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Standardization of surgical care in a high-volume center improves survival in resected pancreatic head cancer

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Abstract

BACKGROUND: Durable clinical gains in surgical care are frequently reliant on well-developed standardization of practices. We hypothesized that the standardization of surgical management would result in improved long-term survival in pancreatic cancer.

METHODS: Seventy-seven consecutive, eligible patients representing all patients who underwent pancreaticoduodenectomy and received comprehensive, long-term postoperative care at the University of Florida were analyzed. Patients were divided into prestandardization and poststandardization groups based on the implementation of a pancreatic surgery partnership, or standardization program.

RESULTS: Standardization resulted in a reduction in median length of stay (10 vs 12 days; $P = .032$), as well as significant gains in disease-free survival (17 vs 11 months; $P = .017$) and overall survival (OS; 26 vs 16 months; $P = .004$). The improvement in overall survival remained significant on multivariate analysis (hazard ratio = .46, $P = .005$).

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CONCLUSIONS: Standardization of surgical management of pancreatic cancer was associated with significant gains in long-term survival. These results suggest strongly that management of pancreatic head adenocarcinoma be standardized likely by regionalization of care at high performing oncologic surgery programs.

The complexity of intraoperative and postoperative care associated with pancreaticoduodenectomy (PD) has led to a growing emphasis on surgical specialization, which is supported by the numerous hepatobiliary and pancreatic surgery subspecialty training programs that have arisen in the last 2 decades. Numerous single institution experiences have demonstrated superior short-term outcomes in specialized, high-volume pancreatic surgical centers.[1–10] The factors contributing to favorable outcomes in single centers, however, remain elusive but are important to discern because up to one quarter of patients will survive five years postoperatively with treatment at highly select centers.[11] The pathobiology of pancreatic cancer (PC) has challenged the development of effective systemic therapies. As a result, PC is projected to be the second leading cause of cancer deaths by 2030 in the United States.[12] Therefore, efforts to understand modifiable clinical approaches that influence survival are warranted.

Emerging data indicate that centralization in pancreatic surgery consistently correlates with improved long-term survival in cancer.[2,3,13] Regionalization of oncologic pancreatic head resections led to a marked survival improvement in a Dutch series of 2,129 pancreatic resections.[13] In addition, results from the same group-isolating cases of pancreatic head malignancies corroborated this correlation between high-volume hospitals and improved survival.[14] Another large series analyzing 2,592 pancreatectomies for cancer through the National Medicare database has confirmed these findings.[2] However, although centralization of pancreatic surgery has led to improved results in high-volume institutions compared with low-volume institutions, the specific factors related to improved outcomes at these highly-specialized centers have not been detailed throughout the continuum of patient care.

The centralization of complex abdominal operations often includes standardization of postoperative management. Specifically, the implementation of clinical pathways in hepatobiliary and pancreatic surgery improved both short-term outcomes and costs associated with postoperative care at 2 major hepatobiliary surgical centers in the United States.[15,16] However, data remain limited as to whether a combination of centralization, defined here as the limitation of pancreatic surgery to high-volume pancreatic surgeons, and standardization, or the implementation of operative and postoperative protocols based on consensus agreements between experienced pancreatic surgeons, leads to improved long-term outcomes.

To specifically address this question, we examined long-term outcomes in a consecutive series of PC patients, who underwent PD and subsequent long-term, comprehensive medical management at the University of Florida (UF). We purposefully selected patients who received the entirety of care at our institution to determine if the outcomes differed from a previous institutional cohort and benchmarked with national high-performing programs. Thus, these cohorts are a highly select group of patients to ensure consistent medical oncologic care, representing only 4% of patients undergoing PD at our institution over this time span. Patients were categorized into prestandardization and poststandardization groups based on the implementation of a pancreatic surgery partnership in 2008, reflecting standardization of operative and postoperative management. We hypothesized that standardization of care throughout the continuum of treatment would result in improved long-term survival in resected PC.

Methods

A retrospective review of an institutional review board–approved, prospectively maintained PC database at UF was conducted. All patients resected by PD with continued follow-up with the institution's medical oncologists were reviewed. Patients receiving neoadjuvant chemotherapy were excluded because most received therapy outside of our treatment center precluding standardization of care.

In 2008, the care of patients with complex surgical diseases, including pancreatic carcinoma, was grouped by clinical expertise resulting in multiple changes in and standardization of care (Supplemental Table S1). Measures undertaken in the partnership program included creation of a pancreas and/or biliary surgical service, concentration of PD to a few, highly experienced surgeons, standardized pathologic assessment, evidence-based pre- and postoperative care pathways, mandatory review at an institutional tumor board, and postoperative oncologic follow-up with in-house medical oncologists. Environmental changes such as surgical, anesthesia, nursing, and outpatient clinical staff were also restricted to consistent personnel with expertise in both the management of pancreatic surgical patients and postoperative oncologic care.

Postoperative complications were evaluated according to the previously validated Clavien-Dindo classification,[17] with a specific focus on pancreatic fistula, defined using the International Study Group on Pancreatic Fistula criteria.[18] Primary outcomes were postoperative disease-free survival (DFS) and overall survival (OS), where DFS is defined as the time from surgery to disease recurrence or death, and OS is defined as the time from surgery to death.

All statistical analyses were performed using the SAS version 9.3. A P value that was less than .05 was considered