# Impact of End Stage Renal Disease on Outcomes of persons with Traumatic Brain Injury at Acute Rehabilitation Discharge

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# What is a Traumatic Brain Injury

“Insult to the brain caused by an external physical force that may produce diminished or altered state of consciousness which results in impairments of cognitive abilities or physical function..”

National Head Injury Foundation

# Traumatic Brain Injury -- Epidemiology

According to the CDC:

In 2014, about 2.87 million TBI-related emergency department (ED) visits, hospitalizations, and deaths occurred in the United States

In 2014, falls were the leading cause of TBI. Falls accounted for almost half (48%) of all TBI-related emergency department visits.

# People who have Traumatic Brain Injuries…

….often have premorbid medical conditions

# End Stage Renal Disease

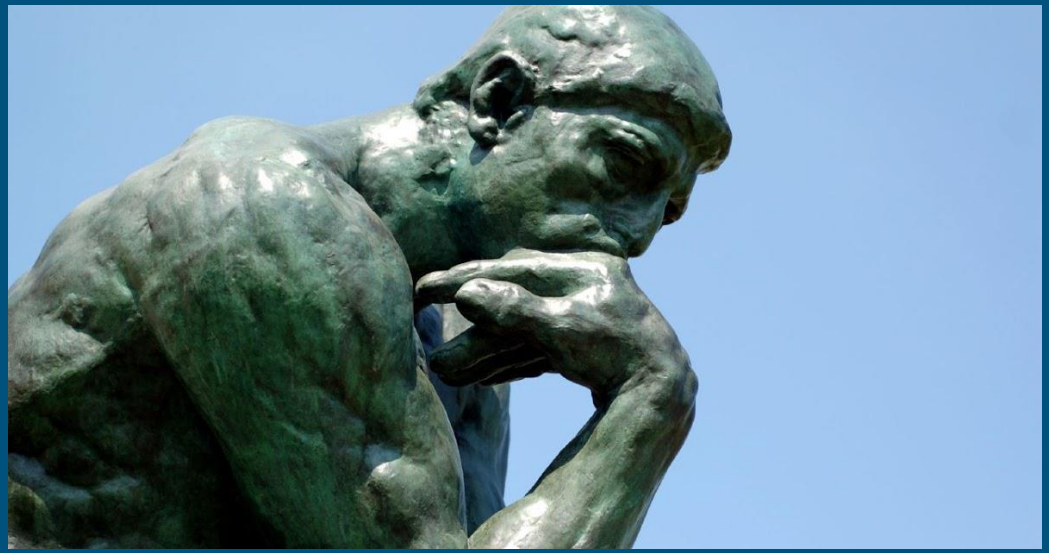
The U.S. Renal Data System Annual Data Report suggests that more than 660,000 Americans are being treated for kidney failure. Of these, 468,000 are dialysis patients.

# How might this affect inpatient rehabilitation?

Potential barriers to optimal rehabilitation:

- Limitation in treatment options for TBI recovery
- Limitations of participation and engagement in rehabilitation
- Fatigue (particularly following hemodialysis)
- Hypotension

# Hypothesis



Individuals with TBI and ESRD will have worse outcomes on discharge from acute rehabilitation compared to matched controls.

# Objective

To characterize individuals with ESRD at the time of TBI Model Systems database enrollment and examine their recovery trajectory and disposition from inpatient brain injury rehabilitation compared to a control group matched on age, sex, GCS, and injury characteristics.

# Methods

Literature review of articles range from 1978 - 2017

Online databases searched: PUBMED, COCHRANE

Data gathered from the TBI Model Systems National Database

# Study Sample

43 Participants with a diagnosis of End stage Renal Disease at the time of TBI and matched controls.

# Data

| Group Statistics | | | | |
|---|---|---|---|---|
| | End Stage Renal Disease | N | Mean | Std. Deviation |
| Age at Injury | Yes | 43 | 61.77 | 16.533 |
| | No | 43 | 61.40 | 17.205 |
| GCS Total on Admission | Yes | 40 | 16.03 | 14.580 |
| | No | 43 | 17.42 | 16.863 |
| Days From Injury to Rehab Admit | Yes | 43 | 20.19 | 22.194 |
| | No | 43 | 15.42 | 16.143 |
| Days From Injury to Rehab Discharge | Yes | 43 | 43.63 | 30.560 |
| | No | 43 | 38.91 | 31.735 |

**Group Statistics**

| | End Stage Renal Disease | N | Mean | Std. Deviation |
|---|---|---|---|---|
| Days From Acute Admit to Rehab Discharge | Yes | 43 | 41.72 | 29.237 |
| | No | 43 | 38.37 | 30.664 |
| Days Spent in Rehab | Yes | 43 | 23.44 | 12.271 |
| | No | 43 | 23.49 | 22.950 |
| Days From Rehab Admit to Rehab Discharge not Including Interuptions | Yes | 43 | 21.72 | 10.539 |
| | No | 43 | 23.07 | 21.772 |
| Days From Injury to Date Out of PTA | Yes | 41 | 181.07 | 352.563 |
| | No | 43 | 213.14 | 376.001 |

| | | | End Stage Renal Disease | |
|---|---|---|---|---|
| | | | Yes | No |
| Residence at Injury | Private Residence | Count | 43 | 40 |
| | | % within Residence at Injury | 51.8% | 48.2% |
| | | % within End Stage Renal Disease | 100.0% | 93.0% |
| | Adult Home | Count | 0 | 1 |
| | | % within Residence at Injury | 0.0% | 100.0% |
| | | % within End Stage Renal Disease | 0.0% | 2.3% |
| | Homeless | Count | 0 | 1 |
| | | % within Residence at Injury | 0.0% | 100.0% |
| | | % within End Stage Renal Disease | 0.0% | 2.3% |
| | Other | Count | 0 | 1 |
| | | % within Residence at Injury | 0.0% | 100.0% |
| | | % within End Stage Renal Disease | 0.0% | 2.3% |

| | | | End Stage Renal Disease | |
|---|---|---|---|---|
| | | | Yes | No |
| Residence after Rehab Discharge | Private Residence | Count | 27 | 28 |
| | | % within Residence after Rehab Discharge | 49.1% | 50.9% |
| | | % within End Stage Renal Disease | 62.8% | 65.1% |
| | Nursing Home | Count | 3 | 5 |
| | | % within Residence after Rehab Discharge | 37.5% | 62.5% |
| | | % within End Stage Renal Disease | 7.0% | 11.6% |
| | Adult Home | Count | 0 | 3 |
| | | % within Residence after Rehab Discharge | 0.0% | 100.0% |
| | | % within End Stage Renal Disease | 0.0% | 7.0% |
| | Hospital: Acute care | Count | 7 | 1 |
| | | % within Residence after Rehab Discharge | 87.5% | 12.5% |
| | | % within End Stage Renal Disease | 16.3% | 2.3% |
| | Subacute care | Count | 6 | 6 |
| | | % within Residence after Rehab Discharge | 50.0% | 50.0% |
| | | % within End Stage Renal Disease | 14.0% | 14.0% |

| Group Statistics | | | | |
|---|---|---|---|---|
| | End Stage Renal Disease | N | Mean | Std. Deviation |
| Days From Injury to Rehab Admit | Yes | 43 | 20.19 | 22.194 |
| | No | 43 | 15.42 | 16.143 |
| Days From Injury to Rehab Discharge | Yes | 43 | 43.63 | 30.560 |
| | No | 43 | 38.91 | 31.735 |
| DRS On Admission | Yes | 42 | 11.071 | 4.8434 |
| | No | 43 | 11.070 | 5.6868 |
| DRS At Discharge | Yes | 42 | 7.667 | 4.9048 |
| | No | 43 | 7.047 | 5.0930 |
| FIM Motor on Admission | Yes | 43 | 30.86 | 13.278 |
| | No | 42 | 35.38 | 16.164 |
| FIM Cognitive on Admission | Yes | 43 | 14.53 | 6.759 |
| | No | 43 | 15.44 | 7.570 |
| FIM Total at Admission | Yes | 43 | 45.40 | 18.952 |
| | No | 42 | 51.07 | 22.526 |
| FIM Motor at Discharge | Yes | 43 | 51.95 | 19.009 |
| | No | 42 | 59.62 | 17.067 |
| FIM Cognitive at Discharge | Yes | 43 | 21.35 | 7.492 |
| | No | 43 | 22.81 | 6.776 |
| FIM Total at Discharge | Yes | 43 | 73.30 | 25.388 |
| | No | 42 | 82.31 | 21.184 |
| Days From Acute Admit to Acute Discharge | Yes | 43 | 20.00 | 22.198 |
| | No | 43 | 15.30 | 16.016 |

# Conclusions

ESRD patients make functional improvements in the the rehabilitation setting

There is an approximate 5 day delay in discharge of ESRD patients from the acute setting to the rehabilitation setting in comparison to matched controls

The FIM motor score in ESRD patients is lower than matched control participants

ESRD does not appear to a unique contributor to discharge disposition

# Conclusions

Symptom management is important to optimize time spent in therapies (fatigue, pain, etc)

Modification of HD to reduce missed therapy times (i.e scheduling HD in the evenings/after therapies)

Education of patients and the caretakers is important.

# References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