

INTRODUCTION

Cefuroxime, a β -lactam antibiotic, is usually prescribed as 1.5 g diluted to 50-100 mL of 0.9% saline 3 times per day.

Current understandings suggest that continuous infusions of β -lactam antibiotics increase pharmacokinetic /pharmacodynamic target attainment. However, this way of administration brings about some practical issues such as stability. Few articles showed the stability of cefuroxime sodium solutions of different concentrations but not at higher concentrations than 60 mg/mL.[1-2]

OBJECTIVE

To determine the stability of 90 mg/mL cefuroxime sodium solution (4.5 g dissolved in 50-mL 0.9% saline) stored in a polypropylene syringe at different storage conditions.

METHOD

Commercially vials of cefuroxime sodium (4.5 g total dose) were reconstituted and mixed with 50-mL 0.9% saline to produce 90 mg/mL solution in polypropylene syringes which were stored at 4°C, 25°C and 40°C. Cefuroxime sodium concentration was determined periodically over 14 days (days 0, 1, 2, 7, 14) using a stability-indicating HPLC method with UV detection. Reconstituted solutions were considered as stable as if antibiotic concentration remained at over 90% of the theoretical concentration.

RESULTS

The analytical results are summarized in table 1. Colour increased with time, heat and exposure to light. No precipitation was observed under any of the storage conditions.

Table 1. Cefuroxime sodium concentrations (mean \pm SD (%); n=3) in polypropylene syringes at different storage conditions

Time	4°C Light protected	25°C Light protected	25°C Exposed to light	40°C Light protected
0 H	/	102.44 \pm 1.97%	106.17 \pm 2.77%	/
24 H	/	98.26 \pm 1.06%	101.16 \pm 1.06%	55.21 \pm 0.73 %
48 H	/	93.68 \pm 2.52%	90.60 \pm 0.44%	/
168 H	97.89 \pm 1.10%	76.94 \pm 1.03%	59.91 \pm 0.51 %	/
336 H	96.66 \pm 0.84%	/	/	/

DISCUSSION/ CONCLUSION

- This study has shown that a 90 mg/mL cefuroxime sodium infusion syringe is stable for 48 hours with storage at 25°C protected or not from light, and for at least 14 days when stored at 4°C.
- In clinical practice, hospital pharmacists can safely prepare 4.5 g cefuroxime sodium in 50-mL 0.9% saline polypropylene syringes that can be stored in a refrigerator for at least 14 days at 4°C.
- Physicians can safely use 90 mg/mL cefuroxime sodium solution as 24-hour infusion.

Références:

- [1] ML Stiles et al., Stability of ceftazidime (with arginine) and of cefuroxime sodium in infusion pump reservoirs, American Journal of hospital pharmacy, 1992 ;
 [2]D Gupta, Chemical stability of cefuroxime sodium after reconstitution in 0.9% sodium chloride injection and storage in polypropylene yringes for pediatric use, International Journal of Pharmaceutical Compounding, 2003.