Peripheral intravenous cannula utilisation and frequency of intravenous fluid delivery – convenience or necessity?

Michael Willis, Ali Bakir, Efrem Colnetti, Jason Pott, Amina Daou, Anuj Gupta, Ben Goozee, Charlie Hubbett, Deren Aygin, Gozde Firat, Laura Maciejec-Biskup, Megan Annetts, Merline Muthukumar, Nicolas Fine, Nicole Loi, Sultan Farooq, Yousef Alame, Tim Harris

INTRODUCTION
- Over a billion peripheral intravenous cannulas (PIVCs) are inserted worldwide each year(1).
- Peripheral Intravenous Catheters (PIVCs) are associated with complications and use up departmental resources. (2)
- A growing body of international research suggests many of the PIVCs inserted in the Emergency Department (ED) remain unused and no national standards on the indications for PIVC insertion have yet been developed.(3)
- We determined the incidence of unused or unnecessarily used PIVCs in a large inner London ED.

METHODS/STUDY DESIGN
- We conducted a single-centre, prospective study recruiting adult patients presenting to the ED.
- Data collection between 8am and 10pm for 21 consecutive days.
- Patients were followed up until discharge from the ED.
- Prior to data gathering, we developed a generous list of valid indications for intravenous (IV) fluids. IV fluid administration for patients not meeting this criteria were deemed unnecessary.
- This list of indications was reviewed post-hoc to determine if there were omissions.
- PIVCs inserted and only used for blood sampling were considered unnecessary as the sampling could have been done by phlebotomy.

Definitions:
Unused PIVCs: Those not being utilised for phlebotomy, IV fluids, IV medications, blood products, CT contrast or pain management medication.

Unnecessary PIVCs: Those being used only for phlebotomy and/or for IV fluids where none of the a priori standards for appropriate IV fluid administration were met.

CONCLUSIONS
- We found an excessive (56%) incidence of unused and unnecessary PIVC insertion in the ED.
- The decision to insert PIVCs is not being appropriately taken on a patient-by-patient basis.
- Overuse of IV fluids suggests guidelines for appropriate usage are not being followed.
- This may be a confounding factor where staff anticipation of IV fluid use may lead to prophylactic PIVC insertion, or IV fluids may be used because a patient already has a PIVC.
- Education on IV fluid guidelines and future work to further develop guidelines encouraging appropriate PIVC insertion and usage is required.

Table 1: Students inputted the following data onto the electronic database.

Table 2: a priori assessment standards for IV fluid administration.

Data collection
- Code ID
- Arrival date and time
- Gender
- Arrival mode
- Age
- PIVC insertion location
- If ultrasound was used
- Grade of staff inserting the PIVC
- PIVC Gauge
- Number of attempts
- PIVC anatomical location on patient
- PIVC usage (plus date and time) for each use
- A priori assessment
- ED discharge time
- Notes (for any queries/questions to lead researchers

Table 1: Students inputted the following data onto the electronic database.

Vomiting (not able to keep oral fluids down)
- WITH signs of dehydration
- IV medications/blood products
- Chronic cognitive impairment where intake needs higher than usual
- Fluid resuscitation
- Electrolytes not potassium
- Potassium and unable to tolerate oral fluids
- NIL BY MOUTH (for actual/potential procedure or due to low GCS)
- Swallowing difficulty
- Suspected delirium/psychosis
- Severe nausea

References

m.willis@se11.qmul.ac.uk
tim.harris@bartshealth.nhs.uk