

## Introduction

Parenteral administration of drugs is a pivotal part in patient's hospital management. Therefore infusion set-up errors can expose patients to adverse clinical complications, especially for those who are in Intensive Care Units (ICU).

To reduce the risk of error and secure infusion set-up, an analysis of existing practices in ICU was carried out. Several approaches for improvement will be suggested afterwards as optimising infusion set-up, in accordance to the Infusion Guidelines.

## Matériel & Méthodes

Over a one-month period, consisting of half-day sessions.

Medical intensive care unit.

**Multidisciplinary team :**

- ICU nurses
- Hygiene specialist nurses
- Pharmacists



The patients' infusion set-up was directly observed.

Audit checklists stratified by intravascular device type :

- Central venous catheter (CVC)
- Peripheral venous catheter (PVC)
- Peripherally inserted central catheter (PICC) line catheter
- Midline catheter
- Implantable venous access port (IVAP)



Data were analysed and linked with medical prescriptions from the ICU software.

A large number of items were assessed, including :

- Characteristics of the vascular access (infusion modality, catheter type, insertion site)
- Dressing characteristics (type and compliance)
- Number of lumens
- Configuration of primary and secondary infusion lines
- Medication administration



Data analysis was carried out with Microsoft Excel.

## Results

42 patients audited.

59 intravascular devices (IVD) identified.

327 infusion lines were observed.

110 main lines (ML)

217 secondary lines (SL)

### Observations:

- Central venous catheters (CVC): The ICU has its own infusion set-up protocol for 4-lumen CVC → harmonization of clinical practices. (figure 4)
- Parenteral nutrition via CVC: 100% of parenteral nutrition were given in accordance to the Infusion Guidelines.
- Anti-reflux valves (ARV): 91% of infusion lines were not fitted with ARV.
- Stopcocks: Open stopcocks were observed even when infusions were suspended, causing flow disturbances.
- Unused infusion lines (figure 3):
  - PVC: 11.8% of ML and 62.2% of SL.
  - CVC: 23.9% of ML and 49.6% of SL.
  - PICC lines: 50% of both ML and SL.
  - Midline catheters: 25% of ML and 51.6% of SL.

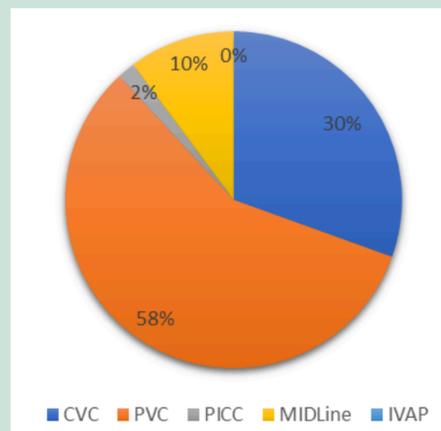


Figure 1. Distribution of audited IVD.

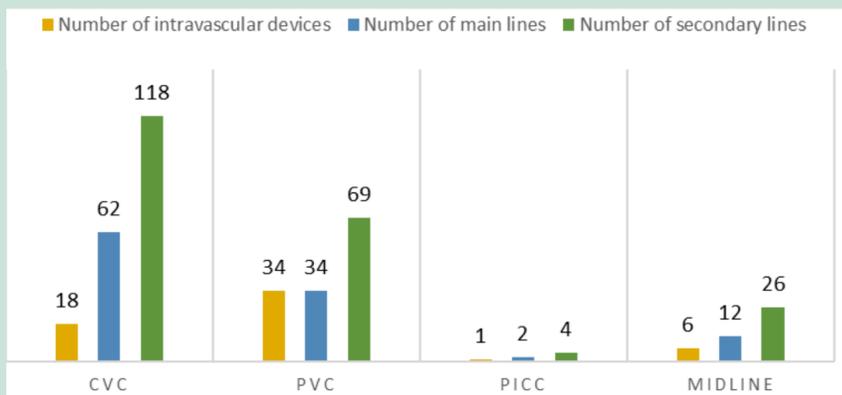


Figure 2. Number of lines observed by type of IVD.

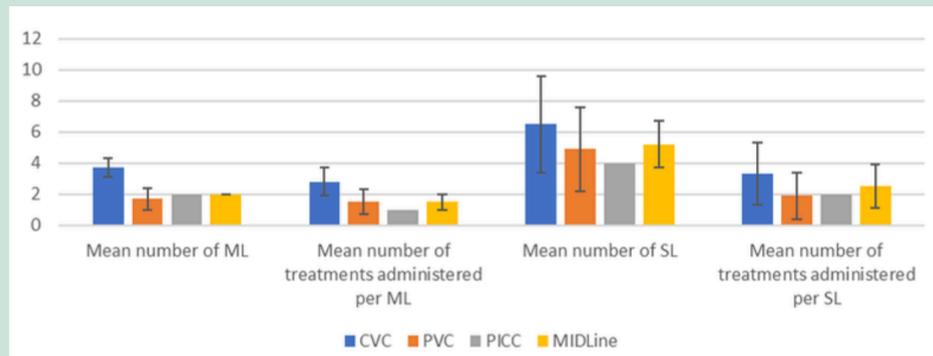
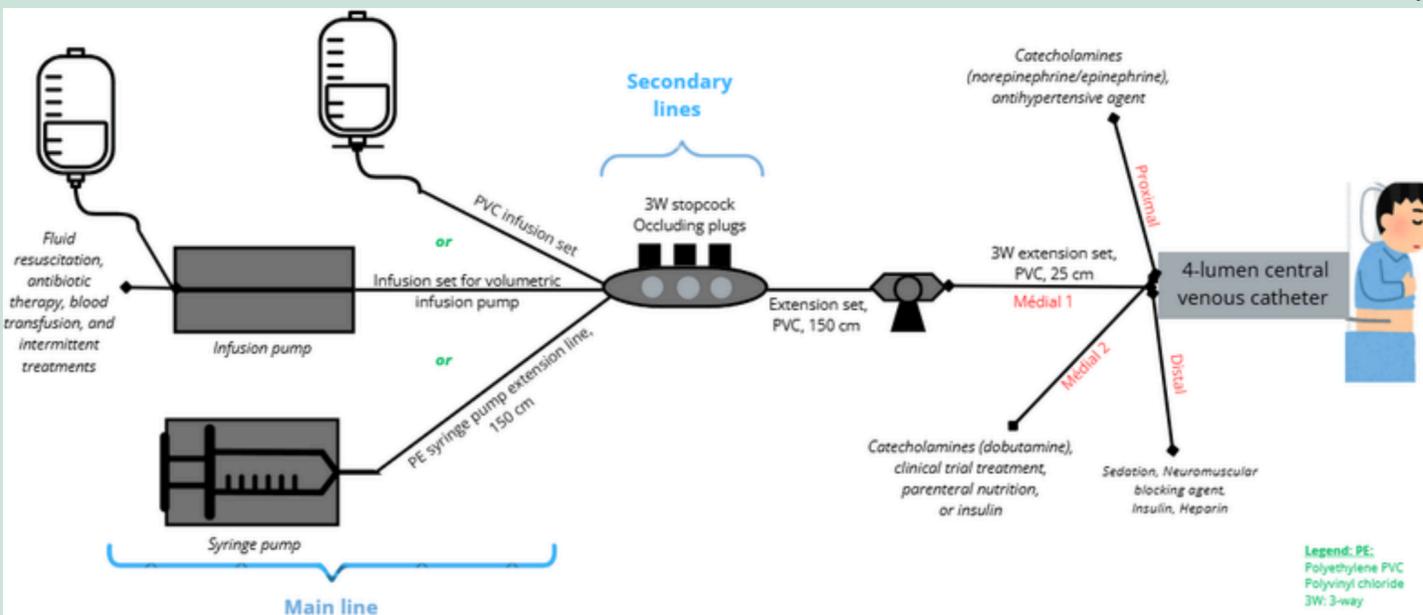


Figure 3. Correlation between the number of infused lines and the number of treatments administered.



### Analyses of software specific to ICU:

- Analysis of medical prescriptions on the audit day: assessment of the consistency between prescribed treatments and therapies observed in infusion setups.
- Drug incompatibilities: 10 drug incompatibilities were identified.

### Dressings:

79.4% of dressings were compliant.

Figure 4. Representation of the medial lumen 1 of the protocolized central venous catheter set-up in medical intensive care.

## Discussion & Conclusion

• A table of physicochemical incompatibilities (PCI) of injectable drugs administered via Y-site was developed based on the main therapeutic agents administered in the ICU, using the STABILIS® database.

• Drug incompatibilities were mainly associated with the intravenous administration of proton pump inhibitors (pantoprazole); therefore, the oral route should be preferred whenever possible.

- Cost reduction.
- Reduction of the risk of drug incompatibilities.
- Reduction of the number of nursing manipulations → decreasing the risk of infection.

• Unused lines: complex and evolving therapeutic regimens with line replacement every 7 days.

→ Proposal to include two-way IV extension sets in unit's equipment to reduce unused intravenous lines.



- ARV : non-compliance due to the absence of this device from the unit's equipment.
  - Inclusion of ARV in the unit's equipment;
  - Training of healthcare staff in their use;
  - Creation of a working group: development of a new standardized protocol for infusion lines including anti-reflux valves.

- Audit feedback was positive within the unit: findings and proposed measures were presented and discussed with the head of the department, intensive care physicians, ICU nurses, hygiene specialist nurses and pharmacists.

