

Parenteral Drug Delivery Techniques: Effects on the Body

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Short Communication

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ABOUT THE STUDY

Parenteral drug delivery has systematic effect on the body, meaning that the drugs do not stay specifically at one area, but body as a whole. In parenteral drug delivery, substance is given by routes other than the Gastrointestinal (GI) tract, including intravenous injection, subcutaneous injection, intra-arterial injection, etc.

Intravenous Injection

The substance is injected into the vein. The substance can be drugs. The first intravenous injection ever given to a patient was in 1667. The advantages of intravenous injection are that the response is very rapid, the dosage of the drug can be easily controlled, and veins are insensitive to irritation by irritant drugs at higher concentration. However, there are many disadvantages of intravenous injection. First of all, it is not always easy to find a suitable vein. Veins disappear when a patient is under high pressure or tension. Second of all, intravenous injection can be toxic due to its fast response from the body. Third of all, trained personnel are required, and the drug cannot be

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given to the patients. Last of all, it is rather expensive to prepare sterilizing the needles.

Intramuscular injection

The substance is injected into the muscle. The substance can be vaccines or antibiotics. The advantages of intramuscular injection are that large volume of drugs can be applied and a sustainable release of drugs is possible. Muscles can act as an adsorption compartment. When the concentration of drug inside of the body is low, the muscle can slowly release the drugs into the body. However, there are also many disadvantages of intramuscular injection. Trained personnel are required for intramuscular injection; the drug cannot be given to the patients. Absorption is sometimes erratic, especially for poorly soluble drugs. The solvent of the drug may be released faster than the drug, causing the drug to precipitate at the site of injection and therefore immobilizes the drug [1-3].

Subcutaneous injection

The subcutaneous (SC, SQ) route is one of the most versatile routes of administration in that it can be used for both short term and very long term therapies. The injection of a drug or the implantation of a device beneath the surface of the skin is made in the loose interstitial tissues of the upper arm, the anterior surface of the thigh, or the lower portion of the abdomen. The upper back also can be used as a site of subcutaneous administration. The site of injection is usually rotated when injections are frequently given. The maximum amount of medication that can be subcutaneously injected is about 2 ml. Needles are generally 3/8 to 1 inch in length and 24 to 27 gauge.

Absorption of drugs from the subcutaneous tissue is influenced by the same factors that determine the rate of absorption from intramuscular sites; however, the vascularity in the subcutaneous tissue is less than that of muscle tissue, and therefore absorption may be slower than after intramuscular administration. But absorption after subcutaneous administration is generally more rapid and predictable than after oral administration.

Subcutaneous injection is injection under the skin. Insulin is a good example for subcutaneous injection. The advantages of subcutaneous injection are that the drugs can be given to the patient because no trained personnel are needed, and the adsorption, even though slow, but is usually complete. The adsorption can be improved by applying massage or heat on the injected site. However, subcutaneous injections are very painful, irritating drugs can cause damage in the skin, and only a small dosage of drug can be applied [4,5].

Below is a picture illustrating the difference between different kinds of injections.

Intraarterial injection

Intraarterial injection is injection into the artery. But it can be very dangerous because, the artery presence in very deep on body.

Intradermal injection

Intradermal injection is injection into the skin itself. Examples are skin testing for some allergen or tattoo.

Transdermal

Transdermal patch utilizes diffusion through the skin to sustain drug released. Examples are transdermal patch. Picture below demonstrates the difference between traditional intramuscular injection and a transdermal patch. As can be seen from the illustration, intramuscular injection can be much more painful than transdermal patch.

Illustration of skin penetration of a traditional intramuscular injection and a novel transdermal patch. The needles of transdermal patch are much smaller and shorter than that of intramuscular needle.

REFERENCES

1. Simler R, et al. Maximizing data collection and analysis during preformulation of biotherapeutic proteins. *Bioprocess Int.* 2008; 6:38-45.
2. Nocent L, et al. Definition of a solvent system for spherical crystallization of salbutamol sulfate by quasi-emulsion solvent diffusion (QESD) method. *J Pharm Sci.* 2001;90:1620-1627.
3. Chang BS, et al. Practical approaches to protein formulation development. in *Rationale Design of stable protein formulations-theory and practice.* Kluwer Academic/Plenum publishers. 2002;5:1-25.
4. KrisztinaTaka´cs-Nova´k, et al. Interlaboratory study of log P determination by shake-flask and potentiometric methods. *J Pharm Biomed Anal.* 1996;14:1405
5. Abdel-Mottaleb MM, et al. Standardized in vitro drug release test for colloidal drug carriers using modified USP dissolution apparatus I . *Drug Dev Ind Pharm.* 2011;37:178-184.