Cefepime Stability in IV Solutions and Admixtures

Cefepime is widely used in clinical practice, yet only limited data are available on its stability in a variety of IV fluids and containers at room temperature and at 5°C. The objective of our study was to investigate the stability of cefepime in IV solutions commonly used in clinical practice.

Solutions of cefepime (Maxipime, Bristol Myers-Squibb, Cairo, Egypt) at concentrations of 10 mg/mL and 20 mg/mL were prepared in each of the 10 IV solutions listed in Table 1. Each admixture was prepared in both glass (supplied by Bristol Myers-Squibb) and polyethylene containers (supplied by Misr Co., Cairo, Egypt). The solutions were stored at room temperature (25°C) for 8 h under normal fluorescent light or in a refrigerator (5°C) for 120 h in darkness. Samples were taken at 0, 2, 5, and 8 h from the solutions stored at room temperature. Samples were taken every 24 h for 5 days (120 h) from the solutions stored in the refrigerator. Each sample was visually examined for colour change and formation of precipitate; a pH meter (Griffin and George Ltd, London, England) was used to measure pH. The concentration of cefepime in each sample was determined by a spectrophotometric stability-indicating method.[1] The cefepime solutions were considered stable if more than 90% of the initial concentration was retained.[2]

Table 1. IV Solutions Used for Testing the Stability of Cefepime

4.2% sodium bicarbonate
2.5% mannitol
5% mannitol
10% mannitol
10% fructose
Ringer's solution
0.18% sodium chloride in 5% dextrose
0.2% potassium chloride in 5% dextrose
10% dextran 40 in 5% dextrose
10% dextran 40 in 0.9% sodium chloride

Neither the concentration of the solution nor the type of container influenced stability. All cefepime solutions tested, other than those prepared in 4.2% sodium bicarbonate and 10% dextran 40 in 5% dextrose were stable for up to 120 h at 5°C and up to 8 h at room temperature under fluorescent light. Solutions of both concentrations prepared in 4.2% sodium bicarbonate were stable for up to 48 h at 5°C and up to 5 h at room temperature under fluorescent light. Solutions of both concentrations prepared in 10% dextran 40 in 5% dextrose were compatible for up to 96 h at 5°C and up to 8 h at room temperature under fluorescent light.

Incorporation of this information into the expiry dates used at individual institutions must be supported by sterility testing.

References

1. Rabouan-Guyon SM, Guet AF, Courtois PY. Stability study of cefepime in different infusion solutions. *Int J Pharm* 1997;154(2):185-190.
2. Evagelou V, Tsantili-Kakoulidou A, Koupparis M. Determination of the dissociation constants of the cephalosporins cefepime and cefpirome using UV spectrometry and pH potentiometry. *J Pharm Biomed Anal* 2003;31(6):1119-1128.

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Stability of Magnesium Sulfate 20% in Viaflex Bags

Magnesium sulfate is the drug of choice for treating eclamptic seizures and for seizure prophylaxis in women with severe pre-eclampsia.[1] Recommendations for IV administration specify a loading dose of 4 g, followed by continuous infusion of 1 g/h.[2] The new guidelines for hypertension in pregnancy from the British Columbia Reproductive Care Program specify that IV fluid administration should be restricted to 80 mL/h to minimize pulmonary edema.[2] To meet these fluid guidelines, the team at our hospital chose to maximize the magnesium sulfate concentration. Magnesium sulfate can be given peripherally at a maximum concentration of 20%, and solutions with this concentration are available commercially in vials.[3] To administer magnesium sulfate at our site, the vial contents had to be transferred to an empty Viaflex bag and administered with an infusion pump.

We conducted a small study to determine the stability of magnesium sulfate USP 20% (Sabex, Boucherville, Quebec; lot 131614, expiry April 2009) in 50-mL Viaflex bags (Baxter Intravia Containers, Deerfield, Illinois; lot UR299784). We tested the magnesium concentration on days 0 and 30 for a bag stored at room temperature (21.5°C to 22°C) and on days 0, 30, 60, and 90 for a bag stored in the refrigerator (4°C to 6°C). The samples were diluted with sterile saline 1:1000 to meet the analytical range of the assay used (magnesium assay, part no. 445360, and UniCel DxC 600i Synchron Access clinical system, both from Beckman Coulter, Fullerton, California). This method has a coefficient of variation of 1.6% at a target mean concentration