Yolk sac tumour arising in mature teratoma in the parapharyngeal space

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Abstract

Yolk sac tumour is germ cell tumour commonly found in children and infants under three years of age in its pure form with a good prognosis. The commonest location for the yolk sac tumour is gonads i.e. testis and gonads. Yolk sac tumour is rarely reported in extra- gonadal locations. Parapharyngeal space is an uncommon site for mature teratoma and very few cases have been reported in adults and children. Malignant transformation in a mature teratoma in the extragonadal sites has been reported but development of yolk sac tumour has not been reported so far in the world literature. We report to our knowledge, the only and first case of yolk sac tumour arising in a mature teratoma presenting as a parapharyngeal mass in a four year old male child.

Keywords: Yolk sac tumour, Testis and gonads, Teratoma, Parapharyngeal mass.

Introduction

Yolk sac tumour is a member of germ cell group of tumours. It is the most common gonadal tumour of infants and children under three years and has a good prognosis. It typically arises in testes or ovaries of children, adolescents or young adults.[1] An extra gonadal location is unusual, but yolk sac tumours have been reported at extra gonadal sites like liver, lung, brain, lateral ventricle, retroperitoneum, mediastinum, psoas muscle, vagina, rectum, urachus, parotid gland, ear, orbit,[2] sinonasal tract and nasopharynx.[3] Parapharyngeal space is an uncommon site for mature teratoma and very few cases have been reported in adults and children. Malignant transformation in mature teratoma in the extragonadal sites has been reported but secondary development of yolk sac tumour has not been reported so far in world literature

We report what is, to the best of our knowledge, the first known case of yolk sac tumour arising in the parapharyngeal space of a child.

Case Report

A four year old boy presented with a swelling in the right submandibular region, gradually increasing in size for the last three months. It was painless and mobile. There was history of removal of an oral swelling at the age of 9 months which was reported as 'hamartoma' on histopathology.

His routine investigations including complete blood profile with differential counts, serum urea, creatinine, and liver enzymes were within normal limits. The swelling was suspected to be a salivary gland tumour and he underwent excision via submandibular approach. The specimen submitted for histopathology consisted of a firm, grey white tumour nodule measuring 4.0x3.5x1.5 cm. It was inked all over the external surface and serial sectioning was done. Cut surface was homogenous white. Multiple sections were submitted for histological examination.

In addition part of right submandibular gland was also received which was tan brown measuring 2.5x 2.0x1.5 cm. Sectioning revealed a tan brown lobulated cut surface. The

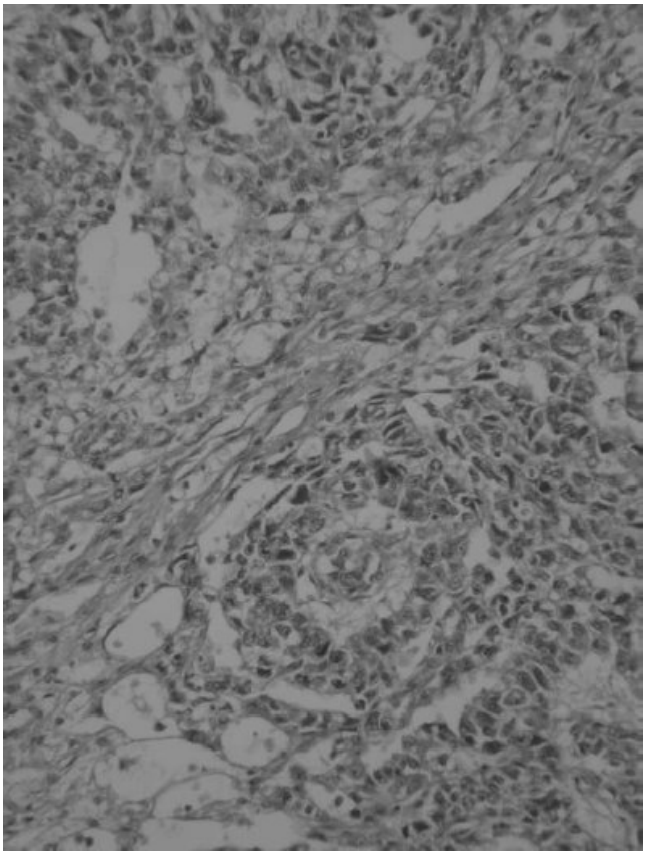

Figure-1: Schiller -Duval body in yolk sac tumour (x200).

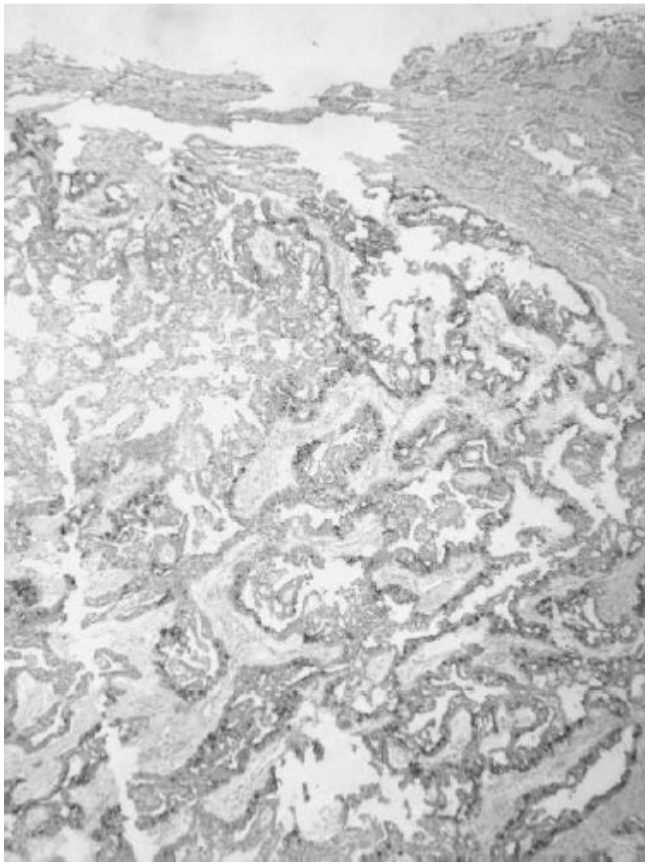

Figure-2: Tumour cells strongly positive for PLAP. (X400).

sections showed a tumour with tubulopapillary architecture and some solid areas Numerous Schiller-Duval body like structures were identified (Figure-1). Lymphatic invasion was seen. The tumour was invading the surrounding muscle and involving the excision margins. Immunohistochemistry revealed tumour cells diffusely positive for CK AE1/AE3 (pancytokeratin) and focally positive for PLAP (Placental Alkaline Phosphatase) (Figure-2) and EMA (Epithelial Membrane Antigen). Tumour cells were negative for AFP (Alphafetoprotein) and CD30 (Cluster of Differentiation 30). A diagnosis of extra gonadal primary yolk sac was made Serum hormone assays were performed including beta-HCG and alpha fetoprotein. Former was within normal reference range but latter showed a raised level of 759.7 IU/ml (normal 0.5-5.5 IU/ml) confirming the diagnosis of yolk sac tumour. The previous biopsy slides labeled as hamartoma were also reviewed which revealed adipose tissue and mature bony trabeculae. No immature elements were found.

CT scan done soon after the first biopsy showed small residual mass in the upper part of the right parapharyngeal space adjacent to the medial pterygoid muscle. Mildly enlarged lymph nodes were seen. Four cycles of chemotherapy were given. Alpha Fetoprotein levels after one month dropped to 5.58 IU/ml further dropping to <0.525 IU/ml in six months. Alpha Fetoprotein levels done after one year were still within the reference range. Three follow up CT scans done over a period of one year did not show any change in the size of residual tumour.

The residual mass was removed after one year, as this mass was not responding to the chemotherapy. The histopathology of this mass showed mature teratoma comprising cystic spaces lined by squamous and columnar epithelium along with mature neural, gastric and adipose tissue. It was reported as mature teratoma and in retrospect this case proved to be a yolk sac tumour arising in a mature cystic teratoma.

Discussion

Germ cell tumours are the most commonly found tumours in children. The age at diagnosis shows a bimodal peak with an increased incidence in the first four years of life and then from second to fourth decade of life.[4] The most common site for primary tumours is gonads, but about 5% of the germ cell tumours appear in some extra cranial site in head and neck region.[5] The prognosis for children with yolk sac tumours remains guarded with successful management depending on early diagnosis and aggressive adjuvant therapy.

In addition to the pure form, these tumours are often found in combination with other kinds of germ cell tumours, particularly teratoma and embryonal carcinoma. Development in teratoma of yolk sac tumour has been rarely seen in extragonadal sites. One such case has been reported in the liver but none seen in parapharyngeal space.[6]

Histologically yolk sac tumour cells resemble cells of endodermal sinuses of rat yolk sac. Microscopic appearance of tumour is variable, but usually includes malignant endodermal cells. Schiller Duval bodies when present are pathognomonic. Immunohistochemistry is helpful in the diagnosis and markers of benefit include placental alkaline phosphatase (PLAP) and alpha-fetoprotein (AFP) although they are lacking in sensitivity and specificity. Wang et al demonstrated 65% and 95% extra gonadal yolk sac tumours to be positive for PLAP and AFP however less than 30% of the tumour cells were positive for both markers. Other markers like cytokeratin and epithelial membrane antigen also show positivity in a large number of cases, however SALL4 has been shown to have 100% sensitivity with 94% cells staining positively.[5]

In our case there was positivity for PLAP, EMA and Cytokeratin but AFP was negative although the serum levels were raised. AFP can usually be detected in tumour tissue, serum, CSF, urine and in rare cases of foetal yolk sac tumour in amniotic fluid. However it is possible to have high serum levels of alpha-fetoprotein without tumour tissue demonstrating it especially in paediatric tumours.[7] This may

be due to a very small percentage of tumour cells producing AFP in some extra gonadal yolk sac tumours as mentioned above.[7] Clinically an elevated serum level of alpha-fetoprotein not only is common in yolk sac tumours but also is the ideal post operative tumour marker for prognostic assessment.

Yolk sac tumour often occurs as malignant foci within a large tumour and biopsy may reveal only teratoma, however elevated AFP may reveal its presence and vice versa biopsy may only show yolk sac component and teratomatous component may not be samples as in our case initially. Yolk sac tumours commonly occur in association with immature teratomas.[9] Our case most likely represents a yolk sac tumour which has arisen in a mature teratoma. A similar case from the nasopharynx has been reported by Byard et al[10] in which a mature teratoma was excised in the neonatal period and yolk sac tumour developed at the same site 3 yesrs later. The patient unfortunately died of disseminated disease in 18 months.

Therapy is primarily surgical excision. The tumour is not radiosensitive but adjuvant multiagent chemotherapy improves survival. Prognosis is however poorer for children with extra gonadal as compared to gonadal germ cell tumours.[8]

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