BRIEF REPORT

Thermolabile Drugs. Operating Procedure in the Event of Cold Chain Failure☆

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Abstract

Objective: To establish a standard operating procedure in the event of cold chain failure.
Method: We selected thermolabile drugs included in the hospital's pharmaceutical guide. We performed a review of the available literature, classifying each drug into a given category with an intervention protocol for each one.
Results: We reviewed 254 drugs (162 active ingredients). Categories were: A (stable ≥28 days at 25 °C): 65 drugs; B (≥7 days at 25 °C): 47 drugs; C (≥48 h at 25 °C): 30 drugs; D (<48 h at 25 °C): 47 drugs; E (unstable >8 °C): 12 drugs; F (batch-dependent) 22 drugs. Thirty-one drugs were not classified into any category.

  The intervention protocol consisted of establishing a system to monitor the products concerned, and discarding or returning them to the laboratory if they were to exceed the time or temperature limit indicated for each category.
Discussion: The aim of this study is to make intervention quicker in the event of cold chain failure.
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Medicamentos termolábiles. Protocolo de actuación en la rotura de la cadena de frío

Resumen

Objetivo: Establecer un procedimiento normalizado de trabajo en caso de rotura de cadena de frío.
Método: Se seleccionaron los medicamentos termolábiles incluidos en la guía farmacoterapéutica del hospital y se revisó la bibliografía disponible, clasificándolos en categorías con un protocolo de actuación en cada caso.

Resultados: Se revisaron 254 medicamentos (162 principios activos). La distribución por categorías fue: A (estable ≥ 28 días a 25 °C): 65 medicamentos; B (≥7 días a 25 °C): 47; C (≥ 48 h a 25 °C): 30; D (< 48 h a 25 °C): 47; E (no estable > 8 °C): 12; F (depende del lote): 22. No se clasificaron en ninguna categoría 31 medicamentos.

El protocolo de actuación consistió en establecer un sistema de seguimiento de los medicamentos afectados y desechar o devolver al laboratorio en caso de superarse el límite de tiempo o temperatura establecido en cada categoría.

Discusión: El trabajo realizado pretende facilitar la rápida actuación en aquellas situaciones de rotura de la cadena de frío.

Introduction

The cold chain is the set of logistical links that guarantee that a temperature between 2 °C and 8 °C is maintained during the processes of storage, handling, transport and distribution of drugs. If this is not done, drug properties are liable to change in varying degrees, depending on the temperature reached and the time spent at that temperature.

There are procedures for receiving, storing and distributing drugs in hospitals to ensure that the cold chain is maintained. Standard operating procedures and facilities ensure that the proper temperature is maintained. The complexity of drug distribution processes in hospitals means that there are cold storage facilities available in a large number of locations in the pharmacy department storage areas, as well as the drug storage areas of inpatient units, day hospitals, operating rooms and outpatient clinics, among others.

The cold chain may be broken in many unexpected ways during daily practice (e.g., due to a power failure, cold room breakdowns, inadequate transportation or an error in storage conditions). These incidents may affect just a few units of a drug in a hospital ward or may affect complete clinical containers due to a refrigerator failure.

Administering a drug which has been inadequately stored can have highly variable potential consequences for the patient. Some medications are affected by a temporary and an isolated break in the cold chain: a number of drugs may lose some efficacy of little clinical relevance, while others may have a total loss of activity or may even become toxic.[1]

In addition, a break in the cold chain may have a significant economic impact for the hospital if the full activity of a drug cannot be guaranteed and it has to be disposed of, and there were no conditions established for its return to the pharmaceutical company supplying it.

The potential clinical and economic impacts posed by the loss of this group of drugs make it necessary to have a protocol for maintaining the cold chain and establishing actions if it is broken. This includes a drug stability report, including the time and temperature to which the drug has been exposed. It is also important to provide information about any such event, as affected batches will have to be withdrawn, and it is important to know whether they can be used or not.

The aim of this study was to establish a standard procedure for a break in the cold chain, prepare an updated list (to 2010) on the maximum stability of thermolabile active ingredients at room temperature, classify them according to the possibility of re-using them for certain time periods and provide a communication system on the hospital intranet and via the Internet.

Method

The main active ingredients to be kept at a temperature between 2 °C and 8 °C or in the freezer were selected from the hospital pharmacotherapeutic guide.

A review of previously published studies in PubMed with the MESH Drug Stability, Drug storage, refrigeration and Cold chain was carried out.[2-10] The information available from the summaries of product characteristics (SmPCs) was taken and the pharmaceutical manufacturer was consulted by fax or e-mail if there was any doubt or lack of data.

An Excel table was prepared, which included speciality-specific data, bibliographic references, and the contact details of the pharmaceutical company department, where appropriate.

Table 1 Classification of Drugs.

Category	Stability	Action
A	Stable ≥28 days at 25 °C	Label if it meets the conditions. If not, discard
B	Stable ≥7 days and <28 days at 25 °C	Label if it meets the conditions. If not, discard
C	Stable ≥48 h and <7 days at 25 °C	Label if it meets the conditions. If not, discard
D	Stable <48 h at 25 °C	Evaluate individually depending on the time and temperature reached
E	Not stable outside the fridge (>8 °C)	Discard
F	Stability depends on the batch	Consult laboratory