Program...Validate...Infuse: Developing an IV Infusion Validation Tool

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Regional Burn Center

Lehigh Valley Health Network, Allentown, Pennsylvania

Background:

- Medication errors negatively affect patient outcomes
- A serious IV medication error occurred on the Burn Center--it was time to take action

Purpose:

- Recent research reveals that user programming errors, bypassing of safety features, and overriding or ignoring alarms can all lead to IV infusion errors with smart pumps
- Nursing leadership in the Burn Center began working with the network Medication Safety Officer to brainstorm solutions to prevent future IV infusion errors
- The 'IV Infusion Validation Tool' was devised to create a simple and easily accessible method to verify correct programming of an IV pump

Methods:

- The tool consists of a spreadsheet with a drug library containing all of the IV medications and concentrations used throughout the network
- One-on-one education and validation was conducted to ensure proper usage and compliance by each RN
- By entering the patient's weight and ordered medication dose, the tool will calculate the correct infusion rate, which can then be compared to the rate calculated by the smart pump, ensuring that the IV pump is programmed correctly before the start of an infusion

Implications:

- ZERO IV medication infusion errors have been reported in the Burn Center since implementation of this tool
- Staff report the tool is user friendly and offers a simple and effective method to decrease IV infusion rate errors

Future Plans:

- This tool will be implemented network wide as part of an action plan to prevent IV infusion rate errors

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Patient Weight 72 kg

Drug	Strength	Diluent Volume	Usual Dosing Range	Dosing	Rate	Infusion Rate
LIDOCAINE (mg/min)	2 g	250 ml	1-4 mg/min	0	mg/min	0 ml/hr
LORAZAPAM (mg/hr)	25 mg	250 ml	1-4 mg/hr	1	mg/hr	10 ml/hr
LORAZAPAM (mg/hr)	50 mg	500 ml		0	mg/hr	0 ml/hr
MAG SULFATE (g/hr)	20 g	500 ml		0	g/hr	0 ml/hr
MIDAZOLAM (mg/hr)	100 mg	100 ml	1-5 mg/hr	5	mg/hr	5 ml/hr
MILRINONE (mcg/kg/min)	20 mg	100 ml	0.375-0.75 mcg/kg/min	0	mcg/kg/min	0 ml/hr
MORPHINE (mg/hr)	100 mg	100 ml	1-10 mg/hr	0	mg/hr	0 ml/hr
NALOXONE (mg/hr)	2 mg	500 ml		0	mg/hr	0 ml/hr
NESIRITIDE (mcg/kg/min)	1.5 mg	250 ml	0.005-0.03 mcg/kg/min	0	mcg/kg/min	0 ml/hr
NICARDIPINE (mg/hr)	20 mg	200 ml	2.5-15 mg/hr	0	mg/hr	0 ml/hr
NICARDIPINE (mg/hr)	40 mg	200 ml		0	mg/hr	0 ml/hr
NITROGLYCERIN (mcg/min)	100 mg	250 ml	5-100 mcg/min	0	mcg/min	0 ml/hr
NITROPRUSSIDE (mcg/kg/min)	100 mg	250 ml	0.3-4 mcg/kg/min	0	mcg/kg/min	0 ml/hr
INTROPRUSSIDE (mcg/kg/min)	200 mg	250 ml		0	mcg/kg/min	0 ml/hr
NOREPINEPHRINE (mcg/min)	4 mg	250 ml	0.5-30 mcg/min	2	mcg/min	7.5 ml/hr
NOREPINEPHRINE (mcg/min)	8 mg	250 ml		0	mcg/min	0 ml/hr

Patient Weight 110 kg

Drug	Strength	Diluent Volume	Usual Dosing Range	Dosing	Rate	Infusion Rate
DILTIAZEM (mg/hr)	125 mg	125 mg		0	mg/hr	0 ml/hr
DOBUTAMINE (mcg/kg/min)	500 mg	250 ml	0.5-20 mcg/kg/min	0	mcg/kg/min	0 ml/hr
DOPAMINE (mcg/kg/min)	400 mg	250 ml	5-20 mcg/kg/min	0	mcg/kg/min	0 ml/hr
EPINEPHRINE (mcg/min)	4 mg	250 ml	1-4 mcg/min	0	mcg/min	0 ml/hr
EPTIFIBATIDE (mcg/kg/min)	75 mg	100 ml		0	mcg/kg/min	0 ml/hr
ESMOLOL (mcg/kg/min)	2500 mg	250 ml	50-200 mcg/kg/min	0	mcg/kg/m in	0 ml/hr
FENOLDOPAM (mcg/kg/min)	10 mg	250 ml	0.03-0.1 mcg/kg/min	0	mcg/kg/min	0 ml/hr
FENTANYL (mcg/hr)	2000 mcg	100 ml	25-500 mcg/hr	100	mcg/hr	5 ml/hr
FUROSEMIDE (mg/hr)	500 mg	50 ml	10-20 mg/hr	0	mg/hr	0 ml/hr
FUROSEMIDE (mg/hr)	1000 mg	100 ml		10	mg/hr	1 ml/hr
HEPARIN Initial Rate - ACS	25000 units	250 ml	12 units/kg/hr, max 1000 units/hr	15	units/kg/hr	10 ml/hr Max Initial Rate Exceeded
HEPARIN Initial Rate - Stroke	25000 units	250 ml	10 units/kg/hr, max 1000 units/hr	8	units/kg/hr	8.8 m/hr
HEPARIN Initial Rate - DVT/PE	25000	250 ml	18 units/kg/hr, max 2000 units/hr	20	units/kg/hr	20 ml/hr Max Initial Rate Exceeded
HEPARIN - Maintenance	25000	250 ml		0	units/kg/hr	0 ml/hr