What Is More About Pediatric Head and Neck Malignancies?

Çocukluk Çağı Baş Boyun Maligniteleri Hakkında Daha Fazla Ne Var?

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ABSTRACT

Objective: Children are not like adults; they should be evaluated separately from adults. H&N tumors are rarely seen in childhood with this age group representing 2-3% of all H&N neoplasms.

In this study we aimed to review all pediatric head and neck malignancies among all cases at our institution to determine the most frequent histopathologic type and clinical behavior of cases.

Material and Methods: This study was a retrospective descriptive and analytic study. The clinical and histopathological data of a tertiary center patients with H&N malignant tumors who were aged 17 years and below.

Results: Among the 23 cases, 9 (39%) cases were malignant epithelial tumors, 9 (39%) cases were malignant mesenchymal tumors, and 5 (22%) cases were diagnosed in the other malignancies group.

Conclusion: H&N malignancies are rarely seen in the pediatric population but the overall incidence appears to be increasing. Early diagnosis and proper treatment are also important factors for the prognosis.

Key Words: Head and neck tumors, Malignant, Childhood

ÖZ

Amaç: Çocuklar yetişkinler gibi değildir, ayrı değerlendirilmesi gerekir. Baş-boyun tümörleri çocuklarda nadiren görülür ve tüm baş boyun tümörlerinin %2-3'ünü oluşturur.

Bu çalışmada enstitümüzdeki tüm pediatrik baş-boyun malignitelerini gözden geçirip en sık görülen histolojik tipleri ve klinik davranışlarını belirlemek amaçlanmıştır.

Gereç ve Yöntemler: Bu çalışma tersiyer bir merkezin 17 yaşa kadar malign baş-boyun tümörlerinin klinik ve histopatolojik verilerinden oluşan retrospektif, tanımlayıcı ve analitik bir araştırmadır.

Bulgular: Yirmi üç olgunun 9'u (%39) malign epitelyal tümör, 9'u (%39) malign mezenkimal tümör ve 5'i (%22) diğer malign tümörlerden oluşmaktadır.

Sonuç: Baş boyun tümörleri pediatrik popülasyonda nadiren görülmekte ancak genel insidansı artmaktadır. Erken tanı ve uygun tedavi prognoz için önemli bir faktördür.

Anahtar Sözcükler: Baş-boyun tümörleri, Malign, Çocukluk çağı

INTRODUCTION

Children are not like adults and should be evaluated separately. Thus, not only developmental anomalies but also neoplastic conditions continue to be important. Malignant neoplasms are the second most common reason of childhood mortality in developed countries (1). Head and neck (H&N) tumors are rarely seen in childhood and the age group represents 2-3% of all H&N neoplasms (2). Head and neck masses in children ban be inflammatory, congenital benign lesions, and neoplastic diseases. H&N malignancies are seen very rarely in pediatric patients. Only 12% of all pediatric malignancies are H&N malignancies (3). The most

common pediatric H&N malignancies are lymphomas, neural tumors (23%), thyroid malignancies (21%), soft tissue sarcomas (12%), salivary gland malignancies, and nasopharyngeal carcinoma (4).

We aimed to review all pediatric neck malignancies except lymphomas among our cases to determine the most frequent histopathologic type and the clinical behavior of the cases.

MATERIALS and METHODS

This study was a retrospective descriptive and analytic study on the clinical and histopathological data of a tertiary center. The data were based on the pathology register and otolaryngology clinic data of Akdeniz University Hospital between 2002 and 2017. Patients aged up to 17 years with head and neck malignancies were included. All medical records were reviewed. Patients with missing medical records or who were diagnosed as lymphoma were excluded. Lymphomas were excluded because they are usually diagnosed clinically or only have small lymph node biopsies without surgical resection.

This study was approved by the Akdeniz University Ethic Committee on 06.03.2019 with number 233. This was a retrospective archive research. There was no specific permission for this study but all patients are informed orally that their scientific information can be shared in the scientific field according to scientific ethics rules at our institution.

RESULTS

Among the 87 pediatric H&N tumors, 23 cases (26%) had a malignant tumor. Seven patients were female (30.4%), 16 patients were male (69.6%). Within the 23 cases, 9 (39%) were malignant epithelial tumors, 9 (39%) were malignant mesenchymal tumors and 5 (22%) were diagnosed in the other malignancies group. Distribution of tumors according to histologic type is given in Table I and localization is given in Table II. Histologic findings of thyroid papillary carcinoma (Figure 1A,B), ganglioneuroblastoma (Figure 2A-C), malignant melanoma (Figure 3A,B), Ewing sarcoma (Figure 4A,B), rhabdomyosarcoma (Figure 5A-D) and squamous cell carcinoma (Figure 6) are given in the figures. All cases underwent treatment according to international guidelines of treatment according to the tumor type, grade and stage. The treatment of all cases is provided in the appendix and included surgical resection, lymph node dissection, chemotherapy, and radiotherapy as required (Appendix 1).

Table I: Distribution of tumors according to histologic type.

Epithelial Malignant Tumors		**Mesenchymal Malignant Tumors**		**Others**	
Histologic type	**n (%)**	**Histologic type**	**n (%)**	**Histologic type**	**n (%)**
Thyroid papillary carcinoma	2 (8.7)	Rhabdomyosarcoma	4 (17.4)	Langerhans cell histiocytosis	2 (8.7)
Mucoepidermoid carcinoma	2 (8.7)	Ewing Sarcoma	2 (8.7)	Malignant melanoma	1 (4.3)
Squamous cell carcinoma	3 (13)	Synovial sarcoma	1 (4.3)	Ganglioneuroblastoma	1 (4.3)
Undifferentiated nasopharynx carcinoma	1 (4.3)	Epithelioid sarcoma	1 (4.3)		
Adenoid cystic carcinoma	1 (4.3)	Chondrosarcoma	1 (4.3)		

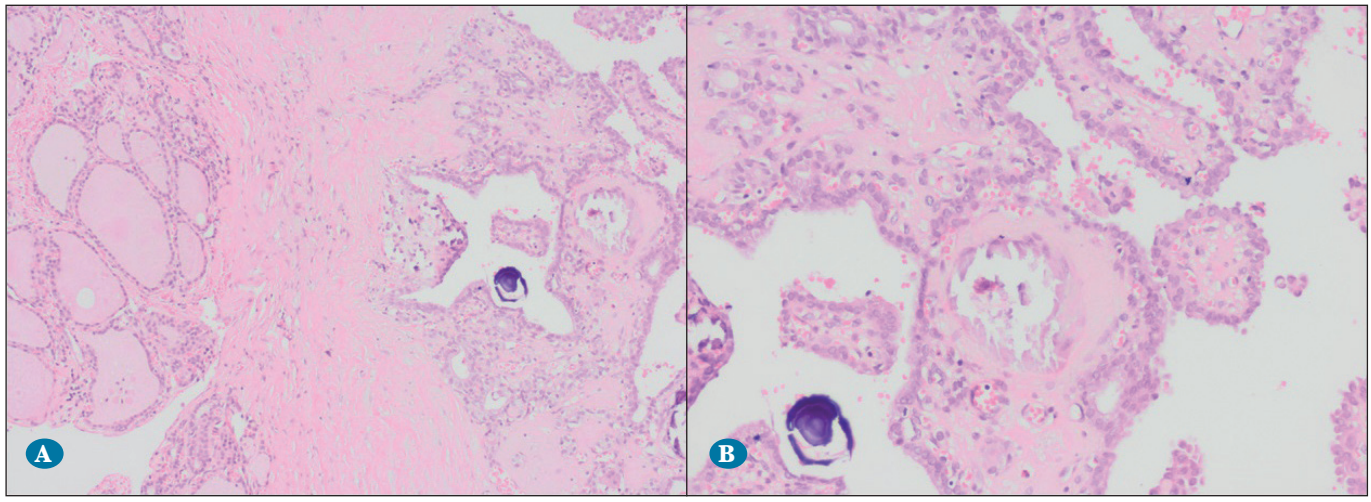

Figure 1: Thyroid papillary carcinoma with psammoma body (Case 1); **A)** H&E, x100; **B)** H&E, x200.

Appendix 1: Clinical and pathological data of whole cases included to study

Case number	Tumor localization	Histologic tumor type	Additional disease	Survival	Age	Status	Treatment
Case 1	Neck	Thyroid papillary carcinoma	Celiac disease	12 months	11	alive	S, LD
Case 2	Neck	Epithelioid sarcoma	absent	unfollowed	11	unkown	S, ChT
Case 3	Neck	Ganglioneuroblastoma	absent	24 months	3	alive	S
Case 4	Neck	Malignant melanoma	absent	24 months	7	alive	S, LD
Case 5	Neck	Ewing Sarcoma	absent	36 months	6	alive	S, LD, ChT, RT
Case 6	Neck	Thyroid papillary carcinoma	absent	12 months	13	alive	S, LD
Case 7	Oral cavity	Rhabdomyosarcoma	absent	12 months	10	alive	S, ChT
Case 8	Nasolabial region	Rhabdomyosarcoma	absent	4 years	1	exitus	S, ChT
Case 9	Oral cavity	Squamous cell carcinoma	absent	34 months	3	alive	S, LD, RT
Case 10	Nasopharynx and paranasal sinuses	Ewing Sarcoma	absent	46 months	11	alive	S, ChT
Case 11	Nasopharynx and paranasal sinuses	Chondrosarcoma	Tuberosclerosis	12 months	8	alive	S, ChT
Case 12	Mastoid region	Langerhans cell histiocytosis	absent	unfollowed	5	unknown	ChT
Case 13	Mastoid region	Rhabdomyosarcoma	absent	8 months	7	exitus	S, ChT
Case 14	Nasopharynx and paranasal sinuses	Rhabdomyosarcoma	absent	unfollowed	2	unkown	unkown
Case 15	Nasopharynx and paranasal sinuses	Langerhans cell histiocytosis	absent	60 months	2	alive	ChT
Case 16	Nasopharynx and paranasal sinuses	Squamous cell carcinoma	absent	unfollowed	14	unkown	unkown
Case 17	Nasopharynx and paranasal sinuses	Undifferatiated nasopharynx carcinoma	absent	38 months	13	exitus	ChT, RT
Case 18	Nasolabial region	Rhabdomyosarcoma	absent	12 months	6	alive	S, ChT
Case 19	Parotid gland	Adenoid cystic carcinoma	absent	unfollowed	8	unknown	S, ChT, RT
Case 20	Parotid gland	Mucoepidermoid carcinoma	Acute Lymphoblastic Leukemia	72 months	7	alive	S, RT
Case 21	Hard palate	Mucoepidermoid carcinoma	absent	40 months	11	alive	S
Case 22	Oral cavity	Squamous cell carcinoma	Lymphoma	6 months	13	exitus	S, ChT, RT
Case 23	Tonsil	Synovial sarcoma	absent	17 months	13	alive	S, LD, ChT, RT

S: Surgery, LD: Lymph node dissection, ChT: Chemotherapy, RT: Radiotherapy

When reviewing the medical history of the patients, three patients had associated disease as provided in Table III. Except these 3 patients, all patients are still under clinical follow up without cancer (86.96%). Three patients died because of the head and neck cancer (Table IV).

DISCUSSION

Although H&N tumors are rarely seen in pediatric population, the incidence is rising. H&N cancer is mostly seen at the age of 10 to 14 in childhood (3,5). In our study the mean age was 12.04 years, which is similar to the literature (6). However, some cancer groups are mostly seen in specific age groups. For instance, embryonal sarcoma or neuroblastoma is usually seen at the age of 5 to 6 (7). H&N cancers in pediatric patients is seen in males (65.67%) more commonly than in females (34.33%) (6). In our series, there were 16 males (69.6%) and 7 females (30.4%), similar to the literature.

Lymphomas are the most common pediatric H&N cancer type in the literature (4). We reviewed carcinomas and sarcomas in this study because these groups undergo surgical resection. This study aimed to determine the rates of H&N cancer except lymphoma and review these pathologies with their surgical approaches.

Soft tissue tumors are mostly seen in childhood and account for 13% of all pediatric cancers. The rate of H&N RMS is 35% to 45% within all RMS cases. Most common RMS locations in the H&N are the eye, oral cavity and the pharynx in order of frequency. These tumors are histologically small round blue cell tumors, presenting with sheets of small cells with large prominent nuclei. There are three histopathologic types called embryonal, alveolar and pleomorphic rhabdomyosarcoma. Embryonal type is the most common subtype, accounting for 75% of H&N cases (8). In our study, rhabdomyosarcoma accounted for 17.4% of all malignant H&N tumors.

Table II: Localization of malignant H&N tumors.

Tumor localization	n (%)
Neck	6 (26.1)
Oral cavity	3 (13)
Nasopharynx and paranasal sinuses	6 (26.1)
Tonsil	1 (4.3)
Parotis	2 (8.7)
Nasolabial region	2 (8.7)
Hard palate	1 (4.3)
Mastoid region	2 (8.7)

Table III: Pediatric H&N tumors associated with additional disease.

	Tumor type	Additional disease
Case 1	Thyroid papillary carcinoma	Celiac disease
Case 11	Chondrosarcoma	Tuberosclerosis
Case 20	Mucoepidermoid carcinoma	Acute Lymphoblastic Leukemia
Case 22	Squamous cell carcinoma	Lymphoma

Table IV: Cases died because of H&N tumor.

	Age (year)	Tumor localization	Histologic tumor type	Survival
Case 1	1	Nasolabial region	Rhabdomyosarcoma	<1 year
Case 2	7	Mastoid region	Rhabdomyosarcoma	8 months
Case 3	13	Nasopharynx and paranasal sinuses	Undifferentiated nasopharynx carcinoma	38 months

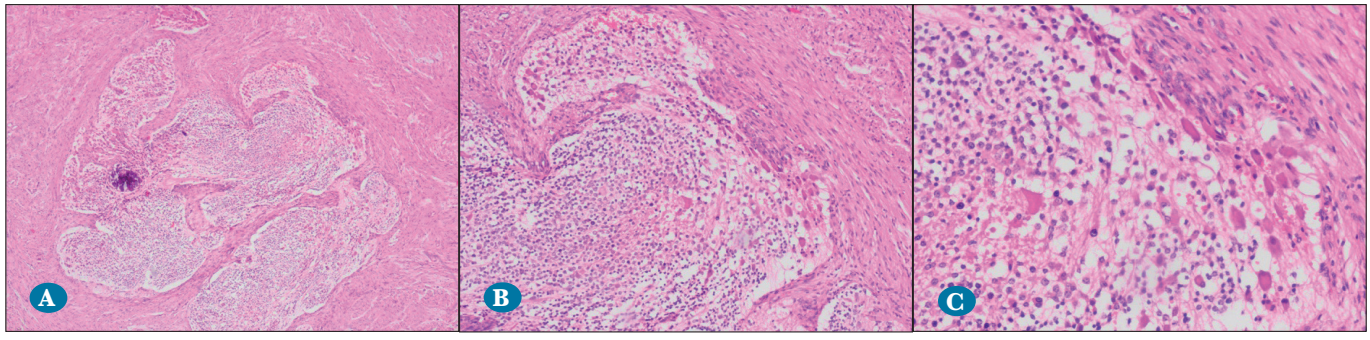

Figure 2: Ganglioneuroblastoma (Case 3); **A)** H&E, 40; **B)** H&E, x100, **C)** H&E, x200.

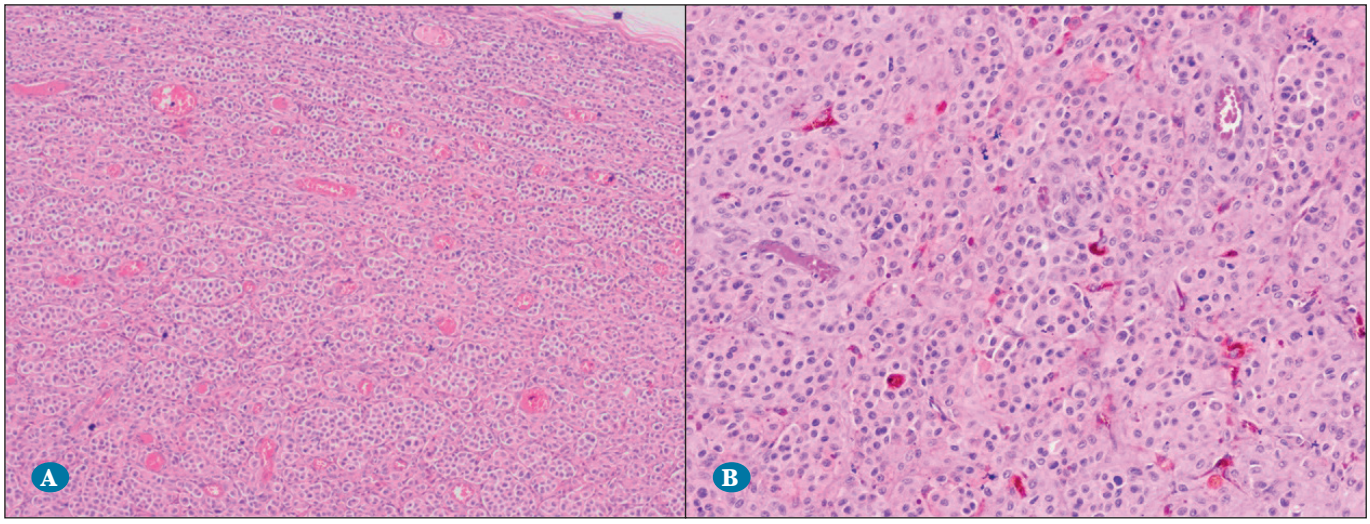

Figure 3: Malignant Melanoma (Case 4); **A)** H&E, x100; **B)** H&E, x200.

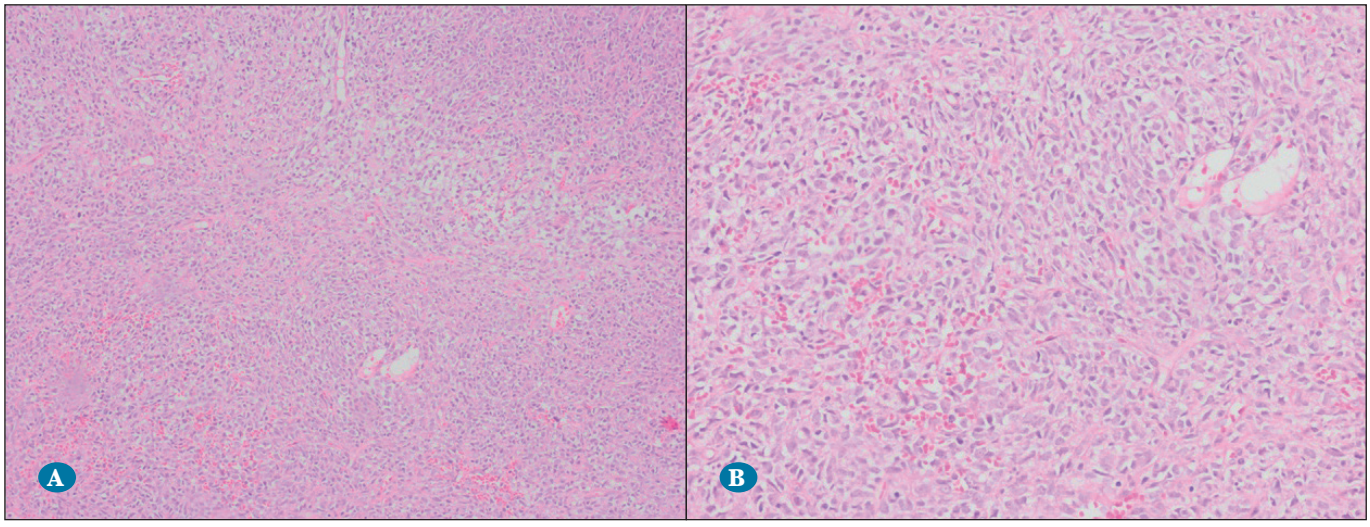

Figure 4: Ewing Sarcoma (Case 5); **A)** H&E, x100; **B)** H&E, x200.

Thyroid carcinoma can be seen in childhood but is rare with an incidence of 2.4 per 100,000 annually. It presents mostly as a solitary mass in the thyroid region. The papillary variant is the most common type. Medullary thyroid carcinoma can be a part of multiple endocrine neoplasia types IIA and IIB in pediatric population. The well-known risk factor for non-sporadic thyroid cancer is still radiation (9). We had two thyroid papillary carcinoma cases with a percentage of 8.7%. Radiation exposure or multiple endocrine neoplasia were not present in these cases.

Nasopharyngeal carcinoma presents mostly at the age of 13 with male preponderance. It usually presents as an asymptomatic neck mass. Treatment of nasopharyngeal cancer is with a combination of radiation and chemotherapy (10). In our series, the tumor was located in the nasopharynx and paranasal sinuses in six cases (26.1%).

Peripheral primitive neuroectodermal tumors include Ewing sarcoma (ES), melanotic neuroectodermal tumors, ectomesenchymoma, and Askin's tumor. ES is the second most common malignant bone tumor after osteosarcoma in childhood. ES settles on the mandible and skull base, in the H&N area. Distant metastasis can be seen in 15% to 30% of cases, which affects the 5-year survival. Treatment modalities of ES are surgical resection and chemotherapy (11). Radiotherapy can be used for unresectable tumors. In our study we had two cases with a percentage of 8.7%.

CONCLUSION

Pediatric H&N malignancies are rarely seen in pediatric population, but the overall incidence appears to be increasing. As we reviewed in this article, many of these tumors require multiple treatment modalities. During treatment, the clinician should think about the effects of therapy on development of the pediatric patient. This issue is the most challenging and important point for pediatric patients. Early diagnosis is an important factor for prognosis and therapy management. The limitation of this

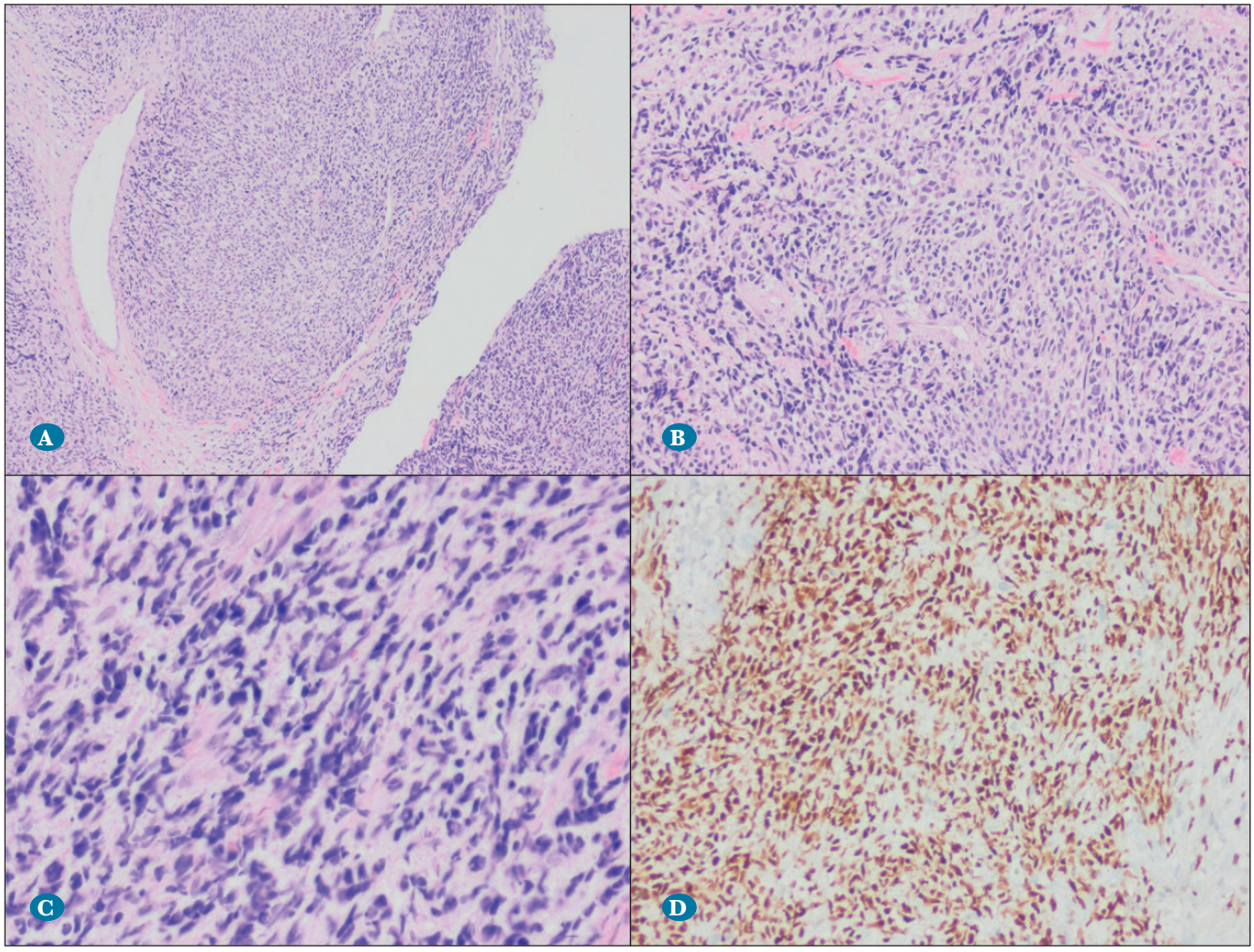

Figure 5: Rhabdomyosarcoma (Case 7); **A)** H&E, x100; **B)** H&E, x200; **C)** H&E, x400; **D)** Myo D1, x200.

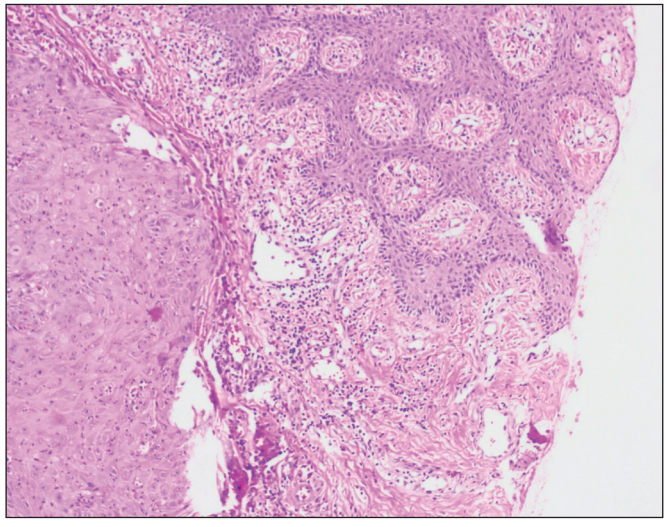

Figure 6: Squamous cell carcinoma (Case 9), H&E, x100.

study is the number of cases. However, it is well known that H&N malignancies are really rare in childhood. Therefore, more series should be presented for pediatric head and neck tumors to make meta-analysis possible. Large series may provide the opportunity for early diagnosis and finding new therapy modalities for each specific head and neck tumor in childhood.

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Author Roles:

Designing the study, collecting data and writing the article: NY

Designing the study, collecting data, writing the article and reviewing the article: HST

Collecting data and reviewing the article: ATD

Reviewing the article, mentor: GÖ

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