

Preoperative Irradiation for Carcinoma of the Colon and Rectum

A Preliminary Report

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IN RECENT YEARS a considerable body of clinical [1-3] and experimental [4-6] data has been amassed to suggest that there is benefit from preoperative irradiation of carcinoma of the colon and rectum.

For several reasons this is somewhat contrary to medical opinion over the past few decades. With varying dosages of ortho voltage irradiation for advanced adenocarcinoma of the colon and rectum, results were so discouraging that it became the general opinion that these tumors should not be irradiated. Despite this belief, over the years a number of patients who were not at the time candidates for surgery have received irradiation for carcinoma of the colon and rectum and subsequently underwent surgery. Retrospective reviews of these patients indicate that surprising benefit has been experienced by some patients. In 1959 Stearns, Deddish and Quan [1] noted that with preoperative irradiation there was an increase in the five year survival from 23 to 37 per cent of patients having Dukes' [7-8] stage 3 cancer of the colon and rectum. Patients without metastases appeared to receive no appreciable benefit. Subsequent reports by Quan and his co-workers [2,3] indicate that this benefit is sustained at the ten year level. More recently, Ruff and associates [9], reporting the results of treatment of ninety-six patients receiving preoperative irradiation or radium implantation for

colorectal carcinoma, found ten patients to have no residual evidence of disease and ten to be converted from an inoperable to an operable state. Of those who became operable, six were five year survivors. Again, patients who did not have advanced disease did not appear to benefit from preoperative irradiation. Within the year a report from Japan [10] indicates that this benefit may not be limited to patients with carcinoma of the colon and rectum but may be shared by patients with carcinoma of the lung, esophagus and stomach.

To this increasingly impressive evidence of clinical benefit from preoperative irradiation for carcinoma has been added experimental evidence to support the hypothesis. Using four different mouse tumor-host systems Hoye and Smith [5,6] have subjected the donor tumor to 170 to 2,000 r *in vivo* prior to transplantation. They state, "in most cases while the intact tumor was not affected by irradiation, a cell suspension from this tumor when injected intravenously into other mice produced 5 to 100 per cent fewer metastases in the lungs when compared with control animals." Extensions of these studies by the same authors using *in vivo* irradiation or TSPA treatment of the donor tumors indicates that the growth of tumor disseminated intravascularly, intramuscularly or into an axillary wound from the *in vivo* treated primary tumor has been decreased by more than 90 per cent. Similar results have been reported by Olch, Eck and Smith [4]. In this instance the tumor was irradiated after implantation into the mouse hind limb and before amputation of the limb. In this situation the number

Current Considerations in Surgery of Cancer of the Colon and Rectum

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PREOPERATIVE RADIOTHERAPY FOR ADENOCARCINOMA OF THE RECTOSIGMOID

KENNETH R. STEVENS, JR., MD,* CLIFFORD V. ALLEN, MD,[†] AND
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Ninety-seven patients with adenocarcinoma of the rectosigmoid have been treated with high dose (5000–6000 rad) preoperative irradiation from 1960 through 1972 at the University of Oregon Health Sciences Center. Fifty-seven were initially clinically resectable and 40 were initially inoperable. Forty of the 57 initially clinically resectable patients had “curative” resections and are at risk for more than 5 years. An increase in 5-year survival (from 38% to 53%) and an absence of pelvic recurrence have occurred in those patients receiving preoperative irradiation and “curative” resection. Four of the 40 initially inoperable patients are alive without tumor. Three of the four survivors had irradiation and surgery; one had irradiation only. An additional four patients had no evidence of tumor at death. Tumor was totally sterilized by irradiation in nine patients and reduced to microfocal extent in an additional three of the 97 patients. Incidence of complications was no greater than has been reported in a surgical series from the same institution.

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ANTERIOR RESECTION AND PRIMARY ANASTOMOSIS FOLLOWING HIGH DOSE PREOPERATIVE IRRADIATION FOR ADENOCARCINOMA OF THE RECTO-SIGMOID

KENNETH R. STEVENS, JR., MD,* WILLIAM S. FLETCHER, MD,¹ AND CLIFFORD V. ALLEN, MD¹

Preoperative irradiation for adenocarcinoma of the rectum and sigmoid does not always limit the surgery to an abdominoperineal resection. From 1960 to 1976 anterior resection and primary anastomosis of the bowel has been performed in 13 patients with adenocarcinoma of the rectum and sigmoid whose tumor had been irradiated with 5000 rads with small pelvic fields. The inferior surgical resection line was within or very near the edge of the radiation field in 10 patients. In no instance was the superior resection line irradiated. Compared to a group of 79 patients treated with anterior resection only, the preoperatively irradiated patients had lower incidence of pelvic and anastomotic tumor recurrence, but a higher incidence of anastomotic leak and subsequent adhesions and intestinal obstruction. We stress that if irradiated rectum is considered for forming the anastomosis, a temporary "protective colostomy" should be strongly considered at the time of the surgery.

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