Title: Improved Pain scores and associated physical functional change: an Observational study

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Background/Purpose: Inadequate data describing functional changes in pain clinic patients

Participants/Data acquisition:
- Retrospective chart review of all new patients seen at Penn Pain Center
  - Jan 1, 2016 - May 31, 2017
- Epic EMR data in Excel format
  - Obtained from Penn's Data Analysis Center
  - 2671 individual patients
  - Reviewed 10,239 data points

Design/Setting:
- Observational study
  - Performed descriptive analysis
- Retrospective chart review of all new patients seen at Penn Pain Center
  - Jan 1 2016 - May 31, 2017
  - Inclusion criteria
    - Patients must had at least two PROMIS 6b data points
    - Individuals with improved VAS pain scores
      - NRS score difference between initial and most recent clinic visit
      - Primary outcome: changes in Physical Function (PROMIS 6b) relative to changes in VAS pain scores

Results:
- Positive correlation noted between changes Physical Function (PROMIS 6b) relative to changes in VAS pain scores ($P < 0.0001$). Not a linear correlation ($R^2 = 0.1341; R = 0.3662$)

Conclusion:
- This study provides evidence that there is a correlation between reported average pain values and physical function. The relationship is not linear, but is consistent both for improving pain scores (improved function) and worsening pain scores (worsening function). These results also support the use of PROMIS 6b, as an evaluation tool for pain patient’s functional improvement.
Predicting Rehabilitation Outcomes using Activity Measure for Post-Acute Care (AMPAC) Measures

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Abstract

**Background:** Determining successful rehabilitation candidates is a multifaceted and largely qualitative task. Increasing financial pressures and a new focus on efficient healthcare resource utilization makes allocation of scarce rehabilitation resources an important focus of the consulting physiatry team. Finding a tool or quantitative score which can help predict patient outcomes is of utmost importance in the new age of value based medicine. Our study examines whether an objective measure of patients’ functional status, while in acute care hospitals (i.e. the Activity Measure for Post-Acute Care [AMPAC] score), can predict their discharge outcome from acute rehabilitation and therefore assist the consulting physiatrist in recommending the most appropriate discharge disposition from acute care hospitals.

**Study Design:** Retrospective Chart Review

**Methods:** Chart review of all unique admissions to Penn Institute for Rehabilitation Medicine (PIRM) from 3/1/17 through 5/30/17. AMPAC mobility scores and AMPAC ADL scores were compared for patients who required an acute discharge from PIRM back to acute care hospital due to acute medical decompensation (Acute Out – AO) and
patients who had a final discharge outcome to a skilled nursing facility (SNF) versus patients who had a final discharge outcome to home.

Results: Patients in the AO group and patients discharged to SNF had significantly lower AMPAC scores in acute care hospital compared to those who were discharged home.

Conclusions: AMPAC scores provide a significant quantitative measure that can be used to predict discharge outcomes of patients prior to admission to an inpatient rehabilitation facility (IRF).

Level of Evidence: III
Effectiveness of Drug Monitoring Program on Improving Patient Opioid Compliance
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Abstract
Background
Over the past 5 years the CDC has placed the US in a state of Emergency regarding the use and access to Opioids in the general population. Since 2010 there has been an increase in the number of prescription opioid-related deaths with 16,651 healthcare fatalities. Although medication overdoses frequently involve multiple classes of drugs, 4903 of 16,651 opioid deaths (29.4%) in 2010 involved solely the ingestion of opioids, a proportion nearly 3 times higher than fatal single-class ingestions of any other psychotropic or central nervous system medicine. In Philadelphia specifically, opioid prescriptions more than doubled between 2000 and 2012, and health care providers continue to prescribe opioid pain medication in greater quantities than [deemed] medically appropriate with the peak age group for overdoses is 45-54. The use of opioids compromised 6,500 Emergency department visits related prescription drug overdose. Mayor James Kenney introduced a coordinated effort to confront this issue, with The Mayor’s Task Force to Combat the Opioid Epidemic in Philadelphia. The task force developed a plan to reduce opioid use disorder and associated morbidity and mortality. The Pennsylvania Drug Monitoring program (PMDP), is a comprehensive tool with interstate contribution, to allow medical providers national to track access and use of controlled substances.

Objective: To implement a protocol, using PMDP within the University of Pennsylvania Physical Medicine and Rehabilitation department to minimize duplicate opioid prescriptions from Medical providers and reduce unintentional enabling of doctor shopping.

Design
Quality improvement study
Setting
Pennsylvania Institute of Rehabilitative Medicine (PIRM)
Patients
Patient seen in the outpatient practice at PRIM

Methods
We reviewed patients reported to have received opioid prescriptions from the outpatient practice at PRIM and queried their names in PMDP over a 12 month time frame.

Main Outcome Measurements
Non-compliance is be defined as patients receive pain morphine derived equivalent prescription from more than one physician in the state of Pennsylvania.

Results
Data was then further filtering by removing individuals who had no record of filling narcotic prescription or went outside of PA for Rx prescriptions (DW, NY, NJ). This reduced the working data set from 566 to 500 individuals. Opioid Non-Compliance highest in patients aged 51-55 and of that age group males. PMDP integration into EPIC visit navigation.

Conclusions
Pennsylvania Prescription drug monitoring is now more accessible to all outpatient providers in the PIRM EPIC system. Along with this integration, PRIM providers, prior to prescribing opioid pain medications, are able to prevent patient non-compliance, doctor shopping and duplicate opioid medication prescription with patient name and DOB query.
Predictive Ability of AMPAC Scores on IRF Discharge Outcomes

Kenton Hagan, MD; Jeremy Charles, MD

Background:
Determining appropriate and successful inpatient rehabilitation candidates is a multifaceted and previously largely qualitative task. Additionally, increasing financial pressures and a new focus on efficient and value added healthcare resource utilization makes allocation of scarce rehabilitation resources an important focus of the consulting physiatry team. Previous research has shown that quantitative measures can allow for predictive modeling of patient discharge outcomes. Our study expands on previous research using acute care hospital Activity Measure for Post-Acute Care (AMPAC) scores as a model for prediction of inpatient rehabilitation (IRF) outcomes. This study provides both higher powered data and preliminary diagnosis specific data for the consulting physiatrist in predicting patient discharge outcomes from IRF and thus the recommendations for discharge from acute care hospital (ACH).

Study Design:
Retrospective Chart Review

Methods:
Chart review of all unique admissions to a free standing urban academic inpatient rehabilitation hospital (UA-IRF) from 3/1/17 through 2/28/18. Inclusion criteria included patients who had acute care AMPAC mobility and AMPAC ADL scores recorded by a physical or occupational therapist and came from within the university health system associated with the UA-IRF. AMPAC mobility scores, AMPAC ADL scores, and a summed total of these scores (AMPAC Total) were compared for patients who required readmission from UA-IRF back to ACH due to acute medical decompensation (Acute Out – AO) and patients who had a final discharge outcome to a skilled nursing facility (SNF) versus patients who had a final discharge outcome to home. Statistical analysis was completed in MiniTab 18.1 and STATA 15.1 software packages.

Results:
The acute care AMPAC score provides strong sensitivity (95.1%), PPV (75.2%), and NPV (75.6%), for predicting potential IRF patients who will be discharged to home. Patients in the AO+SNF group had significantly lower AMPAC scores compared to patients who were discharged home. Furthermore, patients who had a AMPAC score of 23 or lower with a significantly higher chance (74.8%) of an AO+SNF outcome compared with patients with an AMPAC score of 27 or higher (21.9%). Patients with an AMPAC score of 24-26 have a 55.1% chance of being discharged home compared to the AO+SNF group rate of 44.9%.

Conclusions:
AMPAC scores provide a significant tool for the consulting physiatrist to predict discharge outcomes from IRF while a patient is in ACH. By using the AMPAC score to support clinical decision making physiatrists can efficiently utilize limited IRF resources and reduce readmission rates for acute care hospitals. Identification of currently unrecognized variables and further collection of diagnosis specific AMPAC data will provide improved predictive modeling for the consult physiatrist. Finally, this data potentially supports the use of increased ACH therapy services for low AMPAC patients in an effort to improve their final disposition and is a future avenue of research.
The Prevalence of Sleep Apnea in Patients with Chronic Pain: A Retrospective Chart Review
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IRB Number 822951

Introduction: Sleep disordered breathing, including obstructive sleep apnea and central sleep apnea, appears to confer significantly increased risk for adverse events, including death in patients receiving chronic opioids. Patients presenting for evaluation and treatment for chronic pain often report sleep disturbances, and may have undiagnosed sleep disordered breathing. This study is intended to determine a prevalence of sleep disordered breathing in our practice and the role of the STOP-GAP screening tool.

Prior small, observational prospective/retrospective hybrid study indicated that 46% of opioid users has Severe sleep apnea as defined by AHI > 30 and 71% had moderate sleep apnea AHI > 15 however no study could be found using STOP-GAP Screening tool.¹

Evaluation of the prevalence of SDB in patients taking chronic opioid therapy at Penn Pain Center is implicated to compare the population to current estimates in the literature and to serve as a pilot study for a larger prospective study defining the prevalence of OSA and CSA in patients on chronic opioid therapy.

Methods: Our team identified a time period from 06/2015 to 06/2017 whereby all New Patient Visits (NPV) were selected. Inclusion criteria included any patient over the age of 18. Patients below this age or who did not completed a NPV were excluded. Additionally, these patients were screened by ICD-9 and ICD-10 (Index 1) coding to see determine the approximate prevalence of SDB in our population. We then took these patients and performed a manual chart collection of demographic data including Age, Sex, BMI, Race, & MED average at time of initial encounter, PSG ordered and Performed as well as the results of these diagnostic tests.

Results: 2312 NPV in the Penn Pain Medicine Clinic during the above time was captured. STOP-GAP tool was used in < 1% of charts thus this was aborted to utilizing an ICD-9/10 screen for the purposes of this study. Of these, 368 had ICD-9/10 qualifications for SDB. Of the 368 Patients, 72 had PSG ordered however only 23 were performed. Of the 23, 14 had OSA diagnosed by PSG with the other 9 demonstrating “other sleep related breathing disorders.” P-values were statistically significant (p=.0001) for MED values in the “Study Ordered” vs. “No Study Ordered” Group. Average MED in the Study Ordered group was 121.85 (n=72) while the No study ordered group was 44.24 (n=296.) 368 out of 2312 patients leads to a SDB prevalence in the pain clinic of 15.917% which is well below the national average and in comparison to prior studies performed. (Index 2)

Conclusion: This research study indicates that there is a strong correlation with MED and PSG ordered by the Pain Physician. This correlation is further reinforced by the 100% positive testing for the 23 studies performed. This research study was limited by a lack of use of the STOP-GAP screening tool. Limitations also include ICD-9/10 related screening as well as poor patient compliance for PSG testing.

References:
Firing rates and variability differences between motor units and spontaneous activity in needle EMG

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Introduction: Motor unit action potentials (MUAP) can look like positive sharp waves in configuration based upon the needle relationship to the motor unit territory. The regularity and consistency of firing, however, distinguish spontaneous activity (SA) from MUAPs. A measure to assess the degree of firing regularity is needed for quantitative evaluation of SA in the paraspinal muscles of the neck and back. Previous studies have shown marked differences in prevalence of paraspinal SA.

Objective: To quantify firing rates and regularity of SA and MUAPs using a modern, digital interface — DQEMG and Audacity.

Methods: Prospective recordings were obtained from patients referred for routine EMG evaluation of a variety of complaints. The recordings were interfaced through a version of DQEMG software customized to calculate descriptive statistics for these waveforms.

Results: 48 MUAP recordings (41 subjects) and 83 fibrillation/positive sharp wave (Fib/PSW) recordings (63 subjects) were analyzed. 107/131 recordings successfully interfaced with DQEMG. The remaining were analyzed with Audacity. Mean firing rates for MUAPs were 11.2 Hz (SD 3.6) and for SA, 6.9 Hz (SD 2.6). The average proportional consecutive interval differences (APCID) showed 11.3-67.8 (ratio) for MUAPs and 0.6-35 (ratio) for Fibs/PSWs. Only 4/83 of APCID values from SA exceeded the lowest value for MUAPs. There was significant overlap for mean consecutive differences and standard deviation of inter-potential intervals. The distributions of the above parameters were skewed to the right.

Conclusions: APCID appears to well differentiate SA from MUAPs and will be useful for future quantitative studies examining the prevalence of SA in tested muscles.