A Multimodal Approach to Reducing Opioid Administration in the Emergency Department

Eddie Ford, B.A.[1], Vito Rocco, M.D.[2], Shanna Jones, M.D.[2], Patrick Karabon, M.S.[1]

[1]Oakland University William Beaumont School of Medicine, Rochester, Michigan
[2]Department of Emergency Medicine, Beaumont Health System, Royal Oak, Michigan

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Introduction

The United States is currently battling a deadly epidemic against opioid abuse and misuse, which began as a result of pharmaceutical companies purposely downplaying the addictive potential of their opioid medications.[1] In 2016, a Colorado health care system developed a groundbreaking alternative to opioids (ALTO) protocol for acute pain relief in the Emergency Department (ED).[2] The ALTO protocol is an innovative multi-modal approach to acute pain reduction. ALTO takes advantage of incorporating new medications, alternative uses of well-known medications as well as encouraging providers to use relatively quick and low risk procedures such as nerve blocks to combat pain.[2] This protocol was adapted and implemented in the Beaumont Troy ED and is the focus of this current study.

We hypothesize that the ALTO protocol will lead to a reduction in opioid administration in addition to an increase in ALTO medication use for acute pain relief. This research will contribute to the production of universally accepted and preferred non-opioid pain reduction protocols in order to limit future opioid misuse and abuse.

Types of pain targeted by the ALTO protocol				
Headache/ Migraine	Bone fracture	Abdominal pain	Renal colic	Muscular

Figure 1. The 5 ALTO protocol pathway targets

Aims and Objectives

The primary aim of this study is to characterize the impact of the ALTO protocol on the rate of opioid (MEU) and ALTO medication administration in the ED for acute pain relief.

- Through collection of retrospective data, we will assess whether or not the ALTO protocol would overall reduce the administration of opioids in the ED, which is measured in morphine equivalent units (MEUs) and compare it to previous 3 years (non-ALTO protocol).

Methods

This study is a retrospective review utilizing data from ED visits at Beaumont Troy from April 2019 – August 2019 (study period). The patients included in our study consisted entirely of patients over 18 years old and were seen in the Beaumont Troy ER complaining of acute pain. Our data was collected from ED admission, ED discharge, ED transfer data as well as pharmacy administration data. Prior to the study period, ED providers had received training and information regarding the ALTO protocol.

Log-linear regression models were used to measure temporal trends in the measures over time. This is commonly known as the Monthly Percentage Change (MPC) Methodology. This methodology is commonly used in Cancer Surveillance trend analysis. Briefly, the methodology examines the monthly average percentage change in a measure over time. This methodology was chosen due to its ability to concisely report the monthly impact that the ALTO protocol is having on prescribing practices.

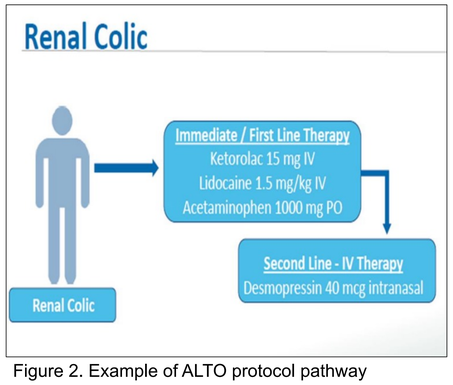

Figure 2. Example of ALTO protocol pathway

Results

Primary measures	MPC (95% CI)	P-Value
Emergency Department Visits	0.53% (0.24%, 0.82%)	0.0003
Alternatives to Opioids Administered (ALTO)	2.36% (1.90%, 2.83%)	< 0.0001
Rate of Alternatives to Opioids Administered (ALTO)	1.82% (1.48%, 2.17%)	< 0.0001
Opioids Administered	0.15% (-0.45%, 0.76%)	0.6194
Rate of Opioids Administered	-0.37% (-1.04%, 0.30%)	0.2759
Morphine Equivalent Units Administered	-0.53% (-1.10%, 0.04%)	0.0688
Rate of Morphine Equivalent Units Administered	-1.05% (-1.71%, -0.39%)	0.0018

Table 1. The MPC of the primary measures during the study period

- ALTOs administered increased, on average, by 2.36% per month between April 2018 and August 2019 (P = < 0.0001).
- The rate of ALTOs administered increased, on average, by 1.82% per month between April 2018 and August 2019 (P = < 0.0001).
- The rate of MEUs administered decreased, on average, by 1.05% per month between April 2018 and August 2019 (P = 0.0018).

Opioids	MPC (95% CI)	P-Value
Buprenorphine	5.10% (-0.59%, 11.13%)	0.0801
Codeine	-1.96% (-5.04%, 1.22%)	0.2247
Fentanyl	14.94% (8.03%, 22.30%)	< 0.0001
Hydrocodone	-0.54% (-1.34%, 0.27%)	0.1928
Hydromorphone	-0.76% (-3.40%, 1.96%)	0.5800
Meperidine	1.87% (-4.13%, 8.26%)	0.5494
Methadone	7.50% (1.93%, 13.37%)	0.0077
Morphine	4.67% (-0.83%, 10.47%)	0.0974
Oxycodone	1.35% (-0.08%, 2.80%)	0.0638
Tramadol	-0.18% (-1.63%, 1.28%)	0.8073

Table 2. The MPC of specific opioids administered during study period

- Fentanyl orders increased, on average, by 14.94% per month between April 2018 and August 2019 (P = < 0.0001).
- Methadone orders increased, on average, by 7.50% per month between April 2018 and August 2019 (P = 0.0077).
- There was not enough evidence to conclude that there was a significant trend between April 2018 and August 2019 for Buprenorphine, Codeine, Hydrocodone, Hydromorphone, Meperidine, Morphine, Oxycodone, or Tramadol (all P ≥ 0.05).

Conclusions

Our results demonstrate that the ALTO protocol lead to a reduction in the rate of MEUs used in the ED for acute pain relief. This innovative protocol also resulted in an increase in the rate of ALTOs being administered for the purpose of pain relief. Surprisingly, there was not a statistically significant overall reduction in the rate of opioids administered as compared to the pre-ALTO period. The discrepancy between the reduction in MEUs while no reduction in the rate of overall opioids can be explained by the standardization conversion of certain opioids to MEUs.

This study will enhance Beaumont's commitment to patient safety and being an innovator when it comes to evidence-based care. The adoption of the ALTO protocol by more healthcare systems will undoubtedly lead to lives being saved and a decrease the chance of future patients developing a misuse disorder. A limitation of our study is the short duration of our collection period and the reliance on provider driven commitment to the ALTO protocol. Our research will contribute to the production of universally accepted and preferred non-opioid pain reduction methods in order to reduce future opioid use.

References

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