

Underutilization of Surgical Resection in Patients With Localized Pancreatic Cancer

Taylor S. Riall, MD,* and Keith D. Lillemoe, MD†

Pancreatic cancer remains the fourth leading cause of cancer deaths in men and women in the United States. Ductal carcinoma (adenocarcinoma) is the most common form, with an annual incidence of approximately 9 cases per 100,000 people. In 2006, there were an estimated 33,730 cases of pancreatic cancer diagnosed and 32,300 deaths from the disease. The mean age at diagnosis is 70 years. The incidence is roughly equal in males and females, but slightly higher in African Americans compared with that in Caucasians. The overall 5-year survival rate is less than 4%.¹

Approximately two-thirds of patients with pancreatic cancer present with advanced stage disease. Such patients are not candidates for surgical resection. Chemotherapy and radiotherapy regimens, although modestly improving survival, are not curative. For patients with locoregional disease, surgical resection is the only hope for long-term survival or cure. Over the last 3 decades, the mortality after pancreatic resection for pancreatic cancer at high-volume centers (>25 cases per year) has decreased to less than 5%, and the 5-year actuarial survival after resection has improved to 15% to 30%.²⁻⁴

Finally, in response to critics who suggest that the actuarial survival reported in these studies overestimates 5-year survival,⁵ a recent report evaluating actual 5-year survival after resection for pancreatic and other periampullary cancers demonstrated an actual 5-year survival rate of 17%. In addition, of those patients who survived to the 5-year landmark, 55% survive to the 10-year landmark.⁶

Although clear evidence supports surgical resection as the standard of care for patients with locoregional pancreatic cancer, surgical resection remains underutilized. In a recent population-based study by Cress et al using the California tumor registry,⁷ only 35% of patients with locoregional disease underwent surgical resection. Likewise, in a recent population-based study using the SEER tumor registry data, only 27% of patients with locoregional disease underwent surgical resection.⁸ The percentage of patients undergoing surgical resection did increase from 19% to 31% over the period of 1988 to 2001. However, although this trend is promising, still less than one-third of patients with locoregional disease are being resected.

Bilimoria and colleagues in this issue of *Annals of Surgery* use data from the National Cancer Data Bank (NCDB) to evaluate and characterize the reasons for the observed underutilization of surgery in patients with localized pancreatic cancer. Similar to previous reports, only 28.6% of patients with clinical stage I pancreatic cancer underwent surgical resection. Between 1995 and 2004, the percentage of patients resected increased from 21.8% to 35.7%. Although encouraging, surgical resection is still strikingly underutilized.

In the analysis of those patients not undergoing pancreatic resection, 51.7% did not have an identifiable reason for not undergoing potentially curative resection (38.2% not offered surgery and 13.5% unknown reason), and the remaining 19.4% refused surgery (4.2%), cited age as a contraindication (9.1%), or had too many comorbidities (6.4%). In a multivariate analysis, patients who were older, black, had a lower annual income, less

From the *Department of Surgery, University of Texas Medical Branch, Galveston, TX; and †Department of Surgery, Indiana University School of Medicine, Indianapolis, IN.

Reprints: Taylor S. Riall, MD, Assistant Professor of Surgery, Department of Surgery, University of Texas Medical Branch, 301 University Boulevard, Johns Sealy Annex 6.312b, Galveston, TX 77555-0542. E-mail: tsriall@utmb.edu.

Copyright © 2007 by Lippincott Williams & Wilkins

ISSN: 0003-4932/07/24602-0181

DOI: 10.1097/SLA.0b013e31811ea2c

education, Medicare or Medicaid insurance, lesions in the pancreatic head, or were seen at a low-volume center or community hospital were less likely to undergo surgery. In addition, patients seen at NCI designated cancer centers were more likely to undergo surgical resection.

The analysis by Bilimoria and colleagues provides insight into the reasons for underutilization of surgery in patients with localized pancreatic cancer. However, this analysis needs to be expanded. First, the authors limited their analysis to clinical stage I (T1N0M0) patients. These results would also likely apply to patients with more advanced, but resectable, regional disease with even more striking underutilization of pancreatic resection expected.

Some of these patients with locoregional disease may not be candidates for surgical resection based on individual characteristics such as severe comorbidities or tumor characteristics such as major vascular involvement. However, if the more favorable stage I patients reported in this series are being inappropriately denied surgical resection, it is likely that this could be even more pronounced for more formidable tumors.

We hypothesize that the main reasons why people do not receive surgical resection for locoregional pancreatic cancer are 2-fold. First, they may never be evaluated by a surgeon due to the nihilistic views of their primary physician including oncologists and gastroenterologists. In our preliminary analysis of SEER-Medicare data, only 75% of patients with locoregional pancreatic cancer underwent surgical evaluation (data unpublished). Second, these patients are evaluated by a surgeon who is not experienced in performing pancreatic resection. This latter point provides further evidence to support the referral of these patients to regional high-volume centers, which have been consistently demonstrated to improve both short-term and long-term survival.^{9–12}

Finally, these types of studies should be extended to include referral to and treatment of pancreatic cancer by nonsurgical oncology specialists. New and effective regimens for neoadjuvant, adjuvant, and palliative therapy¹³ are also likely being denied to a large proportion of patients. The data from this study and those of our group and others support the idea of regionalizing the care of pancreatic cancer patients to experienced centers or surgeons. The data should be used to generate health policy for patients with locoregional pancreatic cancer. We can define minimal appropriate care standards for patients with locoregional pancreatic cancer to assure adequate assessment of resectability from both a technical standpoint and based on patient comorbidities. “Appropriate care” should include the steps necessary to make an informed decision on appropriate treatment. We feel that all patients with locoregional pancreatic cancer should: (1) undergo state-of-the-art abdominal imaging, either with pancreas protocol 3D-computed tomography or MRI, (2) be

evaluated by a qualified, experienced pancreatic surgeon, and (3) be evaluated by a medical oncologist.

In conclusion, although scientists and clinicians strive for screening tools for earlier diagnosis and to develop better chemotherapy and other novel therapies for pancreatic cancer, surgical resection currently remains the only potential for cure. Although such efforts are of major importance, by simply maximizing rates of surgical resection, for all appropriate surgical candidates, we can make an immediate improvement in survival and impact thousands of patients.

The article by Bilimoria and colleagues is certainly appropriate for *Annals of Surgery*. However, this information needs to be disseminated to a wider audience. The nihilistic attitude toward pancreatic cancer is likely at the level of the primary care physician or internists who are the first line of physicians who see these patients. To influence practice and improve care for these patients, this message needs to be delivered to primary care physicians, gastroenterologists, general surgeons, medical oncologists, and the community. Finally, we need to make easily accessible referral networks such that all patients with locoregional pancreatic cancer get an adequate and experienced assessment for resectability.

REFERENCES

1. Jemal A, Siegel R, Ward E, et al. Cancer Statistics, 2006. *CA Cancer J Clin*. 2006;56:106–130.
2. Winter JM, Cameron JL, Campbell KA, et al. 1423 Pancreaticoduodenectomies for pancreatic cancer: a single institution experience. *J Gastrointest Surg*. 2006;10:1199–1211.
3. Conlon KC, Klimstra DS, Brennan MF. Long-term survival after curative resection for pancreatic ductal adenocarcinoma. Clinicopathologic analysis of 5-year survivors. *Ann Surg*. 1996;223:273–279.
4. Yeo CJ, Sohn TA, Cameron JL, et al. Periapillary adenocarcinoma: analysis of 5-year survivors. *Ann Surg*. 1998;227:821–831.
5. Gudjonsson B. Survival statistics gone awry: pancreatic cancer, a case in point. *J Clin Gastroenterol*. 2002;35:180–184.
6. Riall TS, Cameron JL, Lillemoe KD, et al. Resected periampullary cancer: 5-year survivors and their 6- to 10-year follow-up. *Surgery*. 2006;140:754–762.
7. Cress RD, Yin D, Clarke L, et al. Survival among patients with adenocarcinoma of the pancreas: a population-based study. *Cancer Causes Control*. 2006;17:403–409.
8. Riall TS, Freeman JL, Townsend CM Jr, et al. Pancreatic cancer in the general population: Improvements in survival over the last decade. *J Gastrointest Surg*. 2006;10:1212–1224.
9. Fong Y, Gonen N, Rubin D, Radzyner M, Brennan MF. Long-term survival is superior after resection for cancer in high-volume centers. *Ann Surg*. 2005;242:540–547.
10. Gordon TA, Bowman HM, Tielsch JM, Bass EB, Burleyson GP, Cameron JL. Statewide regionalization of pancreaticoduodenectomy and its effect on in-hospital mortality. *Ann Surg*. 1998;228:71–78.
11. Birkmeyer JD, Warshaw AL, Finlayson SRG, Grove MR, Tosteson ANA. Relationship between hospital volume and late survival after pancreaticoduodenectomy. *Surgery*. 1999;126:178–183.
12. Birkmeyer JD, Stukel TA, Siewers AE, Goodney PP, Wennberg DE, Lucas FL. Surgeon volume and operative mortality in the United States. *N Engl J Med*. 2003;349:2117–2127.
13. Krzyzanowska MK, Weeks JC, Earle CC. Treatment of locally advanced pancreatic cancer in the real world: population-based practices and effectiveness. *J Clin Oncol*. 2003;21:3409–3414.