Utilization of a Computerized Dosing Algorithm to Improve Management in Diabetic Ketoacidosis

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Introduction

- Cost across the US in the treatment of DKA has increased substantially of the past several years with noted increases in hospitalizations across North America
- EndoTool IV, is a computerized insulin dosing algorithm was implemented across our 7-hospital system in Central Pennsylvania
- An analysis sought to determine its efficacy in reducing costs and improving care in patients with DKA

Objectives

- Primary endpoint: Cost in management of patients with DKA in utilized computerized dosing algorithm, EndoToo IV (ETIV), in comparison to prior order set utilized approach
- Secondary endpoints: Time on insulin infusion, blood glucose checks, # of hypoglycemic events, average hospital length of stay

Methods

- Retrospective data collected from 115 patients from September-December pre and post ETIV implementation (47 and 68 patients respectively) at UPMC Harrisburg
- Comparative analysis of both groups noted no significant differences in baseline characteristics such as age, sex, BMI and renal function
- Covid patients excluded from this study
- Statistical analyses sought to compare the prior metrics between the two groups

Results

	September- December 2021	September-December 2022	
Metrics	**Pre-ETIV**	**Post-ETIV**	**p-value**
DKA Patients	47	68	
Time on Infusion (Hours)	37.2	35.4	0.0003
Average #BG checks while on drip (started in DKA MOT)	48	21.4	<0.0001
Average ICU Charges DKA	$28,416	$24,009.00	0.4898
% of values < 70 mg/dl	2.26%	0.35%	<0.0001
% of values < 40 mg/dl	0.03%	0.00%	0.4351
Average Hospital Length of Stay (Days)	5.1	4.5	0.4993

Conclusions

- Findings noted a reduction in hypoglycemic events, fewer glucose checks and shorter infusion time
- Although not significant, slight decrease in length of stay
- No significant decrease in charges of patients managed in the ICU
- ETIV computerized algorithm offers a promising approach to improvements in the clinical outcomes of DKA patients
- Further subgroup analysis currently being undergone

References

- Crockett SE. Glucose control in the critically ill patient utilizing computerized intravenous insulin dosing. US Endocrinol 2009;5:45–48
- Harris C, Green D. Guardian of glucose: consider using an electronic algorithm to achieve postcardiac surgery glycemic control. Nurs Manage 2009
- John SM, Waters KL, Jivani K. Evaluating the Implementation of the EndoTool Glycemic Control Software System. Diabetes Spectr. 2018 Feb;31(1):26-30. doi: 10.2337/ds16-0061. PMID: 29456423; PMCID: PMC5813319.

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