# How Are Select Chronic Pancreatitis Patients Selected for Total Pancreatectomy with Islet Autotransplantation? Are There Psychometric Predictors?

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**BACKGROUND:** Selected patients with chronic pancreatitis can benefit from total pancreatectomy with islet autotransplantation. Patient selection is challenging and outcomes assessment is essential.

**STUDY DESIGN:** A prospective database of total pancreatectomy with islet autotransplantation patients was reviewed. Attention was given to psychometric assessments, including Short Form-12 Quality of Life Survey (SF-12), Center for Epidemiologic Studies 10-Item Depression scale, and Current Opioid Misuse Measure in the preoperative period, and SF-12 in the postoperative period.

**RESULTS:** One hundred and twenty-seven patients (76% women, mean age 40.5 years) underwent total pancreatectomy with islet autotransplantation. Preoperatively, the mean SF-12 physical quality of life score (physQOL) was 27.24 (SD 9.9) and the mean psychological QOL score (psychQOL) was 38.5 (SD 12.8), with a score of 50 representing the mean of a healthy population. Mean improvements in physQOL relative to baseline at 1 year, 2 years, and 3 years post surgery were 7.1, 5.8, and 7.8, respectively, which represented significant change (all $p < 0.001$). Mean improvements in psychQOL relative to baseline at 1 year, 2 years, and 3 years post surgery were 3.9, 4.9, and 6.6, which also represented significant improvement (all $p < 0.001$). The percentages of patients evidencing at least a 3-point improvement in physQOL at 1 year, 2 years, and 3 years post surgery were 65%, 60%, and 61%, respectively. The percentages of patients evidencing at least a 3-point improvement in psychQOL at 1 year, 2 years, and 3 years post surgery were 49%, 58%, and 66%, respectively. Exploratory regression analyses of SF-12, Current Opioid Misuse Measure, and Center for Epidemiologic Studies 10-Item Depression scale data revealed limited baseline predictability of surgical response; however, higher opioid misuse scores at baseline were significantly and positively related to physQOL improvement at 2 years ($r[54] = 0.33$, $p = 0.02$).

**CONCLUSIONS:** Total pancreatectomy with islet autotransplantation improves QOL for selected patients with chronic pancreatitis. The physQOL improves quickly after surgery, and psychQOL improvements are more gradual. Opioid misuse can predict physQOL improvement. (J Am Coll Surg 2015;220:693−698. © 2015 by the American College of Surgeons)

The clinical hallmark of chronic pancreatitis (CP) is severe, debilitating, and intractable pain. The underlying pathophysiology of CP pain, however, is complex and poorly understood. Pain mechanisms are clearly multifactorial in the individual patient and heterogeneous between different CP patient populations. In obstructive pancreatitis, elevated intraductal or organ tissue pressure is likely contributory to pain. In other cases, intrinsic or peripancreatic neuropathy plays a role. In some CP patients, peripheral and central neuroplasticity occurs, with the development of maladaptive

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**Abbreviations and Acronyms**

CESD = Center for Epidemiologic Studies 10-Item Depression Scale
COMM = Current Opioid Misuse Measure
CP = chronic pancreatitis
QOL = quality of life
SF-12 = Short Form-12 Quality Of Life Survey
TPIAT = total pancreatectomy with islet autotransplantation

independent pain pathways and neural sensitization.[1] Due to these complexities and our incomplete understanding of underlying contributory mechanisms, the CP pain syndrome is challenging to manage.

In addition, CP patients often have substantial chronic opioid use and are at risk for opioid misuse.[2] They have severe impairments in quality of life secondary to disease and high rates of depression. Management of CP patients can be difficult due to these attendant psychological comorbidities. The impact of existing patient-related behavioral factors on management outcomes in CP has not been well examined previously.

Current strategies in surgical management of CP take into account the various potential mechanisms for pain, using ductal drainage and resection of severely fibrotic parenchyma. A subset of patients with debilitating pain from CP can benefit from total pancreatectomy with islet autotransplantation (TPIAT).[3-6] Notably, patients with diffuse small duct CP, those that have failed lesser interventions for CP (eg, partial resection or drainage procedures), and those with hereditary pancreatitis, are potential candidates for total pancreatectomy for pain relief. Concomitant intraportal islet autotransplantation serves to ameliorate the morbid diabetes of the apancreatic state by allowing for endogenous insulin (as well as glucagon and other counter-regulatory hormones) production. Total pancreatectomy with islet autotransplantation, however, is a radical intervention, and careful patient selection is difficult but essential. Current selection criteria are outlined in Figure 1. Some patients who appear to have disease that would predictably be responsive to TPIAT as assessed objectively by clinical course and organ anatomy do not benefit from the surgery. Therefore, other factors must play a role in success of intervention. The objective of this study was to evaluate and analyze preoperative psychometric parameters to potentially identify predictive factors for success or failure of TPIAT.

## METHODS

A prospectively maintained database of all patients undergoing TPIAT at the Medical University of South Carolina from March 2009 to May 2014 was queried with specific attention paid to demographics and preoperative and postoperative patient specific variables. In addition, another prospective database (known as the Element System) containing psychometric assessment data on TPIAT (as well as all CP) patients was reviewed and analyzed. Data in the Element System includes patient-reported assessments of depression, opioid misuse, and quality of life. At their initial outpatient encounter with the Digestive Diseases Center for CP, patients complete a battery of tests in the Element System, including the Short Form-12 Quality of Life survey (SF-12), the Center for Epidemiologic Studies 10-Item Depression Scale (CESD), and the Current Opioid Misuse Measure (COMM). At each subsequent encounter, patients complete the SF-12 and data can be tracked in real time to evaluate patient progress as measured by quality of life. The SF-12 is a 12-item survey that assesses patient reported quality of life categorized in 8 domains, including Physical Functioning, Role-Physical, Bodily Pain, General Health, Vitality, Social Functioning, Role-Emotional, and Mental Health, as well as a Physical Component and Psychological Component summary scores. These scores are normalized to a healthy population as *t*-scores (mean 50, SD 10), allowing for context of the scale results.

Within-subjects (paired) *t*-tests were conducted comparing quality of life scores at each follow-up time point with baseline. Critical $\alpha$ was Bonferroni-corrected for multiple comparisons for each major quality of life (QOL) subdomain examined (Psychological and Physical QOL; $\alpha = .016$). Standard clinical cutoffs were applied for depression and opioid misuse scale scores and exploratory *t*-tests were conducted between groups (eg, depressed vs not depressed; opioid use concerns vs no opioid use concerns) on QOL subdomain scores over time to determine whether preoperative depression or opioid misuse were associated with differential outcomes. Lastly, exploratory multiple regression analyses predicting QOL change scores at each follow-up time point were conducted with patient demographics, opioid misuse, and depression scores as predictors.

## RESULTS

### Preoperative patient characteristics

During the study time period, 127 patients underwent TPIAT for debilitating pain from CP. Seventy-six percent of patients were women with a mean age of 40.5 years. The primary risk factor for pancreatitis was identified as sphincter of Oddi dysfunction in 51, pancreas divisum in 17, genetic in 19, alcohol related in 7, hypertriglyceridemia in 3, and idiopathic in 29 (Table 1).