The Role of Radiation Therapy in Treating Patients With Potentially Resectable Carcinoma of the Esophagus*

Abram Recht, MD

Radiotherapy (RT) in conjunction with surgery may have a number of roles in the treatment of patients with potentially resectable esophageal carcinoma. The use of RT alone either preoperatively or postoperatively can be expected to improve resectability rates only modestly. The risk of locoregional failure, a common problem in esophageal carcinoma, has been substantially reduced with preoperative or postoperative RT in trials with a duration of follow-up of 3 or more years, although this effect has not been seen in trials with shorter follow-up. Because of the high risk of distant failure associated with these tumors and perhaps because of the inadequate doses used, most trials of RT have not shown notable improvements in overall survival rates. The risk of severe complications following preoperative or postoperative RT is small, provided that very high doses or fraction sizes are avoided. Concurrent chemotherapy and RT administration have been shown to be superior to RT alone in patients who have medically or surgically inoperable conditions; randomized trials using this combined modality in patients with resectable disease have only recently begun. In addition to evaluating the efficacy of this approach, investigators hope to establish the optimal sequencing and timing of administration of these modalities with regard to each other and to surgery.

(CHEST 1995; 107:233S-240S)

Since the advent of aggressive surgical intervention, little progress has been made in the treatment of patients with potentially resectable esophageal carcinoma. Only 40 to 60% of such patients have been medically fit to undergo radical surgery in most series,1-3 and of these, approximately two thirds have all disease grossly resected at surgical exploration. Some patients with very early stage disease (ie, involvement of only the mucosa or submucosa) can be cured readily by surgery alone,4 although such lesions are common only in patients participating in a screening program. Five-year survival rates for all patients undergoing “potentially curative” resection range from 15 to 35%.

Radiotherapy (RT) may play a number of roles in conjunction with surgery. Using RT preoperatively might improve the resectability rate. Theoretically, preoperative treatment might also decrease the risk of tumor dissemination due to surgical manipulation of the tumor. The use of either preoperative or postoperative RT may lower the risk of locoregional failure.

This article will review data concerning the possible advantages and complications of using adjuvant RT in potentially resectable esophageal cancer. Current research has focused mainly on the value of combining chemotherapy (CTh) and RT; this strategy will also be discussed.

Impact of Adjuvant RT on Resectability

Five randomized trials have compared surgery alone with preoperative RT followed by surgery (Table 1).5-15 In general, use of RT did not increase markedly the success rates for complete gross resections. A randomized trial performed at Memorial Sloan-Kettering Cancer Center comparing preoperative RT with preoperative CTh also reported no difference in resectability rates (77 and 75%, respectively).14

These studies are not easily interpreted. Although not documented, rates of pathologic complete response (CR) in these studies were probably extremely low. By today’s standards, patients in most of these studies received marginally effective doses at best.7-10,12 Of note, the study using the highest effective dose5,6 showed the greatest proportional improvement in resectability rates, with 29% of unrespectable disease in patients becoming resectable for cure after RT (ie, [70%-58%]+58%). Also, the period between the end of RT and surgery varied from 8 days or less5-7 to 2 to 4 weeks,8,9,12 the time between surgery and RT in the Edinburgh series was not noted.10 Because tumor regression following RT may continue for a much longer period, resectability rates might have increased more had surgery been delayed 4 to 8 weeks.

*From the Joint Center for Radiation Therapy, Department of Radiation Oncology, Harvard Medical School, Boston.
Table 1—Randomized Studies Comparing Radical Surgery With or Without Adjuvant Preoperative or Postoperative Radiotherapy*

<table>
<thead>
<tr>
<th>Institution</th>
<th>Dates</th>
<th>Dose (Gy)/No. of Fractions</th>
<th>No. of Patients</th>
<th>Duration of Follow-up, mo</th>
<th>% Postoperative Deaths1</th>
<th>% Resectable for Cure1</th>
<th>% Survival2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rennes, France5,6</td>
<td>1973-76</td>
<td>40/10</td>
<td>124</td>
<td>?</td>
<td>21/28</td>
<td>58/70</td>
<td>18/20</td>
</tr>
<tr>
<td>EORTC7</td>
<td>1976-82</td>
<td>33/10</td>
<td>208</td>
<td>(Average)</td>
<td>18/17</td>
<td>58/47</td>
<td>9/15</td>
</tr>
<tr>
<td>Beijing8,9</td>
<td>1977-87</td>
<td>40/20</td>
<td>360</td>
<td>?</td>
<td>9/9</td>
<td>65/73</td>
<td>34/75</td>
</tr>
<tr>
<td>Edinburgh10</td>
<td>1979-83</td>
<td>20/10</td>
<td>176</td>
<td>(Minimum)</td>
<td>36/12</td>
<td>37/40</td>
<td>17/9</td>
</tr>
<tr>
<td>AURC, France11</td>
<td>1979-85</td>
<td>45-55/25-50</td>
<td>221</td>
<td>(Minimum)</td>
<td>?/?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scandinavia12</td>
<td>1983-88</td>
<td>35/20</td>
<td>89</td>
<td>(Minimum)</td>
<td>?/?</td>
<td>37/40</td>
<td>19/19</td>
</tr>
<tr>
<td>Queen Mary Hospital, Hong Kong</td>
<td>1986-89</td>
<td>49/14</td>
<td>60</td>
<td>(Average)</td>
<td></td>
<td>60/57</td>
<td></td>
</tr>
</tbody>
</table>

*EORTC=European Organization for Research and Treatment of Cancer; AURC=Association Universitaire de la recherche contre le cancer.
1Rate given only for patients undergoing curative resection in control/radiotherapy arms.
2No gross residual disease or distant metastases.
3Includes only evaluable patients entered on study except Rennes study, where patients dying postoperatively were excluded. (In parentheses: how measured and at what time point.)
4Radiation given postoperatively.

Most of the randomized studies comparing radical surgery with or without adjuvant preoperative or postoperative RT have used ineffective RT doses and timed surgery too close to the end of RT to see any improvement in resectability rates. Adequate doses of radiation can be expected to increase the resectability rate only modestly. Whether the use of both chemotherapy and radiotherapy might increase resectability rates more dramatically is discussed below.

**IMPACT OF ADJUVANT RT ON LOCOREGIONAL FAILURE FOLLOWING POTENTIALLY CURATIVE SURGERY**

Although patients with esophageal cancer are at substantial risk of having metastases to regional lymph nodes, the risk factors for this have been reported by only a few authors (Tables 2 to 4).15-19 Transmural invasion is also common. Since the proximity of critical normal structures limits the extent of dissection, locoregional failure, as one might expect, is a common problem following radical sur-

Table 2—Incidence and Site of Adenopathy by Pathologic Tumor Stage (Chiba, Japan)*

<table>
<thead>
<tr>
<th>T Stage</th>
<th>No. of Patients</th>
<th>pN0</th>
<th>Cervical/Supraclavicular</th>
<th>Thoracic</th>
<th>Abdominal</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>5</td>
<td>60</td>
<td>0</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>T2</td>
<td>15</td>
<td>60</td>
<td>13</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>T3</td>
<td>33</td>
<td>12</td>
<td>45</td>
<td>45</td>
<td>70</td>
</tr>
<tr>
<td>T4</td>
<td>18</td>
<td>25</td>
<td>50</td>
<td>61</td>
<td>40</td>
</tr>
</tbody>
</table>

*pN0=Pathologically negative regional lymph nodes; pT1=Invasion of lamina propria or submucosa; pT2=Invasion of muscularis propria; pT3=Invasion of adventitia; pT4=Invasion of contiguous structures. Adapted from Onoda and Isono.15

Table 3—Incidence of Supraclavicular/Low Cervical Adenopathy by Tumor Location

<table>
<thead>
<tr>
<th>Series</th>
<th>Upper</th>
<th>Middle</th>
<th>Lower</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Padua, Italy16</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Toranomon Hospital,17</td>
<td>43</td>
<td>33</td>
<td>29</td>
<td>34</td>
</tr>
<tr>
<td>Tokyo</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Cancer Center</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital,18 Tokyo</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chiba, Japan15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4—Incidence of Superior Gastric/Celiac Axis Adenopathy by Tumor Location

<table>
<thead>
<tr>
<th>Series</th>
<th>Upper</th>
<th>Middle</th>
<th>Lower</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Padua, Italy16</td>
<td>18</td>
<td>34</td>
<td>40</td>
<td>82</td>
</tr>
<tr>
<td>Izumo, Japan19</td>
<td></td>
<td>39</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>Toranomon Hospital,17 Tokyo</td>
<td>32</td>
<td>37</td>
<td>83</td>
<td></td>
</tr>
</tbody>
</table>

Multimodality Therapy of Chest Malignancies: Update '94
surgery, although it may take prolonged follow-up to see it emerge (Table 5).7,8,11,13,20-22

Unfortunately, very few series have examined the correlates of such recurrence. In a recent study performed in Liverpool, England,22 the risk of locoregional recurrence was much greater when the circumferential margin was involved by tumor (failure rate, 11/22, or 50%) than when it was not (4/30, or 13%). These authors, however, gave no information on the possible correlates of margin involvement, especially ones that could be assessed preoperatively (eg, tumor size or computed tomography [CT] findings).

Not all the randomized trials listed in Table 1 have reported locoregional failure rates. Either preoperative or postoperative RT reduced the risk of locoregional failure substantially in those series with 3 years or more of follow-up (Table 5). Of note, this effect has not been seen in those series with shorter follow-up.

**IMPACT OF ADJUVANT RT ON SURVIVAL**

As noted, nearly all randomized studies of preoperative RT have been flawed by use of inadequate RT doses (Table 1). Perhaps in part because of this, the results of these trials have been disappointing, showing little if any improvement in overall survival rates.

Two randomized studies of postoperative RT reported no improvement in survival in the experimental arms, although the short duration of follow-up in one of these studies rendered this finding inconclusive (Table 1). Postoperative RT also has been used in nonrandomized studies in relatively small groups of patients.23-26 In one retrospective series,25 patients with pathologically normal regional lymph nodes appeared to benefit from such treatment, but there was no survival advantage for patients with lymph node involvement.

**TOXIC REACTIONS OF RT COMBINED WITH RADICAL RESECTION**

Table 1 lists postoperative mortality rates in patients undergoing curative resection in randomized studies comparing surgery alone with preoperative RT plus surgery. There were few differences among treatment groups, even in the two studies that used very large daily doses,5-7 which especially might be expected to have deleterious effects. Nonfatal postoperative complications are less well reported; in two series there were no differences between treatment arms in the incidence of anastomotic leaks9 or other complications.10 The risks of long-term complication were not noted, however.

Postoperative RT also has been thought by some to jeopardize the integrity of the anastomosis, but to our knowledge, there are no clinical data to substantiate this. Of note, a study performed in rats27 found that RT delivered 1, 3, or 6 weeks after surgery made no significant difference in the bursting strength of the anastomosis.

Complication rates have not been examined in one of the two randomized studies comparing surgery alone with surgery and postoperative RT11 or in a randomized trial in which patients received either preoperative RT or a combination of preoperative and postoperative RT.24 In the randomized study of postoperative RT performed in Hong Kong,13 however, extremely large daily doses (3.5 Gy) were given to a large total dose (49 Gy). Consequently, 5 patients in the experimental arm died of radiation-induced gastritis in the pulled-up gastric remnant, and 16 other patients suffered milder gastric ulcerations. Such high complication rates are not likely when lower doses are used. In a retrospective series of 13 patients treated with total doses of 50 to 60 Gy with conventional fractionation (1.8 to 2.0 Gy/d),26 only one patient developed esophageal stenosis and one
experienced a “flap breakdown”; there were no deaths. Hence, the risk of severe complications following either preoperative or postoperative RT is small, provided that very high doses or fraction sizes are avoided.

**Studies Using Both CTh and RT**

Patients with esophageal cancer undergoing resection alone appear to have a substantial risk of distant failure, especially when transmural extension, positive regional lymph nodes, or both are found. Chemotherapy has only a limited impact on this disease. The rates of significant pathologic response to preoperative (or neoadjuvant) CTh (ie, complete absence of tumor or only microscopic residual disease in the resected specimen) have been less than 10% both for squamous cell carcinomas and adenocarcinomas. Therefore, it is perhaps not surprising that two randomized studies comparing resection alone with preoperative CTh plus surgery have shown no difference in outcome between treatment arms. A similar intergroup study was started in 1990; results from this study are not yet available.

Hence, neither CTh nor RT used singly seems to have a substantial impact on outcome. Interestingly, a randomized study comparing postoperative RT with postoperative cisplatin and vindesine showed no survival difference between the two groups; there was, however, no surgery-only control arm. Recurrences in the RT arm were mainly due to distant failure, while failures in the CTh arm were predominantly in the mediastinum.

Preoperative synchronous administration of CTh and RT (variously termed “concurrent” or “concomitant” chemoradiotherapy) was pioneered by several groups in the late 1970s and early 1980s. Several randomized studies have demonstrated the superiority of concurrent chemoradiotherapy over RT alone for patients who have medically or surgically inoperable conditions. When given to patients with potentially resectable tumors, pathologic CR rates in resected specimens in recent series ranged from 24 to 50%. However, randomized trials of this approach in such patients have begun only recently.

One such ongoing trial, started in May 1990 in Dublin, Ireland, recently reported preliminary results. Patients received two courses of 5-fluorouracil (5-FU) (15 mg/kg/d for 5 days) and cisplatin (75 mg/m² on days 1 to 42) and 40 Gy of RT over a period of 6 weeks; it was not specified whether a split-course regimen was used. The pathologic CR rate was 30%. No data were given on overall resectability rates. The 90-day mortality rate was slightly higher in the treatment group (2/20 patients) than in the control group (1/21). With a mean follow-up of 11 months, 1-year survival rates in the treatment and control groups were 80 and 50%, respectively.

Of interest, the presence of epidermal growth factor receptor (EGFR) was the only predictor for response to preoperative therapy. A pathologic CR was seen in all five patients without immunocytochemical evidence of overexpression of EGFR vs only one pathologic CR among nine patients with evidence of severe EGFR overexpression.

Another randomized study, conducted by the Eastern Cooperative Oncology Group (EST 1282), compared concurrent chemoradiotherapy with RT alone in patients treated either preoperatively or definitively. In a preliminary report, median survival was longer in the combined-modality arm (15 vs 9 months), but data were not reported separately for patients with inoperable conditions and patients undergoing surgery.

To our knowledge, the optimal timing of RT and CTh in relation to one another has not been explored in randomized studies. An approach other than concurrent administration is to give these modalities sequentially, which may reduce toxic reactions considerably but also may lessen the antitumor effect. A recent trial in Scandinavia found sequential CTh (cisplatin and bleomycin) and radiation produced results similar to those obtained by using preoperative RT alone. Further studies of this approach are in progress. The European Organization for Research and Treatment of Cancer (protocol 40881) is comparing surgery alone with preoperative RT (37 Gy, delivered in ten fractions on days 1 to 5 and days 22 to 26) and cisplatin (100 mg/m² given within 3 days prior to RT) in patients with stage I or II squamous cell carcinoma of the thoracic esophagus; surgery is to be performed 2 to 4 weeks later.

Exploration of the best timing of chemoradiotherapy in relation to surgery has been limited. Postoperative concurrent chemoradiotherapy has also been given with only limited severe acute toxic reactions. Another approach is to give either CTh or RT alone prior to surgery and to use the other modality following surgery. At present, there is no consensus on which sequencing or timing approach achieves the best results.

Certainly, no one has yet developed an optimal regimen for controlling either local or distant disease. For example, in a study performed at the University of Michigan, 95% (41/43) of patients completed a 21-day course of concurrent cisplatin, 5-FU, vinblastine, and RT (37.50 Gy in 15 daily fractions or 45 Gy in 30 fractions delivered twice daily) and then underwent exploratory surgery. Complete resection of tumor was achieved in 84% of patients. In a recent update, the 5-year survival rate for the entire
entering group of 43 patients was 34%. Of note, this
rate was 60% among patients who had a pathologic
CR vs 32% for those having residual tumor present
following resection. Of the 36 patients whose tumors
were resected, none had local failure as the first site
of recurrence. There was a 3% incidence of regional
failure (within the irradiated mediastinum), a 47% incidence of distant failure only, and a 14% incidence
of both regional and distant failure. In a Duke Uni-
versity study of 58 patients undergoing complete
gross tumor resection following RT and CTh with
cisplatin or carboplatin and either 5-FU (for squa-
mous carcinomas) or etoposide (for adenocarcino-
mas), 14% had failures initially in local sites, 29% at
distant sites only, and 10% at both local and distant
sites.41 In a recent update,56 the 5-year actuarial lo-
coregional failure rate had reached about 48% and
the overall survival rate was only 14%.

TOXICITY OF COMBINED-MODALITY REGIMENS

Toxicity from these regimens also remains a prob-
lem. Nearly all patients suffer varying degrees of
anorexia and fatigue that eventually resolve, al-
though sometimes not for months following the
completion of therapy. In the University of Michigan
experience,40 86% of patients had transient esoph-
agitis and secondary dysphagia, and 79% required
nutritional support. Grade 3 or 4 leukopenia was en-
countered in 93% of patients, with grade 3 or 4
thrombocytopenia seen in 23% and 33% requiring
RBC transfusions. Two preoperative deaths (5%) oc-
curred due to granulocytopenia and sepsis. In the
Duke University study,41 1% of evaluable patients
(1/143) died of treatment-related bleeding during
CTh, with a perioperative mortality rate (among
patients undergoing surgery) of 17% (12/72).

In practical terms, it may be easier to deliver both
RT and CTh preoperatively, because of the pro-
longed recovery period that often follows surgery.
Preoperative combined-modality treatment does not
appear to increase substantially the risk of postoper-
avie complications in most retrospective series. How-
ever, two randomized studies have reported an
increased risk of severe complications following sur-
ery in patients treated with neoadjuvant chemora-
diotherapy45 or preoperative CTh alone.33 Of note,
the risk of perioperative mortality in the Duke Uni-
versity study was related both to patient age (4/5
patients older than 70 years died postoperatively vs
6/53 patients [11%] younger than 70 years) and pre-
operative RT dose (4/7 patients receiving more than
50 Gy died vs 6/51 patients [12%] receiving 50 Gy or
less.50 When salvage esophagectomy was attempted
in 11 patients who had received previously 60 Gy, the
perioperative mortality rate was 36%.41

FUTURE DIRECTIONS

A number of approaches to improving these results
recently have been under investigation. Some of the
recent and ongoing studies are reviewed below.

Some strategies have modified the RT regimens,
CTh regimens, or both used in past studies. At
Rush-Presbyterian-St. Luke’s Medical Center in Chi-
icago, accelerated RT (2 Gy given twice daily) has been
used with concomitant 5-FU and cisplatin postoperatively in patients with resections.51 While
local control has been excellent (14/15 patients), se-
vere late complications were seen in 3 patients
(ulcerations of pulled-up gastric mucosa in 2 patients
and tracheoesophageal fistula in 1 patient), including
1 death. Further study of this approach, but with a
reduced RT dose (1.7 Gy given twice daily), is
ongoing.

A program at the University of Chicago is using
two induction cycles of cisplatin, 5-FU, and leucov-
orin (PFL), followed by surgical resection in operable
candidates; all patients then receive concurrent
chemoradiotherapy using 5-FU, hydroxyurea (em-
ployed as a radiation-sensitizing drug), and radiation
doses of 50 to 60 Gy.52 One treatment-related death
has occurred among 24 evaluable patients. A similar
study in Essen, Germany, is adding etoposide to the
pre-RT PFL regimen, with cisplatin and etoposide
being given only during RT.53 No deaths have
occurred in this study. A recently opened Radiation
Therapy Oncology Group study (No. 90-12) (Inter-
group Study 0122) is also attempting to determine
the outcome of patients treated with neoadjuvant CTh
followed by concurrent chemoradiotherapy and then
surgery.

A study at Vanderbilt University conducted from
1988 to 1992 gave 66 patients one cycle of PFL, with
or without etoposide, and concurrent RT (30 Gy,
followed by a second CTh cycle.54 The pathologic CR
rate among 51 patients undergoing surgery was 24%.
Of note, two patients (3%) died of myelosuppression,
and there were four perioperative deaths (8%).

At Harper Hospital in Detroit, three additional
cycles of cisplatin and 5-FU have been added follow-
ing initial chemoradiotherapy in an attempt to
reduce the risk of distant failure.55 Only patients with
residual disease at endoscopy following chemora-
diotherapy are offered resection.

Other approaches to this disease include the use of
radiosensitizing agents other than CTh. For example,
we recently conducted a study of the radiosensitizer
etanidazole in combination with RT and cisplatin-
5-FU CTh.36 The pathologic CR rate in patients
treated preoperatively was 29%. Growth factors may
help mitigate the hematologic toxicity of these reg-
imens. In our study,39 45% of patients who did not
receive granulocyte colony-stimulating factor devel-
oped grade 4 neutropenia vs none of the patients in the later phase of that trial.

The optimum RT doses and treatment volumes have not been defined. For example, what is the value of prophylactically treating the second-echelon draining lymph nodes listed in Tables 2 to 4 (ie, supraclavicular, celiac axis, and perigastric)? How far do the RT field borders need to extend above and below the grossly apparent primary tumor? There is no agreement on these points. Some of the excessive toxic reactions seen in the series discussed above may have been avoided had smaller RT fields or doses been used, but such reductions may also increase the risk of locoregional failures. These issues await exploration.

A very different but complementary approach would be to tailor the treatment to the tumor. That is, patients who have localized but unresectable disease might benefit from preoperative treatment, but some patients may have distant metastases that are discovered only at the time of surgery. Further, as discussed previously, some patients with early disease are likely to be cured with surgery alone, and hence can be spared the potential side effects of preoperative CTh and RT. Should the surgical specimen show transmural invasion or abnormal regional nodes, then postoperative treatment could be given. By using such a strategy, only patients likely to derive a benefit will receive adjuvant therapy.

Imaging studies are widely used to evaluate resectability and metastatic spread preoperatively. Such tests, however, are often inaccurate when compared with surgical findings. For example, transesophageal ultrasound was only 70% accurate in determining whether periesophageal lymph nodes were involved by tumor in one recent study, and only 45% accurate in an older study. The accuracy of CT and conventional transabdominal ultrasound in predicting celiac axis adenopathy was only 30 and 48%, respectively, in a recent series. Their accuracy was better (80%) in assessing metastases to the liver or other intra-abdominal sites.

Disease extent in patients with pancreatic carcinoma can be assessed very accurately with laparoscopy. However, there has been only very limited experience with the use of minimally invasive surgery for the staging of esophageal carcinoma or other thoracic lesions. We therefore recently began a collaborative protocol with the Joint Center for Radiation Therapy, the Brigham and Women’s Hospital, and the Dana-Farber Cancer Institute to test the accuracy and clinical value of pretreatment surgical staging with thoracoscopy and laparoscopy in patients with apparently limited disease. The information obtained from this staging will be used to determine the overall treatment plan. Patients with distant metastases (eg, liver metastases, pleural or peritoneal seeding, para-aortic adenopathy) will be removed from study. Patients found to have extrathoracic tumor extension, mediastinal adenopathy, or celiac axis or perigastric adenopathy will receive concurrent chemoradiotherapy preoperatively. Patients with no evidence of extrathoracic spread or adenopathy will undergo surgical exploration; if transmural extension, abnormal mediastinal nodes, or perigastric and celiac axis nodes are found or if the resection margins are involved by tumor, then patients will receive the identical adjuvant combined-modality therapy as those treated preoperatively. Patients with none of these conditions will be observed only. We will thus gather information on the accuracy of such surgical staging and correlate this with the results of noninvasive studies; compare, for the first time, the toxic reactions of identical preoperative and postoperative combined-modality therapy; and test whether such a strategy can limit the inappropriate use of chemoradiotherapy and exploratory surgery.

CONCLUSIONS

Randomized trials have shown that giving preoperative RT alone is safe but does not substantially increase resectability rates. Adequate doses of either preoperative or postoperative RT will significantly reduce the risk of locoregional failure; however, no improvement is seen in survival rates due to the substantial risk of distant failure associated with these tumors. Conversely, systemic therapy appears unlikely to be of much benefit unless the maximum possible rate of locoregional control is obtained. Hence, further investigation of the role of RT in patients with potentially resectable esophageal cancers will focus on combined-modality therapy. Although this approach remains promising, only randomized prospective studies will reveal whether patients truly benefit from such treatment. The optimal CTh and RT regimens and the optimal scheduling of these modalities with regards to each other and surgery are unknown at present. Accurate surgical staging may improve our ability to select the most efficacious and least toxic treatment approach for each patient.

REFERENCES

2. Ellis FN. Carcinoma of the esophagus. CA 1983; 33:264-81

238S

Multimodality Therapy of Chest Malignancies: Update ’94

Downloaded From: http://journal.publications.chestnet.org/pdfaccess.ashx?url=/data/journals/chest/21716/ on 06/27/2017


29 Felici J, Garcia-Giron C, Diaz J, et al. Cisplatin (CDDP) and 5-fluorouracil (5-FU) modulated with leucovorin (LV) for locally advanced esophageal cancer (LAEC) [abstract]. Ann Oncol 1992; 3(suppl):5:12


41 Kavanagh B, Anscher M, Leopold K, et al. Patterns of failure following combined modality therapy for esophageal cancer,
2405


Multimodality Therapy of Chest Malignancies: Update '94

2405

Downloaded From: http://journal.publications.chestnet.org/pdfaccess.ashx?url=/data/journals/chest/21716/ on 06/27/2017