



## SUICIDE AMONG LIVER TRANSPLANT SURVIVORS

## Medical Science

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## ABSTRACT

In a data set of 915 liver transplant recipients covering a 20-year time period, four individuals (.4%) were confirmed to have overtly committed suicide. The four patients were Caucasian males. None had expressed suicidal ideation to a transplant team social worker. One of the suicide patients had evinced symptoms of negative emotionality. All were experiencing deteriorating health status at the time of the completed suicide, findings that are specified for each patient. It is unknown how many other deceased transplant patients in this data set may have died volitionally from a more passive means such as non-compliance to medical regimens. Implications for prevention of suicide in liver transplant recipients are discussed.

## KEYWORDS

suicide, liver transplant, prevention

## Introduction

A 68 year-old male patient shot and killed himself while being treated for gastrointestinal bleeding in an intensive care unit of a university hospital (patient # 4 below). At the time of his death he was in his 9<sup>th</sup> year of liver transplant survival and was regularly monitored during this time period for possible adverse adjustment sequelae including emotional disturbances and suicidal ideation. Indeed, he was included in a 20-year research project designed to investigate survival duration, negative concomitants and post-transplant quality of life. This traumatic suicidal event prompted further scrutiny of suicidal propensities and completed suicides among this large sample of liver transplant recipients.

Although there is a robust literature on depression and liver transplant, few investigators have examined completed suicide. Because a documented suicide confirmed as the official cause of death is uncommon in a transplant population, it must be studied on a case-by-case basis. It is acknowledged that the actual suicide rate is likely higher than the confirmed suicide rate. Transplant patients may die of complications caused by non-compliance with anti-rejection medications, for example (De Greet, Borgermans, Gemoets, Abrahams, Viaminck, Evers, & Vanrenterghem, 1995). It is not known how many deceased patients in the data set purposefully non-complied or those who may simply have lost interest in their anti-rejection

regimen.

## Method

Data were collected on 915 consecutive liver transplants patients from 1993-2015 by the transplant service social worker at the University of Minnesota, Twin Cities. Of the 915 patients 593 were male and 322 were female. Mean age was 52, range 18-75 (for further information on this cohort, see Meller, Welle, Sutley & Thurber, 2017).

Patients were contacted every 6 months to ascertain health related concerns as well as degree of mental and emotional adjustment. Time and cause of death as well as depressive symptoms, substance usage and suicidal statements made to caregivers were recorded data.

## Results

There were 322-recorded deaths. Four deceased patients had suicide listed as the cause of death. All were Caucasian males. Only one was diagnosed with negative emotional conditions (anxiety, depression) and none had made suicidal statements nor were found to have extant substance usage problems. Each individual had significant post-transplant physical problems with decreased functional capacity (Table 1). It is noteworthy that only ten individuals in the complete data set had expressed thoughts related to potential suicide, thoughts that were not acted upon.

**Table 1 Patient Characteristics**

Patient	Diagnosis Pre-transplant	Age at Transplant	Age at Suicide	Post-Transplant Psychiatric Problems	Last Medical Contact prior to Suicide	Reason for Medical Contact
1	Hepatitis C	50	52	Opioid ETOH	242 days	Post-Transplant Pain
2	ETOH Hepatitis C	47	48	Delirium	176 days	Inguinal Hernia Repair; Pain
3	ETOH	66	69	Anxiety Depression	30 days	Anxiety; Tremor
4	Cryptogenic	59	68	None	0 days	Active GI Bleed

## Case #1

He had a complicated postoperative course: Chronic ventilator status requiring a tracheotomy; splenic syndrome to the transplanted liver with a splenic artery ligation; atrial fibrillation requiring cardioversion; an obstructed right main stem bronchus; an extremity deep vein thrombosis; pseudomonas colitis; and ongoing difficulty with pain management requiring opioids.

## Case #2

His last contact was related to a hospital discharge following bilateral inguinal hernia repair, required hospitalization through post-op day five (which is prolonged for this procedure) secondary to nausea and difficulty with pain management, requiring opioids at time of discharge. This patient also was noted to have experienced an episode of delirium.

## Case #3

He experienced several months of anxiety and tremors prior to his

suicide. He was also experiencing depressed symptoms and was diagnosed with an anxiety disorder. In addition, PCP usage was reported. At the time of his last medical visit, he had active medical conditions that included end-stage liver disease and anemia. He was prescribed zolpidem for sleep problems and was placed on a trial of oral lorazepam for anxiety.

## Case #4

He had no prior psychiatric diagnosis. Active medical conditions included the gastrointestinal bleed with a history of colectomy that precipitated admission, bladder cancer, atrial fibrillation, and chronic kidney disease. An initial esophagogastroduodenoscopy (EGD) in an intensive care unit (ICU) was incomplete because there was food in his stomach. He was kept overnight with the intent of repeating an EGD the next day. The next morning, he reported feeling frustrated and very anxious. His physician discussed his possible transfer to another facility due to a heterotopic ossification involving the liver transplant and bowel resections. The patient made a statement that he knew he

was going to die in the ICU at the university. He appeared relieved after his physician clarified that if the bleeding source could be identified at the ICU, a transfer would not be necessary. The next documented note was two hours after the patient met with the physician, indicating a completed suicide via gunshot wound to the head, with a gun found on the hospital bed next to him.

### Discussion

Our data set reveals four individuals who died by confirmed suicide, a rate of roughly 0.4%. This is remarkably similar to rates reported Aberg, Gissler, Karlson, Rasmussen, Bennet, Olausson, Line, Nordin, Bergquist, Boberg, Castedal, Pedersen, & Isoniemi (2015) in a Nordic liver transplant population and by Germani, Theocharido, Adam, Karan, Wendon, O'Grady, Burra, Senzolo, Mirza, Castaing, Klempnauer, Pollard, Paul, Belghiti, Tsochatzis, & Burroughs, (2012) in an European liver transplant registry, who also report a 0.4% suicide rate. Depression and substance abuse are common concomitants of suicide and in the liver transplant population they are associated with suicidal ideation (Errichiello, Picozzi, & de Notaris, 2014). However, in our data set only a single patient reported depressed symptomatology and substance usage problems prior to suicide. This finding is consistent with Druss and Pincus (2000) who reported that suicide attempts in the medically ill population can be independent of substance abuse and depression, a point emphasized by Billiard (2008).

The four liver transplant recipients who committed suicide did not report having suicidal thoughts, nor did they admit to characteristics often found to be precursors of suicidal behaviors. This finding is congruent with Bush, Fawcett and Jacobs (2003) who found that the majority of inpatient suicide victims never mention suicidal ideation. It is also possible (but unlikely) they did not actually experience stress, hopelessness or depression and suicidal ruminations, factors that have been found to be associated with suicide attempts. Instead, they may have succumbed to a sudden "impulse to action" without prolonged ideations or planning beforehand. This interpretation however is difficult to reconcile with the behaviors of the recipient (patient 4) who brought a firearm into the intensive care unit.

The shared element among these patients was the experience of deteriorating health status. It seems likely that critical information about possible impending suicidal behaviors and the related predisposing variables such as stress, depression, hopelessness, and substance usage were withheld or not totally revealed by these patients. Again, persons with suicidal inclinations in general are unlikely to express such propensities to medical or mental health professionals (Glenn, Werntz, Siana, Steinman, Teachman, & Nock, 2017). Moreover, among the 322- deceased liver transplant patients in our sample there were likely individuals who in effect ended their lives more passively through suicide via medication non-compliance. This hypothesized subgroup likewise would not be forthright in expressing their suicidal dispositions.

We opine that with respect to post-transplant patients and suicidality, more frequently scheduled contact with medical and mental health professionals would be beneficial, certainly in greater frequency than six-month intervals. A recent study outside the transplant domain indicated that the large majority of suicidal individuals make plans within one week of the attempt and most within a 12-hour time period (Millner, Lee & Nock, 2017). Furthermore, adequate scrutiny of the suicidal propensities of liver transplant recipients requires consideration of factors outside the more common indicators. For example, in a recent meta-analytic review using research domain criteria from the National Institute of Mental Health, Glenn, Kleiman, Cha, Deming, Franklin & Nock, (2018) found that insomnia and nightmares were important predictors of suicide attempts (note sleep problems in patient #3 above).

Finally, the use of the Implicit Association Test for Suicide, a five-minute Ipad or desktop administered instrument, could be employed with transplant patients. The measure evaluates the association between death/suicide and the self. It has excellent predictive validity in relation to suicidal attempts over a subsequent six month time period. Moreover and importantly, the use of the Implicit Association Test could possibly circumvent the issue of unwillingness of suicidal persons to reveal intent, since what is being measured is indeed implied and not obvious to the test-taker (Nock, Park, Finn, Deliberto, Dour, & Banaji, 2010).

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