

ADULT PARAMENINGEAL RHABDOMYOSARCOMA - A CASE REPORT AND LITERATURE REVIEW

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ABSTRACT

Although rhabdomyosarcoma is predominantly a malignant disease of children, it is also seen in adults. Since adults account for only 15% of rhabdomyosarcomas, the experience gathered for the treatment of the malignancy has been derived from treating children. The treatment of a case of adult extensive parameningeal rhabdomyosarcoma with CyVADIC chemotherapy and radiotherapy is described, together with a review of the literature.

Keywords: Rhabdomyosarcoma, Chemotherapy.

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INTRODUCTION

Rhabdomyosarcoma is the commonest soft tissue sarcoma in infants and children, accounting for 4 to 8% of malignant disease in children less than 15 years old⁽¹⁾. It is rarer in adults, with adults above 20 years old accounting for only 15% of patients with rhabdomyosarcoma⁽²⁾.

We present an adult with extensive parameningeal rhabdomyosarcoma arising from the ethmoid sinus, treated with combination chemotherapy and radiotherapy, followed by a review of the literature.

CASE REPORT

JJL was a 31-year-old woman who presented with tearing and epistaxis. Ophthalmic examination was normal and she was treated symptomatically. Her symptoms persisted and subsequently, a right proptosis was noted. Computerised axial tomography (CT) of the orbit showed an ethmoidal sinus mass protruding into the right orbit. A transnasal biopsy of the mass revealed alveolar rhabdomyosarcoma.

She was referred to our department for further management. Clinically, there was right proptosis, with swelling of the right side of her face. Eye movements were full without diplopia. Fundoscopy revealed venous congestion in the right fundus. A fleshy tumour was seen occluding the right nasal cavity and nostril. By direct laryngoscopy, a large fleshy tumour was seen in the right posterior laryngeal space. Her oropharynx was normal and there were no palpable cervical lymph nodes.

Her heart, lungs and abdomen were normal. There were no focal neurological deficits.

Staging investigations revealed normal haemogram, urea, electrolytes, creatinine, and liver function tests. Serum lactate

dehydrogenase was elevated at 500 U/L (180 - 380 U/L normal range).

CT orbit and brain revealed an extensive soft tissue mass within the nasal cavity predominantly on the right. It filled the ethmoid sinus, invaded through the medial wall of the right orbit and extended into the right frontal lobe (Fig 1). Chest X-ray and CT chest were normal. Bone marrow aspirate and biopsy showed normal haemopoiesis with no evidence of malignancy. Review of the original nasal biopsy confirmed rhabdomyosarcoma, of the alveolar subtype.

In view of the above findings, she was staged as IRS group III (Table I) and started on chemotherapy four days after presentation to our department. She was started on CyVADic chemotherapy comprising intravenous (iv) cyclophosphamide 600mg/m² on day one, iv vincristine 1.4 mg/m² on day one, iv doxorubicin 60 mg/m² by continuous infusion over 24 hours on day one, and iv dacarbazine 250 mg/m² by continuous infusion over 96 hours over days one to four. The cycles were repeated every 21 days. She tolerated chemotherapy well with no dose modifications and received four cycles of chemotherapy.

Table I- IRS clinical group classification for rhabdomyosarcoma

| Group | Classification |
|-------|---|
| I | Localized disease, completely resected, regional nodes not involved; confined to muscle or organ of origin; contiguous involvement with infiltration outside the muscle or organ of origin, as through fascial planes |
| II | Grossly resected tumour with microscopic residual disease; no evidence of gross residual tumour; no evidence of regional node involvement |
| III | Incomplete resection or biopsy with gross residual disease |
| IV | Metastatic disease at presentation |

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CT of the skull repeated after the fourth cycle showed no evidence of residual disease. Mild mucosal thickening of the right ethmoid sinus was noted. The rest of the sinuses were normal, with no orbital or cerebral involvement (Fig 2).

Following four cycles of chemotherapy, the patient received external beam irradiation via a 3-field technique to 4500 rad, including a wide margin around the tumour volume, but without whole brain irradiation.

Fig. 1a - Computerised tomogram of brain before treatment

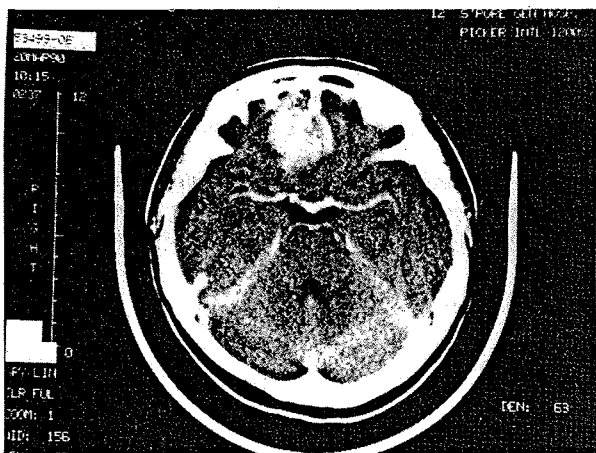


Fig. 2a - Computerised tomogram of brain after chemotherapy



Fig. 1b - Computerised tomogram of orbit before treatment

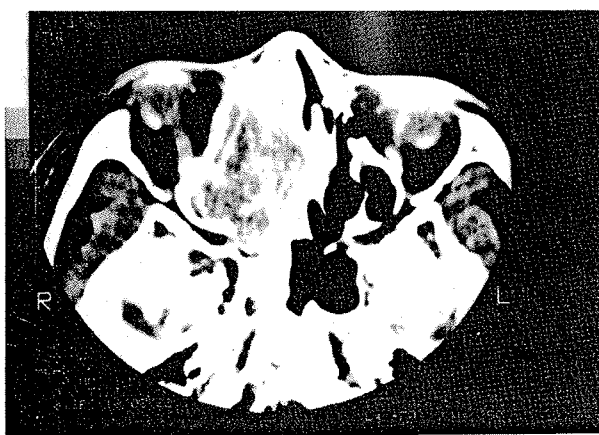


Fig. 2b - Computerised tomogram of orbit after chemotherapy



Cerebral spinal fluid obtained after irradiation was normal. She completed a further three courses of chemotherapy and remained well without evidence of disease for 8 months. However there was leptomeningeal recurrence one year after initial diagnosis.

DISCUSSION

Incidence

Rhabdomyosarcoma is a highly malignant tumour of children and adolescents that arises from embryonal mesenchyme with the potential of differentiating into skeletal muscle. This tumour grows by local extension and metastasizes via the lymphatics and bloodstream.

Rhabdomyosarcoma occurs annually in 4.4 per million white children⁽³⁾. However, it has been reported only rarely in adults, and adults comprise only 15% of all patients with rhabdomyosarcoma.

Histology

The classical histological types of rhabdomyosarcoma are alveolar, embryonal and pleomorphic. Alveolar subtypes were found in 20% of the patients in IRS-I, in the trunk, extremities and perineal regions. It was more frequent in teenagers, and associated with a significantly shorter survival even if the patient had localised disease which was completely resected at diagnosis^(4,5). This less favourable alveolar subtype was found in 43% of adults with rhabdomyosarcoma⁽²⁾.

Prognosis

In the past two decades, treatment for rhabdomyosarcoma has undergone many changes, and there has been significant increase in survival rates. The relative five-year survival for rhabdomyosarcoma in children under the age of 15-years has increased from 34% to 67%⁽⁶⁾. However, adults with rhabdomyosarcoma fare worse than children with an actuarial five-year survival of 22%⁽²⁾.

IRS-II demonstrated that survival varied depending on the site of disease and histologic subtype^(7,8). Patients with orbital, nonparameningeal head and neck, and genitourinary tumours have a much better prognosis than those with primary disease in the parameningeal areas, extremity, retroperitoneum and trunk. The alveolar and pleomorphic tumours do worst. Hence, the case discussed above had several poor prognostic features.

Management

Parameningeal rhabdomyosarcoma, which accounts for 14% of all rhabdomyosarcoma, includes tumour in the infratemporal fossa, ear, nasopharynx, nasal cavity and paranasal sinuses⁽⁹⁾. Up to 35% of patients with parameningeal rhabdomyosarcoma have direct tumour spread into the central nervous system⁽¹⁰⁾ as did the case discussed. Although skillful surgical excision of parameningeal tumours has been described⁽¹¹⁾, wide clearance with adequate control is uncommon.

In IRS-I, radiotherapy doses of 4000-5500 rads were associated with good local control. Cranial radiotherapy with intrathecal methotrexate, hydrocortisone and cytosine

arabinoside increased the relapse-free survival rate from 33% in IRS-I to 63% in IRS-II in patients with parameningeal rhabdomyosarcoma⁽¹²⁾. However, no such studies have been reported for adults.

Systemic vincristine, actinomycin-D and cyclophosphamide have been found to be agents of greatest efficacy⁽¹³⁾. Doxorubicin used alone has produced response rates of 27 - 40%, while the addition of dacarbazine has been reported to produce a response rate of 42%⁽¹³⁾. The further combination of vincristine and cyclophosphamide to doxorubicin and dacarbazine (CyVADic) further increased response rates to 50 - 60%⁽¹⁴⁾. Among Group III patients in IRS-I and IRS-II, the three-year relapse-free survival has increased from 59% to 73% with this chemotherapy. Overall survival rates have also significantly improved from 55% to 69%⁽¹²⁾.

The current management of parameningeal rhabdomyosarcoma as recommended in IRS-III is for cranial irradiation, with additional triple intrathecal chemotherapy if cerebral spinal fluid cytology is positive. In a patient with parameningeal disease with no bony erosion and negative cerebral spinal fluid cytology, radiotherapy is given to the primary site with a 5 cm margin, and to adjacent meninges⁽¹²⁾. Again, it is difficult to extrapolate results from IRS-III, which studied children and teenagers, to adults.

Despite aggressive multimodality management, when adults develop rhabdomyosarcoma, cure rates are apparently lower^(2,15,16). However, because of the rarity of this tumour in adults, there is some controversy as to whether age is an important prognostic factor.

Nevertheless, some adult patients with rhabdomyosarcoma respond favourably to therapy and have been cured⁽¹⁶⁾. Similar to the management of rhabdomyosarcoma in children, a combined multimodality approach encompassing surgery, radiotherapy and chemotherapy is recommended.

Our patient received combination chemotherapy with radiotherapy and had good control of the disease for almost one year. Surgery was not employed because of the site of disease and the excellent local tumour response to bimodality therapy.

CONCLUSION

Rhabdomyosarcoma is a relatively rare but highly malignant and complex tumour, involving several histological types arising virtually anywhere in the body affecting mainly children and adolescents. Because of the rarity of this malignancy in adults, all patients with rhabdomyosarcoma should be entered into study to further advance our knowledge of the malignancy. Although a lower cure rate is reported among adults with this disease, we should continue to treat this group with a multimodality approach similar to that employed in children.

REFERENCES

1. Maurer HM. Rhabdomyosarcoma. In: Sutow WW, Fernbach DJ, Vietti TJ. eds. *Clinical Pediatric Oncology*. St Louis, Missouri: Mosby. 1984: 622-51.
2. Prestige RP, Donaldson SS. Treatment results among adults with childhood tumours: A 20-year experience. *Int J Rad Onc Bio Phys* 1989; 17 (3): 507-14.
3. Maurer HM, Moon T, Donaldson M et al. The Intergroup Rhabdomyosarcoma Study Group: A preliminary report. *Cancer* 1977;40: 2015-26.
4. Gehan EA, Glover FN, Maurer HM et al. Prognostic factors in children with rhabdomyosarcoma. *Natl Cancer Inst Monogr* 1981; 56: 83-92.
5. Ruymann FB, Heyn R, Ragab A et al. Completely resected rhabdomyosarcoma: The effect of unfavourable histology on recurrence. A report from the Intergroup Rhabdomyosarcoma Study. *Proc Am Soc Clin Onc* 1984; 3: 86.
6. Silverberg E, Lubera JA. *Cancer statistics 1989*. *Cancer* 1989; 39: 3-20.
7. Newton WA, Soule EH, Hamoudi AB et al. Histopathology of childhood sarcomas, Intergroup Rhabdomyosarcoma Studies I and II: clinicopathological correlation. *J Clin Oncol* 1988; 6: 67-75.
8. Crist WM, Garnsey L, Beltangady MS et al. Prognosis in children with rhabdomyosarcoma: A report of the Intergroup Rhabdomyosarcoma Study Groups I and II. *J Clin Oncol* 1990; 8: 443-52.
9. Raney RB, Tefft M, Newton WA et al. Improved prognosis with intensive treatment of children with cranial sarcoma arising from non-orbital parameningeal sites. *Cancer* 1987; 59: 147-55.
10. Tefft M, Fernandez C, Donaldson M et al. Incidence of meningeal involvement of rhabdomyosarcomas of the head and neck in children: A report of the Intergroup Rhabdomyosarcoma Study. *Cancer* 1978; 42: 253-8.
11. Albin RE, O'Donnell RS. RMS of the pterygoid fossa. *Cancer* 1986; 58: 163-8.
12. Ruymann FB. Rhabdomyosarcoma in children and adolescents. *Hematol Oncol Clinics* 1987; 1(4): 621-54.
13. Gottlieb JA, Baker LH, O'Bryan RM et al. Adriamycin used alone and in combination for soft tissue and bony sarcomas. *Cancer Chemother Rep* 1975; 6: 271-82.
14. Benjamin RS, Gottlieb JA, Baker LO, Sinkovics JG. CYVADIC vs CYVADACT: A randomized trial of cyclophosphamide, vincristine and adriamycin, plus dacarbazine or actinomycin-D in metastatic sarcomas. *Proc Am Soc Clin Onc* 1977; 17: 256.
15. Lloyd RV, Hadju SI, Knapper WH. Embryonal rhabdomyosarcoma in adults. *Cancer* 1983; 51: 557-65.
16. Ang PT, Molina A, Torti F, et al. Rhabdomyosarcoma in adults: combined modality therapy. *Proc Am Soc Clin Onc* 1990; 9: 309.