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Flushing Out the Competition: Normal saline vs heparin flushes in peripheral IV catheters

Sarah Albrecht SN & Sarah Williams SN



What We Learned

Although nurses must follow the policies and procedures of their institutions, they should be aware of the possible negative clinical implications of heparin and the economic benefits of normal saline flush solutions. Nurses have to advocate for the best intravenous catheter care for their patients, by staying up-to-date on evidence based practice.

Background

Over 150 million peripheral intravenous (IV) catheters are inserted every year in the United States for hydration, medication, and nutrition. IV catheters must be continually flushed and monitored by nurses, to ensure they remain intact and free from complications. If peripheral IV patency is lost, it may result in adverse effects or the placement of a new line, which can be painful for a patient. It is in a hospital's best interest to research ways to maintain peripheral IV patency.

Purpose

- To perform a nurse authored literature review
- Compare flushing solution effects on the length of patency of the peripheral IV catheter, as well as the percentage of negative effects that occurred

Methods

- Database search: MEDLINE and CINAHL
- Search terms: Flush solution, heparin sodium, normal saline, peripheral IV
- Inclusion criteria:
 - Nurse authored
 - Published 2008-2014
 - Inclusion of all patient age groups

Results



Table 3 Reasons for removal

| | Saline n = 46 (%) | Heparin n = 42 (%) | P value Chi-square |
|----------------------------------|----------------------|-----------------------|-----------------------|
| Non-elective reasons for removal | 38 (83%) | 33 (78%) | 0.632 |
| • Leakage | 11 (24%) | 2 (5%) | |
| • Phlebitis | 4 (9%) | 6 (14%) | |
| • Infiltration | 9 (20%) | 9 (21%) | |
| • Obstruction | 14 (30%) | 16 (39%) | |
| Elective reasons for removal | 8 (17%) | 9 (20%) | 0.632 |
| • Restart continuous infusion | 1 (1%) | 4 (9%) | |
| • Discharge | 3 (7%) | 1 (2%) | |
| • Death | 0 (0.0%) | 1 (2%) | |
| • Other* | 4 (9%) | 3 (7%) | |

Values are number (%)
*Other: end of treatment



Results

- Four peer reviewed studies were analyzed:
- A double blind, randomized study of 88 neonatal patients
 - A randomized study of 62 pediatric patients
 - A pragmatic, cluster-randomized controlled study of 214 adult patients
 - A prospective controlled trial of 359 adult patients

Conclusions

- No statistical differences of patency or negative clinical implications were found between normal saline and heparin flush solution
- Heparin is associated with heparin induced thrombocytopenia (HIT) and intraventricular hemorrhage, particularly in neonates
- Thrombocytopenia is one of the most frequent complications of heparin flush solutions in acutely ill patients
- Errors in heparin flush solution may be lethal
- Heparin is incompatible with certain types of medication, requiring additional normal saline flush
- Potential fluid overload in sensitive populations
- Normal saline is economically superior to heparin

Next Steps

- Research - sodium bicarbonate, heparin in vulnerable populations and central catheters
- Examine local hospital policies
- Extend the literature review to include more studies

Limitations

- Only four studies were analyzed
- Differing patient populations were compared
- Only nurse authored studies were utilized
- Varying concentrations of heparin flush solutions were examined

Acknowledgments

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