 14ans | F | nodule thyroïdien | Nodule froid du lobe droit+hypertrophie du lobe gauche | Thyroïdectomie subtotale+ curage | Papillaire |

**Fig-2: Table summarizing all the observations collected**

The thyroid scintigraphy performed in all our patients found in 50% of cases (3 cases out of 6) a cold nodule, in 2 cases (33%) it was a hypertrophy of a lobe and in one case the scintigraphy was normal income.

The cervical scan was performed in one case. Chest X-ray was normal in all our patients. She did not reveal any cases of pulmonary metastasis. Standard biology does not show any notable peculiarities.

All the surgical specimens were the subject of an anatomopathological examination and thus the definitive histological examination found in our series:

- 4 cases of papillary carcinoma (67%).
- 2 cases of vesicular carcinoma (33%).

Therapeutically; all the patients were operated on.

- A lobectomy or isthmolobectomy was performed in 66% of cases (4 out of 6 cases).
- 1 case of subtotal thyroidectomy was performed.
- In one case a total thyroidectomy in 1 time was performed.

Lymph node dissection was performed in 3 children or 50%. Of the 4 isthmo-lobectomies initially performed, 2 secondary tabulations were performed. Immediate operative follow-ups were simple for the majority of these operated patients. No patient died from thyroid surgery. No cases of recurrent palsy were detected. No postoperative hypoparathyroidism was observed.

All the patients were put under treatment blocking thyrotropic function. Radioactive iodine was administered in 66% of the cases (4 cases out of 6). No cardiac event occurred after the implementation of a braking treatment. No growth disorder has appeared.

## DISCUSSION

Differentiated thyroid cancer is a condition where age is recognized as the most important prognostic factor. This type of cancer has several characteristics that should be remembered because they affect the treatment. The incidence is low: 0.2 to 5 cases per million per year in children under 20 years of age. It is exceptional before the age of 10 and its incidence increases with age with a peak incidence around 15 years [5].

This incidence increased markedly after the Chernobyl disaster in the contaminated areas, however, irradiation does not seem to be the only determining factor, as evidenced by the lack of any notion of

irradiation in patients of our series [6]. Other factors could play a determining role such as genetic predisposition, stable iodine deficiency or hormonal factors. Currently, genetic predispositions are becoming more prominent, with 3 to 5% of thyroid cancer patients having a family member who also has thyroid cancer [7].

The sex ratio is predominantly female with a frequency of 69 to 79% depending on the series [8]. This predominance appears from puberty. Before adolescence, he is close to 1. The most frequently encountered histological type is papillary thyroid cancer (59% to 90%) [9], whether in its typical form, in its diffuse follicular or sclerosing variant. Clinical and pathological presentations differ from those of adults.

The telltale signs are dominated by cervical adenopathy whose association with the thyroid nodule remains the most evocative aspect [10]. Cervical ultrasound is part of the minimal assessment in order to establish a precise extension assessment guiding the surgical procedure [11].

Depending on the histological result (by needle aspiration or biopsy) and depending on the course of the disease, extension assessments may be recommended by means of imaging examinations (cervico-thoraco abdominopelvic CT).

However, important and aggressive tumor lesions (extra thyroid extension, multifocal, capsular rupture lymphadenopathies) are present in the diagnosis in children, the incidence of ganglion invasion and metastases at initial distance is higher. The evolution is often complicated by early and / or late recurrences whether they are locoregional or distant metastatic (up to 40%).

The extension can be made to the lungs, which remains the most frequent secondary location and looks like a whole-body scan isotopic miliaria, rarely revealed on a standard chest X-ray, and is generally very satisfactory [12]. The ganglionic recurrence is important, evaluated from 21 to 29%, but which remains curable, thanks to the combination of surgery and radioactive iodine [10].

However, in this age group, less than 21 years old, with particular clinical, tumoral and evolutionary characteristics, the prognosis is better than in the adult population. Despite the aggressive presentation (cervical and distant metastases, frequent recurrences), the prognosis is excellent (low mortality) with a 20-year survival greater than 90%. A recent study of 215 children reported a 40-year specific mortality of 2% [4].

Unlike differentiated thyroid cancer in adults where many prognostic factors; clinical and pathological have been identified, in children and adolescents all prognostic factors have not been individualized, furthermore some studies are discordant (histological type). Immunohistochemical and molecular biology prognostic factors are being evaluated.

**The progression of the disease is slow**

Standard treatment is controversial; Classically, it combines surgical treatment, internal metabolic irradiation with I131 (Ira therapy) and hormonal therapy [9]. Other treatments such as radiotherapy and chemotherapy are rarely used. The morbidity associated with treatment is an important aspect to consider. It is to be taken into account in the evolution of a subject for whom the life expectancy is long. Surgery, IRA therapy and hormone therapy are usually low-risk means but they can have detrimental effects if they are not used properly.

## CONCLUSION

The differentiated cancer of the thyroid in children has an excellent prognosis whatever the stage. The treatment that was performed mainly in this study associates a total thyroidectomy with at least a central dissection and is completed by ira therapy in some cases.

In retrospect, this therapeutic sequence brings back an excellent rate of survival without recurrence compared to the data of the literature.

This therapeutic sequence performed by a trained surgeon seems to provide the best chance for these patients, pending reliable prognostic biological factors that may allow some therapeutic de-escalation.

## CONFLICT OF INTEREST

All the authors declare that they do not have any conflict of interest.

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