Embryonic Rhabdomyosarcoma Case Report and Literature Review
H Al- Muala ., A Alaboudy

Citation

Abstract
Rhabdomyosarcoma is a fast-growing, highly malignant tumor which accounts for over half of the soft tissue sarcomas in children. Less frequently, other soft tissue sarcomas are found in children: fibro sarcoma, mesenchymoma, synovial sarcoma, and liposarcoma. Rhabdomyosarcoma often causes a noticeable lump on a child's body. If the tumor is located internally, the symptoms depend on its location.

INTRODUCTION
Rhabdomyosarcoma (RMS) is a mesenchymal malignant neoplasm that exhibits skeletal muscle cells with varying differentiation degrees. Rhabdomyosarcoma is the most common soft tissues tumor of childhood. RMS was first described by Weber in 1854, and accounts for 6% of all malignancies and represents 50% of all soft tissue sarcomas in children under 15 years of age. Diagnosis of Rhabdomyosarcoma is difficult not only because of the consistent absence of the typical rhabdomyoblast with cross striations but also because of the close resemblance of this tumor to malignant fibrous histiocytoma and other Pleomorphic sarcoma. It occurs most often in the head and neck region, genitourinary tract, retroperitoneum and, to a lesser extent, the extremities. Rhabdomyosarcoma tumors arise from a cell called a “rhabdomyoblast”, which is a primitive muscle cell. Instead of differentiating into striated muscle cells, the rhabdomyoblast grow out of control. Since this type of muscle is located throughout the body, the tumors can appear at numerous locations. The four major sites in which Rhabdomyosarcoma is found are head and neck; around the eyes 35-40 %, genitourinary tract 20%, extremities 15-20%, trunk (chest and lungs) 10-15%. Head and neck RMS is anatomically divided in two categories: parameningeal (including nose, nasopharynx, paranasal sinuses, mastoid region, infra-temporal and pterygopalatine fossae and medium ear) and non-parameningeal (which include scalp, orbit, parotid gland, oral cavity, oropharynx and larynx).

In the oral cavity the most common sites are tongue, palate and buccal mucosa of our patient, buccal mucosa were involved. Four basic histological patterns of RMS are recognized: embryonic, botryoid, alveolar and Pleomorphic. The embryonic type represents more than 70% of all cases. RMS involving the head or neck is most commonly of the embryonic subtype and rarely involves regional lymph nodes, lymphatic spread is un usual with head and neck primaries particularly in children under the age of ten.

Histological, embryonic RMS is characterized by a mixture of Pleomorphic and skeletal immature muscle cells, the so-called rhabdomyoblast. These cells have a distinctive eosinophilic-rich cytoplasm representing poorly formed myofilaments, and proliferate in a myxoid loose stroma. RMS has been associated with familial syndrome such as neurofibromatosis, the Li-fraumeni, Beckwith–Wiedemann, and Costello syndrome, many of these families have germ line inactivating mutations of the p53 tumor suppressor gene, whose normal function involves cell cycle regulation and in the maintenance of genomic integrity. Hypoploidy may lead to inactivation of tumor suppressor genes which might lead to disturb cell cycle. Kummoona R. et al 2007 reported that Bcl-2 expression was significantly higher in tumor tissues compared with that in normal mucosal tissues which suggested that the tumor cells are less susceptible to apoptosis compared with cells of normal mucosal tissues.

Rhabdomyosarcoma is treated by a combination of surgery, chemotherapy, and radiation.

1. Surgery. Resection (removal) of the primary tumor. If
necessary after chemotherapy or radiation has shrunk the tumor.

2. Chemotherapy. The following chemotherapy agents are commonly used: vincristine, cyclophosphamide, dactinomycin, adriamycin, ifosfamide, VP-16.

3. Radiation. External beam radiation is used in some cases of Rhabdomyosarcoma.

4. Stem cell transplant allogenic / autologous.

The objective of this article is to describe a case of an oral embryonic RMS in a very young patient with diagnosis being only achieved through clinical, histopathological investigation.

CASE REPORT

A seven year-old female was referred to our Maxillofacial department for evaluation of a non tender mass on his face that had appeared two years earlier. During extra-oral examination an extensive swelling on the left side of the face was observed, and fever is only rarely present intra oral examination a single, large, exophytic, botryoid with undefined limits, shiny and smooth surface, reaching the mandible ramus, occupied all buccal vestibule, during intra-oral examination, a normal-colored mass was verified, with smooth surface and fibrous consistency involving the buccal mucosa. Ultrasonography reveals large hypoechoic area at soft tissues mass (3.5 x 1.8 cm) deep in the check muscle hypo vascular on color Doppler Sonography at left malare region deep in the muscle of check which appear hypo vascular in color Doppler Sonography. Computerized tomography revealed a soft tissues mass isodense to the muscles (3.5 x 1.8) overlying the left maxillary bone, no sign of bony erosion, lesion showed heterogeneous enhancement. In view of these findings, diagnostic possibilities of Burkett’s lymphoma, RMS, Ewing’s sarcoma and fibro- sarcoma were hypothesized and an incision biopsy was performed. Hematoxylin and eosin-stained sections revealed a malignant neoplasm of mesenchymal origin constituted of a loose myxomatoid stroma exhibiting scattered Pleomorphic cells embryonic type. Laboratory studies was include a complete blood count with differential serum electrolytes, blood urea nitrogen, liver function tests, serum level of creatinine, uric acid, magnesium and calcium. Patient was operated under general anesthesia, local excision intra orally and four pieces for free margin was performed. Histopathological section showed the presence of loosely arranged, haphazardly oriented, large round very elongated tumor cells, strap – like with abundant, there was Pleomorphic cells with hyper chromatic nuclei and deeply eosinophilic cytoplasm. With obvious evidence of cross striations were seen and the four pieces of biopsy was free from lesions histopathological. Thus diagnosis of Pleomorphic Rhabdomyosarcoma was confirmed by histopathology patient send for pediatric oncology for adjuvant chemotherapy, follow up post surgery was performed for thirteen month.

Figure 1
A. Extra oral photograph.

Figure 2
B. intra oral photograph.
Figure 3
C. Ultrasonography reveals large hypoechocic area at soft tissues.

Figure 4
D. CT scan revealed a soft tissues mass isodense to the muscles (3.5 x 1.8).

Figure 5
E. Hematoxylin and eosin-stained sections revealed loosely arranged large round or Pleomorphic cells.

Figure 6
F. Hematoxylin and eosin-stained sections revealed large hyper chromatic nuclei with prominent nucleoli and abundant well defined eosinophilic cytoplasm. Intra oral photograph showed excision of the tumor under general anesthesia.

Figure 7
H. Photograph of the specimen postoperatively.
Rhabdomyosarcoma is an uncommon malignant tumor of striated muscle. Peak age for occurrence is between two and six years. Our patient was seven year-old, which was in agreement with Shafer WG et al.\textsuperscript{13, 14, 6} Congenital Alveolar RMS clinical and molecular distinction from alveolar RMS in older children. Head and neck RMS is anatomically divided in two categories: parameningeal and non-parameningeal (which include scalp, orbit, parotid gland, oral cavity, oropharynx and larynx).\textsuperscript{4} In the oral cavity the most common sites are tongue, palate and buccal mucosa.\textsuperscript{5, 6} Our patient was non-parameningeal one and involved the buccal mucosa which was in agreement with, K. Pavithran et al,\textsuperscript{6} E. Peters et al.\textsuperscript{5}.

The Intergroup Rhabdomyosarcoma Study (IRS) classifies RMS into four distinctive groups according to biological behavior. Group I tumors have better prognosis whereas groups III and IV have the worst. Studies show that around 50% of RMS patients die following chemotherapy\textsuperscript{15} or one year after emission of histopathological diagnosis\textsuperscript{16}. The diagnosis of RMS is confirmed through biopsy of the primary tumor and an adequate amount of tissue should be obtained. In agreement with Pohar –Markinsen et al 2008, fine needle aspiration biopsy is in adequate for diagnosis\textsuperscript{17}. In the described case, we chose as biopsy spot the left buccal mucosa\textsuperscript{3}. Histopathological our case was embryonic type which was most common in children and head & neck which was in agreement with Shafer WG et al\textsuperscript{13}. Embryonic Rhabdomyosarcoma was closely resembles developing muscle in the 7 to 10 week old fetus. It is characterized by round to spindle cells of small to moderate size, a central ovoid to round nucleus and occasional cross
striations. It is most commonly seen in children and is the frequent type involving the head and neck region\textsuperscript{13}. Microscopically examination occasionally reveals striations in the muscle cells or rhabdomyoblast\textsuperscript{1}.

Regarding the histogenesis of Rhabdomyosarcoma is controversial Enzinger and Weiss\textsuperscript{1} proposed two histogenic possibilities for Rhabdomyosarcoma, one from the primitive and undifferentiated mesenchymal cells and the other from the embryonic muscle tissue displaced during early stages of development, or may be apparently arisen from the stroma of a long standing ameloblastoma\textsuperscript{18}. Genetic changes like \( t \), familial occurrence or occasional trauma may serve as a trigger mechanism to induce such growth\textsuperscript{19}.

For the treatment of RMS, The first line of treatment is radical excision, intensive doses of chemotherapy in multidrugs and multi-cycle regimens are used. Our patient was treated with a combination of vincristine, actinomycin D and endoxane. Direct complications of chemotherapy are myelosuppression, thrombocytopenia and fever neutropenia, mucositis, nausea, vomit and neurotoxicity\textsuperscript{20}.

It is believed that adjunct combination chemotherapy may greatly improve the prognosis\textsuperscript{20,21}. Inadequately treated tumors grow in an infiltrative manner and recur in a high percentage of cases. Bone does not constitute an effective barrier to the growth of the tumor and bone invasion is a frequent finding in head and neck Rhabdomyosarcoma but our case was not involved the maxilla C T scan revealed that, Major sites of metastasis are the lungs, lymph nodes and bone marrow followed by heart, brain, meninges, pancreas, liver and kidney\textsuperscript{21}.

Prognosis of RMS is excellent in relation to other oral soft tissues malignant lesions\textsuperscript{5,22}. Prognosis of RMS is influenced by clinical staging and anatomic site of the tumor\textsuperscript{5}, and may be influenced by age of patient and genetic factor. Within histological subtypes whereas botryoid has the best\textsuperscript{1}. The described case was classified as embryonic, and familial occurrence or occasional trauma may serve as a trigger mechanism to induce such growth\textsuperscript{19}.

In conclusion, Rhabdomyosarcoma is an uncommon malignant tumor of striated muscle, we described a brief review of RMS of head and neck, clinical and histological aspect of intra oral case, Rhabdomyosarcoma was soft tissues sarcoma should be included in the different diagnosis especially in children. Our patient was treated with a combination of surgery and chemotherapy, prognosis of Rhabdomyosarcoma is influenced by clinical staging, anatomic site of the tumor and histological sub type.

References


Author Information

Header Dakhel Al- Muala , BDS , M Sc , F I C M S .
Department of Oral and maxillofacial surgery, College of Dentistry, Al –Sadder Teaching Hospital

Abbas Taher Alaboudy, BDS, LDSRCPS, MSc, FICS, FACOMS
OMF Surgeon in Private Practice