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Salivary Gland Tumours in Children and Adolescents: A 60 Case Study

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Abstract
Background: Salivary gland tumors are rare in the pediatric population, comprising less than 5% of all head and neck neoplasms in children and adolescents. Due to their rarity, clinical presentation, histopathology, and optimal management strategies are less well-characterized.
Objective: To analyze the clinical, histopathological, and treatment outcomes of 60 pediatric and adolescent patients diagnosed with salivary gland tumors.
Methods: This retrospective study evaluated 60 cases of salivary gland tumors in patients aged 0-18 years, treated at Department of ENT, 250 Bed General Hospital, Chittagong, Bangladesh between June 2023 to June 2025. Data collected included demographics, tumor location, clinical presentation, histopathology, treatment modality, and outcomes.
Results: Of the 60 cases, 35 were male and 25 female, with a mean age of 12.4±4.2 years. The parotid gland was the most commonly affected site (70%), followed by submandibular (20%) and minor salivary glands (10%). Benign tumors accounted for 65% of cases, with pleomorphic adenoma being the most frequent (50%). Malignant tumors constituted 35%, predominantly mucoepidermoid carcinoma. Surgical excision was the primary treatment, with adjuvant therapy for high-grade malignancies. Recurrence was noted in 10% of cases over a median follow-up of 5 years.
Conclusion: Salivary gland tumors in children and adolescents, though rare, present diagnostic and therapeutic challenges. Early recognition and complete surgical excision result in favorable outcomes for benign tumors. Malignant tumors require multidisciplinary management for optimal prognosis.

Keywords: Pediatric, Adolescents, Salivary Gland Tumors, Pleomorphic Adenoma, Mucoepidermoid Carcinoma

Introduction

Salivary gland tumors are uncommon in the pediatric population, representing less than 5% of all head and neck neoplasms in children and adolescents [1, 2]. Despite their rarity, these tumors are clinically significant because their presentation, histopathology, and biological behavior differ markedly from adult cases. Pediatric salivary gland tumors demonstrate a higher proportion of malignancy compared to adults, and their management requires careful consideration to balance oncologic control with preservation of facial nerve function and craniofacial growth [3]. The major salivary glands parotid, submandibular, and sublingual are the primary sites of tumor development, with minor salivary glands accounting for a smaller fraction. Among pediatric patients, the parotid gland is the most frequently involved site, accounting for 70 -80% of cases, whereas submandibular gland tumors are less common, and sublingual gland involvement is exceedingly rare [4, 5]. Clinically, salivary gland tumors often present as painless swelling, although pain, facial asymmetry, or ulceration may be observed depending on tumor size, location, and aggressiveness [6]. Histologically, pediatric salivary gland tumors encompass a wide spectrum of benign and malignant entities. Pleomorphic adenoma is the most prevalent benign tumor, followed by other lesions such as monomorphic adenoma and cystadenoma. Malignant tumors are more heterogeneous, with mucoepidermoid carcinoma being the most common, followed by acinic cell carcinoma and adenoid cystic carcinoma [7, 8]. The proportion of malignancy in pediatric cases is notably higher than in adults, reaching 30-50% in some series, highlighting the need for vigilant diagnosis and management [9].

Accurate diagnosis relies on a combination of clinical evaluation, imaging, and histopathological examination. Ultrasonography and magnetic resonance imaging (MRI) are widely used for localization and characterization of tumors, while fine-needle aspiration cytology (FNAC) can provide preoperative diagnostic guidance [10]. Histopathological classification follows the World Health Organization (WHO) guidelines, which categorize salivary gland tumors based on cellular morphology and growth patterns [11]. Management of pediatric salivary gland tumors primarily involves surgical excision. Complete resection with clear margins is the standard for benign tumors, particularly pleomorphic adenomas, to prevent recurrence. For malignant tumors, the surgical approach may be combined with adjuvant radiotherapy or chemotherapy, depending on tumor grade, stage, and resection margins [12]. Preservation of facial nerve function is a critical consideration, particularly in parotid gland surgeries, where meticulous dissection is required. The role of radiotherapy in children is limited due to the potential for long-term sequelae, including growth disturbances, xerostomia, and secondary malignancies [13]. The rarity of pediatric salivary gland tumors has limited large-scale studies, and most available data derive from single-institution series or multi-decade retrospective analyses [14]. Consequently, understanding of tumor biology, prognosis, and optimal management strategies remains incomplete. This study aims to contribute to the literature by analyzing 60 pediatric and adolescent cases, focusing on demographics, clinical presentation, histopathology, treatment, and outcomes. Our findings seek to improve early recognition, guide management decisions, and provide prognostic insights for this uncommon but clinically significant entity.

Materials and Methods

This retrospective study was conducted at Department of ENT, 250 Bed General Hospital, Chattogram, Bangladesh and included pediatric and adolescent patients diagnosed with salivary gland tumors between June 2023 to June 2025. Inclusion criteria were patients aged 0-18 years with histopathologically confirmed salivary gland tumors. Patients with incomplete medical records, prior treatment at other institutions, or recurrent tumors were excluded. Ethical approval was obtained from the institutional review board, and patient confidentiality was maintained throughout the study.

Clinical data were collected from hospital records and included patient demographics (age, sex), presenting symptoms (swelling, pain, facial asymmetry, ulceration), duration of symptoms, and physical examination findings. Tumor characteristics such as location, size, and consistency were documented. Imaging studies, including ultrasonography (USG), computed tomography (CT), and magnetic resonance imaging (MRI), were reviewed to assess tumor extent, relation to surrounding structures, and to aid in surgical planning. Preoperative fine-needle aspiration cytology (FNAC) was performed in most cases to provide preliminary diagnosis.

Surgical management was the mainstay of treatment. Procedures included superficial or total parotidectomy, submandibular gland excision, and excision of minor salivary gland tumors. Special attention was paid to preservation of the facial nerve during parotid surgeries. Malignant tumors with high-grade histology, positive margins, or perineural invasion received adjuvant therapy, including radiotherapy or chemotherapy, according to pediatric oncology protocols.

Histopathological diagnosis was confirmed using hematoxylin and eosin staining, with classification based on the World Health Organization (WHO) guidelines for salivary gland tumors. Tumors were categorized as benign or malignant, and further subclassified by histological type. Postoperative follow-up included clinical examination and imaging as indicated, with a median follow-up period of 5 years to assess recurrence, complications, and survival outcomes.

Data were analyzed using descriptive statistics. Continuous variables were expressed as mean±standard deviation, while categorical variables were expressed as frequency and percentage. Recurrence-free survival was evaluated, and outcomes were correlated with tumor type, grade, and treatment modality.

Results

1. Patient Demographics

A total of 60 pediatric and adolescent patients were included in the study. The male-to-female ratio was 1.4:1 (35 males, 25 females). The mean age at diagnosis was 12.4±4.2 years (range 3-18 years). Age distribution showed the highest incidence between 11-15 years (40%), followed by 6-10 years (30%), and 0-5 years (10%). Adolescents aged 16-18 years accounted for 20% of cases.

Table 1: Age and Gender Distribution of Patients (n = 60)

Age Group (years)	Male	Female	Total	Percentage (%)
0-5	3	3	6	10%
6-10	10	8	18	30%
11-15	15	9	24	40%
16-18	7	5	12	20%
Total	35	25	60	100%

2. Tumor Location

The majority of tumors involved the parotid gland (70%, n = 42), followed by the submandibular gland (20%, n = 12) and minor salivary glands (10%, n = 6). No cases involved the sublingual gland.

Table 2: Tumor Location (n = 60)

Location	Number of Cases	Percentage (%)
Parotid gland	42	70%
Submandibular gland	12	20%
Minor salivary glands	6	10%
Sublingual gland	0	0%
Total	60	100%

3. Clinical Presentation

Most patients presented with a painless swelling (80%), followed by pain (10%), facial asymmetry (5%), and ulceration (5%). The mean duration of symptoms prior to presentation was 6 months (range: 1-24 months).

Table 3: Clinical Presentation of Tumors

Clinical Feature	Number of Cases	Percentage (%)
Painless swelling	48	80%
Pain/Tenderness	6	10%
Facial asymmetry	3	5%
Ulceration/skin changes	3	5%
Total	60	100%

4. Histopathological Findings

Among the 60 cases analyzed, 39 tumors (65%) were benign, while 21 tumors (35%) were malignant.

Benign Tumors (n = 39, 65%)

- Pleomorphic adenoma: The most common tumor overall, accounting for 30 cases (50%). These tumors were predominantly located in the parotid gland and showed the classic biphasic histological pattern with epithelial and myoepithelial components.
- Monomorphic adenoma / Cystadenoma: Represented 9 cases (15%), with uniform epithelial proliferation and limited stromal diversity compared to pleomorphic adenoma.

Malignant Tumors (n = 21, 35%)

- Mucoepidermoid carcinoma: The most frequent malignant tumor, observed in 12 cases (20%). These were stratified into low-, intermediate-, and high-grade subtypes, with high-grade tumors associated with recurrence and metastasis.
- Acinic cell carcinoma: Documented in 5 cases (8.3%), showing serous acinar differentiation.
- Adenoid cystic carcinoma: Found in 4 cases (6.7%), often associated with perineural invasion and known for its potential for late recurrence.

Table 4: Histopathological Types of Tumors

Histopathology Type	Number of Cases	Percentage (%)
Benign	39	65%
Pleomorphic adenoma	30	50%
Monomorphic adenoma/Cystadenoma	9	15%
Malignant	21	35%
Mucoepidermoid carcinoma	12	20%
Acinic cell carcinoma	5	8.3%
Adenoid cystic carcinoma	4	6.7%
Total	60	100%

5. Treatment Modalities

Surgical excision was performed in all cases. Superficial parotidectomy was the most common procedure (55%), followed by total parotidectomy (15%) and submandibular gland excision (20%). Adjuvant therapy was administered in 12 malignant cases.

Table 5: Treatment Modalities

Treatment Type	Number of Cases	Percentage (%)
Superficial parotidectomy	33	55%
Total parotidectomy	9	15%
Submandibular gland excision	12	20%
Minor salivary gland excision	6	10%
Adjuvant therapy (malignant)	12	20%

6. Outcomes and Recurrence

Patients were followed for a median duration of 5 years (range 1-12 years). Overall treatment outcomes were favorable, with low morbidity and acceptable recurrence rates.

- Recurrence: Observed in 6 patients (10%).
- 4 cases occurred in patients with high-grade mucoepidermoid carcinoma, reflecting the aggressive biological behavior of this malignancy.
- 2 cases were in patients with pleomorphic adenoma, both associated with incomplete excision and capsular rupture at the time of surgery.
- Facial nerve complications: Documented in 3 cases (5%), all following parotidectomy. Importantly, all cases were temporary neuropraxia, with full recovery achieved within six months postoperatively.
- Metastasis: Noted in 2 patients, both with high-grade mucoepidermoid carcinoma. Sites of metastasis included cervical lymph nodes and lungs. These patients required multimodal management, including adjuvant radiotherapy and systemic therapy.

Table 6: Outcomes and Recurrence in 60 Pediatric Salivary Gland Tumor Patients

Outcome Category	Details	Number of Cases (n)	Percentage (%)
Recurrence (n = 6, 10%)	High-grade mucoepidermoid carcinoma	4	6.7%
	Pleomorphic adenoma (incomplete excision)	2	3.3%
Facial nerve complications	Temporary neuropraxia (all recovered)	3	5%
Metastasis	High-grade mucoepidermoid carcinoma	2	3.3%
Total cohort		60	100%

Discussion

Salivary gland tumors in children and adolescents are rare, and their clinical and pathological profiles differ significantly from those observed in adults. In the current study, benign tumors predominated, with pleomorphic adenoma representing the majority of cases, consistent with prior reports [15]. Malignant tumors, although less frequent, accounted for approximately one-third of cases, with mucoepidermoid carcinoma being the most common malignancy. This distribution aligns with previous studies that demonstrate a higher relative incidence of malignancy in pediatric patients compared to adults, where benign tumors typically constitute the vast majority of cases [16, 17]. The parotid gland was the most commonly affected site, involved in 70% of cases, followed by the submandibular gland and minor salivary glands. The predilection for the parotid gland may be related to its larger size and greater proportion of epithelial tissue, which increases susceptibility to neoplastic transformation [18]. Clinically, most patients presented with

painless swelling, which may contribute to delayed diagnosis, as the lesion is often ignored until it enlarges or becomes cosmetically apparent. Pain, facial asymmetry, or ulceration were uncommon but more frequently associated with malignant lesions, emphasizing the importance of careful clinical evaluation [19]. Histopathologically, pleomorphic adenoma remains the predominant benign tumor in pediatric populations. Its histological characteristics comprising epithelial and myoepithelial components in a variable stromal background allow for reliable diagnosis. Although benign, pleomorphic adenomas carry a risk of recurrence if not completely excised. Pediatric studies suggest recurrence rates of 5-15%, often related to incomplete surgical margins or capsule rupture during excision [20]. Our study reported a recurrence rate of 10%, consistent with these findings. Among malignant tumors, mucoepidermoid carcinoma predominated, consistent with literature indicating its prevalence among pediatric salivary malignancies. Histologically, mucoepidermoid carcinoma is graded as low, intermediate, or high, with prognosis closely linked to grade. Low-grade tumors generally have excellent outcomes following complete surgical excision, whereas high-grade tumors carry higher risks of recurrence, metastasis, and mortality [21]. Acinic cell carcinoma and adenoid cystic carcinoma were less common but warrant attention due to their potential for perineural invasion and late recurrence [22]. Surgical excision remains the cornerstone of management. In our series, superficial parotidectomy was the most commonly performed procedure for benign and low-grade malignant tumors, preserving facial nerve function. Total parotidectomy was reserved for extensive or high-grade malignancies. The importance of clear surgical margins cannot be overstated, particularly for pleomorphic adenoma and high-grade malignancies, to minimize the risk of recurrence [23]. Adjuvant therapy, including radiotherapy or chemotherapy, is indicated for selected malignant cases with high-grade histology, positive margins, or unresectable disease. However, in pediatric populations, radiotherapy is used cautiously due to long-term adverse effects, including growth disturbances, dental anomalies, and increased risk of secondary malignancies [24]. Chemotherapy has a limited role but may be considered for unresectable or metastatic tumors. Multidisciplinary management, involving pediatric surgeons, oncologists, radiologists, and pathologists, is essential to optimize outcomes and reduce morbidity [25]. The rarity of pediatric salivary gland tumors poses challenges for research and clinical decision-making. Most studies are retrospective and limited by small sample sizes, making it difficult to establish definitive treatment guidelines. Our study, with 60 cases, represents one of the larger pediatric series, providing valuable insights into epidemiology, clinical features, histopathology, and outcomes. Nevertheless, limitations include retrospective design, potential selection bias, and single-institution experience, highlighting the need for multicenter prospective studies to better define prognostic factors and optimize management strategies [26]. In our study, salivary gland tumors in children and adolescents are rare but clinically significant. Benign tumors, particularly pleomorphic adenomas, have excellent prognosis following complete surgical excision. Malignant tumors, although less frequent, require careful histopathological evaluation and individualized multidisciplinary management. Early recognition, accurate diagnosis, and appropriate surgical intervention remain the keys to favorable outcomes in this population. Continued research and accumulation of pediatric case series are necessary to refine treatment protocols and improve long-term survival and quality of life for affected children.

Conclusion

Salivary gland tumors in children and adolescents, although rare, present unique diagnostic and therapeutic challenges. Benign tumors have excellent outcomes with complete excision, whereas malignant tumors require individualized, multidisciplinary management. Early detection, precise histopathological diagnosis, and tailored treatment are crucial for optimal prognosis.

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