10. Prefilled Disposable Syringes: an improvement in the quality of injectable systems

AUTHORS: Dr Xavier Fábregas, Dr Benito García, Dr Imma García

WHAT WAS THE PURPOSE OF THE ORIGINAL STUDY?

In 1992 the Spanish Society of Hospital Pharmacy required Drs. Garcia and Fábregas to create a working group to identify which injectable drugs in the opinion of the hospital pharmacy consultants would be important to have as prefilled disposable syringes (PDS). The results of the study were published [1]. Recently we participated in a multicentre European cost-benefit analysis comparing prefilled syringes versus conventional systems [2,3].

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Author: X. Fabregas, B.Garcia, I.Jimenez

The use of prefilled disposable syringes (PDS) in the application of injectable medicines has increased due to their advantages over conventional vials and syringes, and to a growing interest in unit-dose medication. PDS have applications in a number of therapeutic areas. Because they are quick and easy to use, they are particularly applicable for use in emergency situations (e.g. cardiopulmonary resuscitation) and for drug administration in the homecare setting (e.g. insulin for diabetes mellitus, heparin for prevention of thrombosis). Advantages of this preparation include assurance of drug sterility, a reduction in medication errors, and economic benefits due, for example, to a reduction in the time taken to prepare and administer an injection.
This article reviews the benefits of prefilled syringes.

HOW DID IT EVOLVE?

There were 15 drugs on the commercial market in Spain available in prefilled syringes in 1994. Hospital pharmacists suggested to the industry the maximum amount of drugs required in prefilled syringes, especially those needed in emergency situations. Consideration of new drugs was also required. In Spain, in the last ten years, around 84 different drugs (52 molecules) were commercialised in prefilled syringes, the main therapeutic classes being vaccines, anticoagulants, biotechnology drugs, anti-infectives, anti-inflammatories and central nervous system drugs. The most important of these are listed in Table 1. The Health Department should provide an easier way for the Pharmaceutical Industry to register these products.

RECENT DEVELOPMENTS

There has been an increasing interest in medication errors in hospitals in recent years. The most frequent of these are related to packaging, dosing, reconstitution, identification of syringes etc. We think that prefilled syringes can solve a large part of these problems, because the manipulation required is minimal; it is possible to save time and to reduce the amount of medication and dosing errors. For that reason, the prefilled drug delivery industry is contributing to global healthcare with a wide range of innovative prefilled devices to facilitate the administration of injectable drugs. Examples are:

- **Prefillable Glass Syringes:** a version of the preceding syringes, provided with a thinner wall needle and a new needle shield. It is proven that the use of such syringes can decrease a patient's pain perception by 40%.
- **Micro-Needles.** The system consists of an intradermal injection using 1-3 mm long micro needles. Advantages are: decreased patient apprehension, decreased pain perception and increased efficacy for some drugs. In fact, a reduced dosage can induce the same immunological response.
- **Safety Needles** to prevent needle stick injuries and disease transmission by means of devices covering the needle after injection, detachable needles with needle shield or even devices without a needle.
- **Auto-injection devices** for the treatment of diabetic patients.
- **Prefillable syringes** made in plastic polyolephin (CCP). The shock-resistant CCP acts as an excellent barrier and provides good chemical resistance with low risk of drug contamination.

Table 1. The most important therapeutic drugs classes

Therapeutic Classes	Pharm. Cos.	Molecules	Products
Erythropoietin Products	4	3	4
Fractionated Heparins	6	5	8
Unfractionated Heparins	1	1	1
Cyto Gonadotropin Hormone Analogues	3	3	3
Immunoestimulin Agents Ex Interferon	2	2	3
Alpha Interferons	1	2	2
Beta Interferons	1	1	1
Musculo-Skeletal Products	8	2	8
MRI Agents	2	1	2
Aminoglycosides	2	2	2
Antimigraine Triptans	1	1	1
Hepatitis Vaccines	2	3	7
Comb W. Tetanus Component Vaccines	2	6	15
Influenza Vaccines	5	1	6
Tetanus Immunoglobulin	2	1	2
Pneumonia Vaccines	2	1	2
Specific Antirheumatic Agents	1	1	1
IMMS data			

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CONTACT INFORMATION:

Dr. Fábregas is a Consultant in the Pharmacy Department, Mataró Hospital, Barcelona, Spain. Email: xfabregas@csm.scs.es.
Dr. B García is Head of the Pharmacy Department, Leganès Hospital, Madrid, Spain Email:beni.garcia@telefonica.net. Dr. I García is a Consultant in the Pharmacy Department, Hospital Carlos III, Madrid, Spain