30.

INTERSTITIAL THERAPY IN PEDIATRIC ONCOLOGY.
P. Littman[1], L. Berghaus[1], R.B. Raney[2], for the Department of Radiation Therapy[1] at the Hospital of the University of Pennsylvania and the Department of Oncology at the Children's Hospital of Philadelphia[2], Philadelphia, Pennsylvania 19104, U.S.A.

Unlike external radiation therapy which can be associated with considerable morbidity in the pediatric patient, interstitial therapy provides good local control while sparing adjacent normal tissue. Since 1971, thirteen children have been treated with an interstitial implant, both as part of initial therapy (I.T.) and for recurrent disease (R.D.). In the former group, six had rhabdomyosarcoma and one had neurofibrosarcoma. In the latter group, there were a variety of histiologies (rhabdomyosarcoma, Wilms tumor, chondrosarcoma, embryonal cell sarcoma of the pineal, and ependymoma). Four of six patients with R.D. had apparent local control. Six of seven I.T. patients had local control, and six are alive at six months to 10 years. No complications were encountered in these groups. The management of children with implants, the dosimetry, and other technical considerations are discussed.

31.

BRACHYTHERAPY IN THE MANAGEMENT OF CHILDREN AND ADOLESCENTS WITH SOLID TUMORS. S.Donaldson, D.R.Goffinet, Department of Radiology, Division of Radiation Therapy, Stanford University School of Medicine, Stanford, California, 94305, U.S.A.

Emphasis upon improved quality of long term survival with minimal late effects has stimulated application of new ways of administering irradiation (XRT) so to achieve local control while maintaining cosmesis and function.

During the 5 year period 1976-1981, 11 children have been specifically selected as candidates for brachytherapy (BT) for curative therapy to primary neoplasm, or for palliative treatment to sites of recurrence or metastases. Six had initial planned therapy with BT; 5 had failed all previous therapy. Six patients survive with 10-62 mos. follow-up with excellent cosmetic and functional results. Five patients died from metastatic disease having had good palliation. All patients have had local control of neoplasm in the implanted volume and none have suffered complications from the procedures. No late soft tissue, nerve or osseous injury has occurred.

IMPLANT	PATIENTS	ISOTOPE	SURVIVAL	LOCAL CONTROL
Temporary	6-Soft Tissue Sarcoma (STS)	Ir^{192} / Cs^{137}	5/6	6/6
	1-Retinoblastoma (RB)	Ir^{192}	0/1	1/1
Permanent	4-Osteosarcoma (OS)	I^{125}	1/4	4/4

The 6 children with STS presented with unique and difficult clinical problems: in 3 conventional XRT was not recommended because of patients' young age; in the remaining 3, residual inoperable tumor following XRT required additional treatment. The 1 child with RB enjoyed good palliation from treatment of parotid-facial mass. BT enabled high dose limited volume XRT to 4 adolescents with non-resectable OS. Pediatric brachytherapy utilizing innovative intraoperative techniques allows delivery of tumoricidal radiation doses with excellent cosmetic and functional results.

32.

PRE-RADIATION CHEMOTHERAPY FOR NEWLY DIAGNOSED CHILDHOOD BRAIN TUMORS--A MODIFIED PHASE II TRIAL. J. Allen, B. Jereb, L. Helson, Memorial Sloan-Kettering Cancer Center, New York, NY, U.S.A.

Children who present with disseminated, primary CNS malignant neuroectodermal or germ cell tumors have a poor prognosis. They require neuraxis irradiation, and once this is administered, tolerance for subsequent chemotherapy is lessened. We have explored a multimodal treatment approach in 14 poor risk patients consisting of a modified phase II chemotherapy trial followed by neuraxis radiation. Eleven patients had disseminated CNS disease and 2 had bone marrow involvement at diagnosis. Nine received 2 courses of intravenous cyclophosphamide (80mg/kg) alone over 8 weeks and 5 others received 3 daily doses of intrathecal Ara-C (50mg/m^2) and oral hydroxyurea (40mg/kg) with each course of cyclophosphamide. There were 4 complete responses (2 dysgerminomas, 1 pineoblastoma, 1 primitive neuroectodermal tumor), 1 partial response (1 medulloblastoma), and 3 mixed responses (2 medulloblastomas, 1 pineoblastoma) to chemotherapy alone for a response rate of 57%. Twelve patients subsequently tolerated the planned dose of neuraxis radiation. The median survival of all patients was 11 months and 6 of 7 deaths were related to recurrent disease. The hematologic toxicity was appreciable and 1 death resulted from gram negative septicemia. With this type of phase II trial, valuable information can be obtained on the response rates to specific chemotherapy agents administered prior to radiation. Although cyclophosphamide alone is an active agent in this context, these treatment regimens did not have an important effect of survival.

33.

HYPERFRACTIONATED IRRADIATION OF THE WHOLE ABDOMEN IN FIVE CHILDREN (3 WILM'S TUMOR, 2 HEPATOBLASTOMA) TREATED AT INSTITUT GUSTAVE-ROUSSY : TOLERANCE AND EFFICACY.
D. Sarrazin, B. Roullet, F. Fontaine, G. Rawlings. Institut GUSTAVE-ROUSSY, 94800 Villejuif, France.

From January 1981 to February 1982, 5 children received hyperfractionated abdominal irradiation for recurrent tumours considered incurable by classical methods, after multiple surgical interventions and chemotherapy. There were 3 cases of Wilm's tumour and 2 of AFP-secreting hepatoblastoma. The nephroblastoma patients received 28 Gy in 40 fractions over 12 days, with 5 fractions of 0.7 Gy given perday, 4 treatment days per week. For the hepatoblastoma patients, the same regimen was followed 3 weeks later by a further dose of either 8 or 12 Gy. Renal shielding was begun at 12 Gy. The liver was treated to full dose, except in one case where partial shielding was used after 20 Gy. This irradiation was performed without chemotherapy, with the exception of one patient who received Vincristine weekly. Liver and intestinal tolerance was poor in the initial period ; 2 cases of radiation hepatitis were noted. Intestinal tolerance was the poorest, with 3 cases of diarrhea occuring, one of which resulted in dehydration which required parenteral support - the portal of entry for a fatal septicemia. Three children are alive, at 10-12 month follow-up ; two have treatment induced dijestive complications. Herperfractionated radiation has not been shown to be effective in the hepatoblastoma cases. By contrast, the efficacy of this treatment is clearly and objectively demonstrated for the 3 nephroblastoma patients. Because of the dijestive tract complications, the choice of this treatment must be made with great care.

34.

EXPERIENCE WITH CYCLIC LOW-DOSE TOTAL BODY IRRADIATION (LD/TBI) FOR METASTATIC NEUROBLASTOMA. G.J.D'Angio and A.E.Evans. The Departments of Radiation Therapy and Pediatrics, University of Pennsylvania; and the Children's Hospital Cancer Research Center (CCRC), Philadelphia, PA 19104, U.S.A.

Survival rates of 20-25% for Stage IV neuroblastoma (NBL) patients (pts) with bone metastases (NBL/IV) remain low despite good response rates after chemotherapy such as the Children's Cancer Study Group regimen using 3-week cycles of cyclophosphamide (day 1: 700 mg/sq.m i.v.), vincristine (day 5: 1.5 mg/sq.m. i.v.), and DTIC (days 1-5: 250 mg/sq.m. i.v.) (CVD). Total body irradiation (TBI), which acts as a systemic agent, was added to CVD for NBL/IV as a fourth "drug" in a clinical trial at the CCRC. Ten pts aged 9 months to 5.5 yrs (median: 19 months) have received CVD plus 100 rad LD/TBI (50 rad q. 2d X 2) q. 3 wks for multiple courses, with prompt remissions. Three survive free of active disease after 400-600 rad for 13, 22 and 24 mos, 4 are dead after 300-400 rad, two are still on protocol at 5 and 7 mos. and one who relapsed is stable on retrieval therapy at 11 mos. Those surviving free of disease are in excellent general health despite the prolonged thrombocytopenia which has limited therapy after the 3rd or 4th cycle of CVD+LD/TBI. The 12 month actuarial survival for these 10 children is 56% and not appreciably different from larger experience with CVD alone. The quality of life during and after therapy seems superior, however. Higher LD/TBI doses per cycle omitting the 3rd and 5th cycles of CVD are currently being tested. Conclusions: Cyclic LD/TBI is well tolerated despite prolonged thrombocytopenia. Supported in part by U.S.P.H.S. Grant No. CA-14489 and CA-11796.
