

Incidence of infusion alarms in NICU and PICU: focus on occlusion alarms

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Introduction

Infusion alarms alert nurses of problems like overpressure or air in the catheter to prevent clinical consequences (bolus release, over-infusion, extravasation, air embolism). Alarms in ICU being frequent and noisy, infusion alarms should be quantified and analysed to prevent unnecessary ones.

Objectives

To determine the incidence and type of infusion alarms and the cause of occlusion alarms in NICU and PICU

Methods

- Prospective analysis of recorded infusion alarms during 90 days (2164h) on smart pumps (Orchestra® workstation base intensive, Modules DPS/MVP, Fresenius Kabi) and volumetric pumps (Volumed µVP7000, Arcomed)
- Extraction of data twice a day using Base Dump and Druglib 224-1 (Eeprom configuration v2.18)
- Standardized form to be filled by ICU nurses to detail occlusion alarms when they occurred



Results

1 Type of patients?

- 40 patients (18 cardiac, 12 neonates, 10 others)
- Mean weight 11.7 ± 11.4 kg (0.48 to 50)



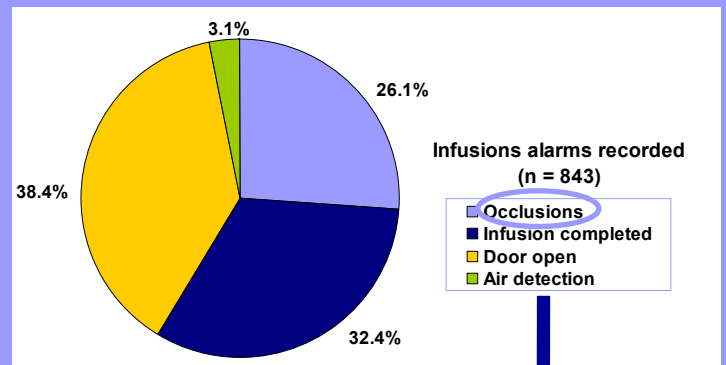
45% cardiac patients



30% neonates

2 Incidence and type of alarms?

- 843 infusion alarms recorded over 2164 h
- Estimated incidence: 9.3 infusion alarms per patient per day
- 2.5 occlusion alarms per patient per day



3 Causes of occlusion alarms?

- Only 50 (18 patients) out of 220 occlusion alarms detailed:
- Combined causes sometimes present
 - 1 minor clinical consequence observed (take out of injection device due to pain on site)
 - Lumen flushing necessary in 11 cases

36% (18) spontaneous

36% (18) closed stopcock

24% (12) drug incompatibilities

- 12 events in 5 patients:
- 7 alarms in 40 min with midazolam + fat
 - 2 alarms with frozen plasma + G40%
 - 1 alarm with rifampicin + TPN
 - 1 alarm with flucloxacilline + fat
 - 1 blood + G10%

16% (8) direct IV drug injection

- 8 events in 6 patients:
- 3 bolus of inositol
 - 2 infusion of paracetamol over 15 min
 - 1 bolus of ketamine
 - 2 reinjection of blood

8% (4) total infusion rate exceeding central venous catheter tolerance (10 ml/h)¹

- 4 events in 2 patients with central venous catheter type Deltac 27G (20cm):
- 2 alarms with 32.2 ml/h (paracetamol)
 - 1 alarm with 19.2 ml/h (flucloxacillin + TPN)
 - 1 alarm with 29.6 ml/h (rifampicin + TPN)

Occurrence of occlusion alarms

Conclusion

An incidence of 9.3 infusion alarms (2.5 occlusions) per patient per day was determined. Due to underreporting, occlusion alarms analysis was incomplete. Optimisation of drug infusion could be done to prevent unnecessary alarms consecutive to drug incompatibilities or inadequacy for rate and catheter tolerance.