Peripheral Administration of Three Percent Saline

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BACKGROUND

Sodium chloride 3% has been traditionally administered via a central venous line because of perceived risk of infiltration and tissue injury due to its high osmolarity. However, patients requiring 3% NaCl often require timely administration, predominantly for reduction of elevated intracranial pressure.

Kaleida Health's Pharmacy and Therapeutics Committee (PTC) approved peripheral administration of sodium chloride 3% in December 2017 with a maximum duration of 72 hours. This policy was approved with the contingency of periodic assessment for incidence of adverse events. There are currently no large trials assessing the safety of this practice.

SUPPORTING LITERATURE

	Dillion et al (2017)	Jones et al (2017)	Perez et al (2017)
Hypertonic saline peripheral administration			
Number of patients	168	233	28
Duration of administration (hours)	4-30	26-81	1-124
Rate of administration	25-75 ml/hr	20-40 ml/hr	30-50 ml/hr
Infusion related complications n(%)	4 (6)	3 (10.7)	15 (6.4)

Table 1. Literature supporting peripheral administration of hypertonic saline

OBJECTIVE

Primary Outcome: Incidence of adverse events from administering sodium chloride 3% peripherally

DESIGN AND METHODS

A retrospective chart review of the Kaleida Health medical record at Buffalo General Medical Center.

Inclusion Criteria:
Any patient that receives sodium chloride 3% at Buffalo General Medical Center from December 27, 2018 through September 10, 2019

Exclusion Criteria:
No exclusion criteria

Data collected:
- Administration of hypertonic saline
- Placement of central line
- Duration of infusion
- Documented adverse reaction

Kaleida Health Policy:

Central Line
- Maximum rate 200 mL/ hour

Peripheral Access Only
- Maximum rate 300 mL/ hour for 1 hour
- Subsequent maximum rate of 75 mL/hour
- Large bore catheter in proximal large vein preferred
- Recommended duration: 72 hours

Figure 1. Kaleida Health policy for the administration of hypertonic saline

RESULTS

Policy Compliance n(%)	
Central line placed within 72 hours	7 (23)
Infusion duration <72 hours	23 (77)
Compliance with protocol	30 (100)

Table 2: Compliance with Kaleida Health policy

RESULTS

150 orders reviewed

87 unique patients

80 patients administered 3% saline

30 patients no central line at initiation of 3% saline

Figure 2: Patient administered hypertonic saline peripherally

Adverse Events n(%)	
No adverse event documented	29 (97)
Adverse event documented	1 (3)

Table 3: Rate of adverse events

Description of Adverse Event:
Patient was received from Emergency Medical Services with right antecubital line. Hypertonic solution started then stopped in the right antecubital, later flushed to check patency. There was no blood return and skin around IV site slightly red and hard to touch. IV line was discontinued. No further mention of incident in patient chart.

DISCUSSION

- Sodium chloride 3% possesses an inherent risk of infiltration when administered peripherally given its high osmolarity. However, the indication for hypertonic saline use typically requires administration in a timely fashion.
- Although Kaleida Health's Pharmacy and Therapeutics Committee liberalized its policy on hypertonic saline to allow for peripheral administration, the majority of patients receive hypertonic saline via central line.
- Since Kaleida's updated policy review *Mesgali et al* published a retrospective cohort study evaluating extravasation incidence in patients receiving hypertonic saline peripherally. Authors found no incidence of extravasation in any of their patients.
- Only one patient was determined to suffer an adverse event related to administration of hypertonic saline and the reaction was minor. The rate of adverse events was similar to that found in the literature.
- Peripheral administration of hypertonic saline should be considered when patients require timely care.

Disclosure
Author(s) of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation. Emily Lewandowski, PharmD, nothing to disclose.

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