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Stability of Nafcillin Sodium Solutions in the Accufuser[®] Elastomeric Infusion Device

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ABSTRACT

The aim of this study was to investigate the stabilities of two kinds of solutions of nafcillin sodium (2.5 mg/mL) in 0.9% sodium chloride solution (NS, normal saline) and in injectable 5% dextrose water (D₅W) in the intravenous elastomeric infusion device (Accufuser[®]) based on recommended solutions and storage periods. The injectable nafcillin solutions (NS- and D₅W-nafcillin) in the Accufuser[®] device were stored and evaluated at controlled temperatures (room temperature, RT, 5°C ± 2°C and cold temperature, CT, 4°C ± 2°C) during 6 weeks. Effects of the periods of storage (from 0 to 6 weeks) and the temperatures of storage (RT and CT) on the physicochemical appearances and concentrations of active compounds were determined. The visual clarity, pH, and concentrations of nafcillin sodium were determined by stability-indicating high-performance liquid chromatography (HPLC)-ultraviolet (UV) detection. The results showed that in NS and D₅W solutions, the amount of nafcillin slightly changed and remained 92.66% and 97.30% of their initial amounts at CT during 6 weeks, respectively. On the other hand, in NS and D₅W solutions at RT, the amount significantly decreased with time and reached 27.66% and 31.97% of their initial amounts during 4 weeks, respectively. Slight decrement of pH was observed in CT storage while significant change was observed in the RT storage. Moreover, in CT, no significant changes in physical appearances and colors of the solutions were observed during the study. However, the solutions changed into yellowish color and some particles were detected in both kinds of nafcillin solutions (NS and D₅W) after 1.5 weeks in RT conditions. To sum up, under CT two kinds of nafcillin sodium solutions (NS and D₅W) were stable with time in Accufuser[®] without any significant physical changes and retained almost all of the initial concentrations up to 6 weeks. However, the solutions were not stable in RT storage. We suggest that nafcillin sodium solutions in an Accufuser[®] should be preferentially diluted in NS and D₅W while storing in CT condition.

KEYWORDS

Stability; Nafcillin Sodium; Intravenous Elastomeric Infusion Device (Accufuser[®])

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