

Incidence of Preventable Postoperative Readmissions Following Pancreaticoduodenectomy: Implications for Patient Education

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Pancreaticoduodenectomy (PD), a large abdominal surgery performed for patients with pancreatic cancer, originally was associated with significant perioperative morbidity and mortality; however, multiple studies have shown that this operation can be safely performed at institutions with a high volume of PD surgery and expertise (Kennedy et al., 2007).

Pancreatic cancer is associated with poor prognosis because few clinical warning signs or symptoms occur, resulting in a late-stage diagnosis. Therefore, the associated life expectancy after PD and without significant surgical morbidity is estimated to be less than five years. The five-year survival figures mandate that optimal postoperative care be implemented to maximize positive outcomes and minimize postoperative complications and readmissions in patients with poor life expectancy (Kotwall, Maxwell, Brinker, Koch, & Covington, 2002).

Reasons for readmission to the hospital in the immediate PD postoperative period (90 days postsurgery) are related to disease process or complications arising from the surgery, such as abscess formation, fistulas, or fluid leakage from the pancreas. In some cases, postdischarge complications are a result of complications deemed preventable, such as surgical site wound infections, malnutrition, glucose intolerance, or failure to recognize symptoms warranting additional intervention. The need for patient and family understanding of the care regimen to prevent complications postoperatively creates a therapeutic demand on the patient and family unit. The inability to meet that therapeutic demand also can be defined as a self-care deficit.

Self-care is the practice of activities that individuals initiate and perform on their own behalf in maintaining life, health, and well-being (Orem, 1995). Anecdotal data show that self-care deficits cause readmissions and may increase morbidity and mortality following PD. The postoperative self-care deficits of patients undergoing

Purpose/Objectives: To determine readmission rates post-pancreaticoduodenectomy (PD), readmission reasons following PD, and patients' postoperative education prior to discharge.

Design: Retrospective, descriptive study of established medical records of patients who have undergone PD from 2006–2008.

Setting: PD cohort from a pancreatic cancer program.

Sample: 62 patients aged 18 years or older, diagnosed with pancreatic cancer, who had PD.

Methods: Data abstracted from inpatient and outpatient electronic records as per study protocol and entered into Excel® spreadsheet for analysis.

Main Research Variables: Incidences of and reasons for readmissions post the PD procedure. Discharge education given to patients prior to discharge.

Findings: Patients were discharged at mean postoperative day 11.3. Readmission rate was 28%. Reasons for readmission were dehydration or malnutrition (n = 10, 16%) and surgical site infection (n = 7, 11%); 10% of patients (n = 6) had documented difficulties with dehydration, malnutrition, and failure to thrive noted at follow-up. PD discharge teaching was documented in a mandatory discharge form. No standard curriculum was used.

Conclusions: Patients undergoing PD experience an increase in self-care demand postdischarge. Poor discharge education can lead to high rates of readmission, specifically for dehydration and malnutrition, mandating an assessment of patient education prior to discharge.

Implications for Nursing: Close attention must be given to the needs of patients with pancreatic cancer postdischarge. Trying to identify the areas of educational deficit at patient readmission could help nurses identify what they can do to minimize preventable complications. Educational focus for patients undergoing PD should be on prevention of dehydration, malnutrition, and surgical site infections.

PD have received little or no attention in the literature. A pancreatic cancer diagnosis, prognosis, and associated complications can cause distress for patients and family

members. Nurses can play a pivotal role in minimizing the distress imposed on families by predicting the likely preventable complications and educating patients and family members in early detection and intervention methods for those complications, therefore minimizing self-care deficits among this vulnerable population.

Literature Review

PD is an extensive procedure with a high demand of self-care postsurgery, which, without adequate education, can leave a patient prone to multiple postoperative self-care deficits. The surgery involves the removal of the pancreatic head, duodenum, gallbladder, and bile duct with or without removal of the gastric antrum (Yen, Abdalla, Pisters, & Douglas, 2005). The surgery usually lasts about 6–10 hours, depending on the surgeon and the patient characteristics (Kennedy et al., 2007). During the operation, the surgeon places two drainage tubes to prevent fluid collection in the abdomen (Scardillo, 2005). After PD, patients' oral intake may be compromised because of the extensive surgical manipulation (Yen et al., 2005). Therefore, a gastrostomy tube may be placed to drain stomach contents if patients are nauseous. A tube is put in place to feed patients until they can tolerate oral intake (Scardillo, 2005). Enteral feedings may result in diarrhea, as well as nausea and vomiting, causing vulnerability for malnutrition. Infection also can result at wound and tube sites (Scardillo, 2005).

To prepare for discharge, patients and their families require a great deal of education on self-care. Patients are required to care for multiple drains, monitor blood glucose, administer tube feedings and insulin, and recognize changes in their condition that warrant medical intervention. The multiple demands for self-care and poor patient and family knowledge could lead to postoperative complications and readmission. The quantification of postoperative complications and need for readmission in patients who have undergone PD is poor. Grobmyer, Pieracci, Allen, Brennan, and Jaques (2007) stated that specific uniform and complete definitions of postoperative complications after PD are lacking. In the study aimed at defining morbidity after PD, data from 204 PDs from January 2001 to December 2003 at Memorial Sloan-Kettering Cancer Center in New York were reviewed to characterize 30-day morbidity and mortality. Grobmyer et al. (2007) reported an 11% readmission rate related to wound infections, 1% related to dehydration, and 0.5% related to fluid imbalance. Yermilov et al. (2009) believed that high rates of readmissions for preventable causes such as dehydration, malnutrition, and electrolyte disorders highlight areas for focused patient education to decrease patient readmissions following PD. Population-based data were used by Yermilov et al. (2009) to examine PD re-

admissions, and 12% of the readmission causes could have been from poor self-care management. Yermilov et al. (2009) hypothesized that self-care deficits responsible for PD readmission are probably underreported or under-recognized by healthcare providers. Older adult patients face more risk for postoperative complication and readmission after undergoing PD because of decline in function and nutritional parameters, with a 17% readmission rate for malnutrition (Lightner et al., 2004). Patients readmitted after PD had worse median survival than those not readmitted (10.5 months versus 22 months, $p = 0.0001$) (Yermilov et al., 2009).

Patient education has been known to improve patient adherence to treatment as well as encourage follow-up postdischarge (Koelling, Johnson, Cody, & Aaronson, 2005). However, education should not be limited to the patient only; ensuring that these patients have adequate social support when they are discharged is important. Educating the family member or caregiver and ensuring that learning has occurred also can be instrumental in decreasing self-care deficits that could consequently lead to readmissions. Patient and caregiver education should not only be comprehensive, but should also be delivered in a timely manner. Because PD is a planned procedure, starting education prior to admission could be highly beneficial to the patient, family, and caregivers. Studies have shown that if a patient is to undergo a surgical procedure that will greatly impact lifestyle, starting postdischarge education early greatly improves patients' ability to care for themselves and reduces the chances of complications postdischarge (Chaudhri, Brown, Hassan, & Horgan, 2005).

Conceptual Framework

The current study is guided by Orem's (1995) Self-Care Deficit Theory to recognize the self-care requirements imposed on patients undergoing PD. Nursing is the provision of education about self-care, which is therapeutic for sustaining life and health, recovering from disease or injury, or coping with their effects (Orem, 1995). Orem's theory discusses three self-care requisites. The first is universal, or needs that are common to all individuals. The second one is developmental, or needs that result from personal maturation or development because of a certain condition or event. The third requisite, health deviation, results from illness, injury, disease, or the treatment. Patients with pancreatic cancer who have undergone PD fall into the third requisite. Orem (1995) stated that the nursing staff must provide patients and caregivers with the tools they need to meet the third requisite.

According to Orem's theory, patients who have undergone PD have a health deviation resulting from illness and treatment of the illness. They are unable

to or are limited in maintaining life, health, and well-being. The theory also states that nurses use specialized capabilities, such as empowering patients through education, to create a helping system in situations where people are likely to have an existent or potential self-care deficit. According to this theory, three variations exist: wholly compensatory, partly compensatory, and supportive educative nursing systems (Orem, 1995).

At the University of Pittsburgh Cancer Center, anecdotal data showed that patients with pancreatic cancer were readmitted with preventable complications (Personal communication, A.J.M. Moser, September 23, 2009). The current study aimed to determine the exact rates and reasons for postsurgical readmissions for patients who had undergone PD and identify what postoperative education was delivered to patients and families.

Methods

Design and Sample

This study's retrospective, descriptive design used established medical records of patients who had undergone PD from January 2006 through December 2008 at the pancreatic cancer program at the University of Pittsburgh Cancer Center. Review of charts and abstraction of relevant data of all inpatient and outpatient electronic clinic notes and correspondence were used.

Sixty-four patients who had been diagnosed with pancreatic adenocarcinoma and had undergone PD were identified and completed data for review. Eligibility criteria included patients who had been diagnosed with pancreatic adenocarcinoma and had undergone PD; the only exclusion criteria were patients who were aged younger than 18 years. The surgical team was the same for all patients.

Procedures

The institutional review board at the University of Pittsburgh approved this project as a quality assurance project. Medical records were retrieved (paper and electronic) by an oncology RN familiar with the pancreatic cancer population. Data were collected and entered into Microsoft® Excel®. This study was conducted at the University of Pittsburgh Medical Center through the Pancreatic Cancer Institute.

Measures

One of the main research variables was rate of readmissions within 90 days after discharge. Any emergency department visit within 90 days was recorded. Capturing all readmission rates was difficult because some patients were from different towns and states and may have visited an emergency department closer to them. In some cases, the correspondence notes between the phy-

sicians recorded the outside hospital emergency visits. However, that only happened in cases where the patient, who had been readmitted at an outside hospital, was referred back to the physician who performed the PD.

Another research variable was the reason for readmission. Patients were readmitted because of the progression of the disease, a surgical complication that patients had no control over, or because of reasons deemed preventable such as dehydration, malnutrition, and wound infections. Malnutrition and dehydration were grouped together in most clinical notes and diagnosis; therefore, they also are grouped in the current study.

Patient education was the third variable. The nurses recorded methods of patient education on a form that was part of the discharge material. The form required that each healthcare provider indicate in a check box that education was delivered. The form did not break down the different areas of education specific to patients who had undergone a PD but was a generic form applicable to all surgical patients. The options for methods of education delivery were written, verbal, or demonstration. The nurses recorded one of the methods or all as a tool for education delivery to the patient.

Data Analysis

Descriptive statistics of all variables were performed. The mean age of the patients, the mean number of days postdischarge, the percentage of patients readmitted, and reasons for readmission all were recorded. Education delivered by physicians and nurses was recorded, as well.

Results

Sample

Sixty-four patient charts were identified as eligible for review. Of those, 62 had complete data for review. Two patients who had unresectable pancreatic cancer were excluded from the study. Gender distribution was predominantly female ($n = 34$, 55%). Patient race was predominantly Caucasian ($n = 61$, 98%), with one African American patient.

Patients were discharged at mean postoperative day 11.3 (SD = 4.3), with a 27% overall rate of readmission. The primary reasons for readmission were dehydration and malnutrition ($n = 10$, 16%) and infection ($n = 7$, 11%). In addition, six patients (10%) had documented difficulties with dehydration, malnutrition, and failure to thrive noted in clinic notes, but did not require readmission.

Patient Education

Postoperative, pre-discharge educational time and evidence of patient learning were assessed. For each patient reviewed, nurses documented having used one or all forms of education (see Table 1). The form did not

Table 1. Documented PredischARGE Education

Topic	No Education Recorded	Written	Verbal	Demo
	n	n	n	n
Infection	1	59	58	4
Nutrition	2	58	55	5

N = 62

Demo—demonstration

Note. Participants could select more than one category.

specify what the educational content was and left that to the discretion of the nurse. No visual aids were used to educate the patients on their postdischarge care, or any content-specific printed material. The documentation was inconsistent, with each nurse recording a different method of education with no justifiable reason. No standard curriculum was used.

Discussion

Patients with pancreatic cancer usually face a very poor prognosis. PD is one of the procedures known to increase their chances of survival. However, even with that intervention, the prognosis still remains poor. Postoperative complications increase patient-related distress and reduce quality of life. Minimizing preventable complications leading to readmissions from this surgery is imperative. Current literature emphasizes surgical complications and disease progression, but does not focus on preventable PD complications. Although home nursing care should be recommended for all patients undergoing PD, the number of visits the healthcare provider is allowed to make is dependent on the ever-changing reimbursement rules. Even with provision of home nursing care, patients still are readmitted with mutable complications, reiterating the need for patient and family education regarding preventable complications. Patient education has been shown to decrease surgery-related anxiety in all patient populations (Jlala, French, Foxall, Hardman, & Bedford, 2010).

Education delivered to most surgical patients may not be effective because the postoperative period is not the optimal time for patient instruction (Klein-Fedyshin, Burda, Epstein, & Lawrence, 2005). Studies that have looked at readmissions after PD have not addressed preventable complications or patient education postdischarge. The current study of 62 patients showed that 27% (n = 17) were being readmitted with preventable complications and that postdischarge education was inconsistent and no evidence of learning was shown. Although no literature addresses PD patient education, nursing interventions with an educational component have

reported positive outcomes for patients after discharge (Mistiaen, Francke, & Poot, 2007). Therefore, in the case of patients who have undergone PD, nurses should aid the patient in meeting the self-care deficit imposed by providing comprehensive, timely, and adequate education prior to discharge. PD is a planned procedure, and the time when the patient and caregiver consult with the surgeon about the procedure presents an opportune time to start educating the patient. To enhance understanding of the self-care needs postdischarge, healthcare providers should consider different formats for postsurgical patient instruction (Klein-Fedyshin, 2005). Use of visual aids, such as printed material with step-by-step instructions or audio tapes going over certain tasks, would help the patient and caregiver retain the information as well as have it available for review at home.

Limitations

Limitations for this study include the inability to capture readmissions of patients who were from other cities or states. Although clinical correspondence between doctors was used, some out-of-state patients showed no clinical follow-up with their surgeons after PD.

The second limitation was related to this particular facility's transition from paper chart to electronic health records from 2006–2008. Although the facility attempted to scan all paper records into the computerized system, some patient records that could have been included in the study were missing.

Conclusions

Complications secondary to PD can be related to the disease process, the surgery, or self-care deficits. Readmissions because of self-care deficits have not received any attention in the literature. Because of the stress imposed on patients following diagnosis, healthcare providers have a responsibility to minimize preventable complications such as those regarding self-care. Patient education on postdischarge self-care relies heavily on patients' participation and understanding of the disease as well as compliance in the treatment regimen. Patients who have undergone PD require specific and structured instructions on their postdischarge needs. The immediate postoperative period does not provide an opportune time for educating patients who have undergone PD about self-care needs postdischarge. With that knowledge, nurses need to develop a comprehensive discharge educational model for patients undergoing PD and deliver it at a time that is conducive for patient learning. Nurses also should recognize that learning is greatly impaired in the presence of illness; therefore, taking advantage of available family members and caregivers, educating them, and ensuring that they are able to provide adequate care for the patient is imperative.

Implications for Nursing

Nurses can be an important factor in trying to give patients with pancreatic cancer the best quality of life. Nurses need to identify the optimal time to deliver patient education, and be sure to recognize caregivers and family members as support systems that also need education. Family members and other caregivers can be a useful addition to the care team, particularly post-discharge. Nurses should work in collaboration with the surgeons to meet with patients before surgery and provide anticipatory guidance. With that in mind, the future goal would be to establish what areas of self-care patients, as well as their caregivers, struggle with when they are readmitted with preventable complications.

The next step would be to establish comprehensive patient education material and pilot test the material to determine if nurse-tailored education for patients who had undergone a PD and their caregivers decreases the rate of preventable complications and associated hospital readmissions.

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