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Administration of Subcutaneous Injections

Nurses can help family caregivers enhance their knowledge, experience, and skill in managing injectable treatments.

This article is the second in a series, *Supporting Family Caregivers: No Longer Home Alone*, published in collaboration with the AARP Public Policy Institute. Results of focus groups conducted as part of the AARP Public Policy Institute's No Longer Home Alone video project supported evidence that family caregivers aren't being given the information they need to manage the complex care regimens of their family members. This series of articles and accompanying videos aims to help nurses provide caregivers with the tools they need to manage their family member's medications. Each article explains the principles nurses should consider and reinforce with caregivers and is accompanied by a video for the caregiver to watch. The second video can be accessed at http://links.lww.com/AJN/A75.

According to a recent study conducted by AARP and the National Alliance for Caregiving, many family caregivers experience stress when managing the complex care of older relatives, particularly in regard to the administration of medication.[1] Advances in the management of diseases like diabetes, cancer, and autoimmune diseases—as well as in preventive care for conditions such as thrombosis—have led to a proliferation of injectable treatments that are often administered at home by family caregivers. The technique used to administer these injections can affect the absorption of the medication and the achievement of therapeutic dosing. It can also influence the amount of pain and bruising experienced by the care recipient. It's essential that professionals teach family caregivers the correct administration technique to ensure a therapeutic response is achieved and to minimize anxiety for the family caregiver and harm to the recipient.

Performing new procedures can be frightening, especially to family caregivers, who may not be adequately prepared or instructed. Combine this with a fear of harming a loved one, and the result can be an overwhelmed family member. It's important that nurses instructing family caregivers understand and acknowledge the complicated and conflicted feelings caregivers may have about learning to perform new procedures. Nurses can then collaborate with family caregivers to enhance their knowledge, experience, and skill in managing injections.

The following evidence-based recommendations can facilitate teaching family caregivers how to administer subcutaneous injections safely and effectively. The examples cited in this article focus on insulin injections, because these are the most frequently administered subcutaneous injections at home; however, the basic principles apply to all subcutaneous injections.

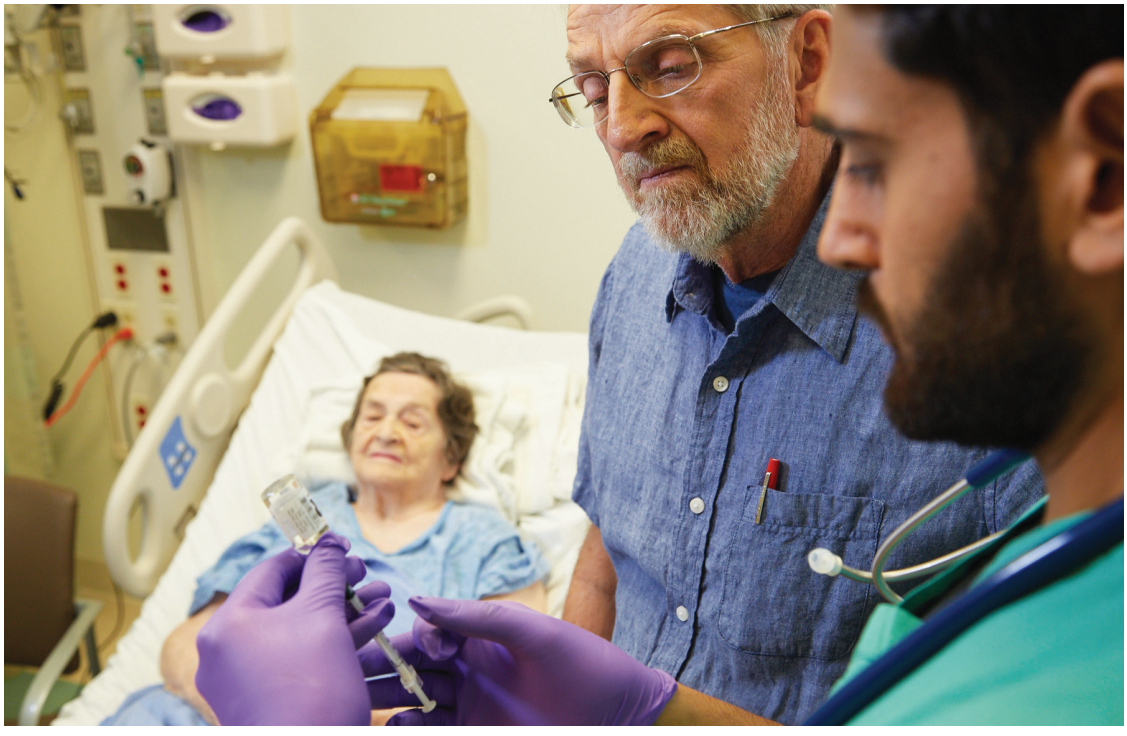
BACKGROUND AND EVIDENCE

Approximately 34.2 million caregivers provide care to a family member over the age of 50.[1] Forty-six percent of these caregivers report giving medications, pills, and injections to their loved ones. Forty-two percent report performing nursing procedures, such as injections and wound care, without any preparation, and only 14% acknowledge receiving any training.[1]

Hicks and colleagues identified multiple psychological challenges faced by adults who must administer subcutaneous injections.[2] These challenges include the belief that the psychomotor skill is too complex, that a failure might occur or the injection is not necessary, and that the risk of harm outweighs the benefits of injection. Family caregivers were found to commonly worry about the risk of infection and were also concerned that they would cause pain or harm to their loved one or give too much or too little medication.

It's important that nurses examine the available evidence on administering injections in order to minimize the risk of complications and improve comfort for the injection recipient, which should also help to reduce the family caregiver's anxiety.

Skin preparation prior to injection. Current recommendations call for washing hands carefully and



A nurse instructs a family caregiver and his wife in the technique for subcutaneous administration of insulin using a syringe. Photo courtesy of the AARP Public Policy Institute.

ensuring that the area to be injected is clean to minimize the risk of infection. Hutin and colleagues conducted a review of the evidence and recommend the use of soap and water to clean the site if the area is visibly soiled.[3] In the past 45 years, research has consistently shown that swabbing the skin with alcohol before injection is unnecessary, though it's still common practice.[4-7] If the decision is made to teach the caregiver to use an alcohol pad, the site should be cleaned and allowed to air dry for 30 seconds to ensure adequate inactivation of surface bacteria and to minimize the risk of stinging.[3, 8]

Strategies to minimize pain. To help minimize bruising and pain, the person administering the injection should allow a refrigerated medication to warm to room temperature for about 30 minutes. A new, shorter-length needle (4 mm to 6 mm, for instance) should be used for each injection. Caregivers should insert the needle quickly into the skin, inject slowly, and ensure the plunger or thumb mechanism has been depressed completely.[2] It's important to follow the package insert regarding recommendations for storage, as it will vary among medications.

Absorption. Absorption is variable from site to site. The most rapid absorption occurs from injections to the abdomen, followed by the lateral or posterior aspect of the upper arm, and, finally, the upper lateral thigh and hips or buttocks.[9] Koivisto and Felig have suggested that rotating systematically within a site (for example, among the four quadrants of the abdomen) may result in a more consistent drug effect.[10]

Factors affecting absorption include the concentration and dose of the medication, the patient's body mass, and massage of the injection site, among others. It's important to assess these parameters when making site recommendations.

Needle length. Needle length should be chosen based on the ability to penetrate through the dermal layer to the subcutaneous layer while avoiding the muscle layer. For subcutaneous injections in adults, this translates to a length between 4 mm and 8 mm.[2]

Lipohypertrophy. Fat pads can accumulate under the surface of the skin as a result of the lipogenic properties of insulin, lack of adequate site rotation, and needle reuse. It can take months to years for this condition to resolve.[2] It's crucial to explain the rationale for rotating sites, demonstrate rotation techniques, and discuss the importance of not reusing needles to avoid this complication.

Encourage family caregivers to create a chart in which they can track injection sites, helping to ensure systematic rotation. If lipohypertrophy is present, advise the family caregiver to avoid the area because this condition will have an impact on absorption rates.[2]

CONSIDERATIONS WHEN TEACHING INJECTION TECHNIQUES

In developing the following suggestions for nurses, we drew on the principles of the "just culture" movement in health care, which is supported by the American Nurses Association.[11] (For a description of the just culture concept, see the first article in this series, "Managing Complex Medication Regimens," November.)

When developing a teaching plan, it's important to consider the principles of adult learning theory.[12] People bring a variety of experiences, skills, and knowledge to any new situation, and this influences how they acquire new knowledge and skills. Most adults are goal and relevancy oriented, need to understand the rationale behind the knowledge or action, and are practical and like to be respected. They have different learning styles—some will learn by listening, some by seeing, and some by doing. Applying these principles, we make the following recommendations for teaching subcutaneous medication administration.

Assess family caregiver knowledge. Identify who will be administering the injection. This may not be the person who was at the bedside with the older patient. Schedule teaching time with this family caregiver.

Assess what this family caregiver knows about giving injections; how she or he prefers to learn; and if she or he is anxious about the disease process, the medication, and the psychomotor skill needed to perform the injection. After determining which, if any, concerns the family caregiver has, address these before proceeding.

Identify the goals of and rationale for injection. Identify the goals of therapy; that is, the rationale for the medication, how it works, and how long it needs to be used. Discuss how the family caregiver will know if the treatment is effective.

Step-by-step demonstration. Prepare supplies to accommodate both demonstration and return demonstration. Find a clean, clutter-free work space where you can place the supplies. Make sure you have everything you need.

Discuss the appropriate areas on the body for injection based on your assessment of the patient and the sites that might best result in consistent absorption in this patient.

To reduce the risk of bleeding or accidental administration of insulin into the umbilical veins, it is recommended to allow a 5-cm radius around the umbilicus.[13]

Wash hands and, if indicated, don gloves. (Gloves are typically not needed in the home setting. The Advisory Committee on Immunization Practices recommends the use of gloves only when contact with infectious body fluids is expected or if the person administering the injection has open lesions on her or his hands.[14])

Palpate the skin for lipohypertrophy and inspect for any bruising, redness, or edema that may indicate infection or inflammation. Teach family caregivers to avoid any areas of concern and to contact the patient's health care professional for further instruction.

Be sure the area is clean, using soap and water if needed. When administering insulin, cleanse the stopper of either the pen cartridge or the multidose vial with alcohol. If using a prefilled system, prime as recommended by the manufacturer. If using a syringe, inject the vial with an amount of air equal to that of the dose to be drawn. Turn the vial upside down and withdraw the dose. Holding the syringe with the needle up, tap the barrel of the syringe to cause any air bubbles to move to the top, then expel the air. Verify the accuracy of the dose. Remove the syringe from the vial.

Insert the needle at a 45-to-90-degree angle to the skin, depending on the amount of underlying fatty tissue. It's important that the medication is administered into the fatty layer and not the muscle or skin layer.[15] If the patient is very thin, create a skinfold with your thumb and forefinger to reduce the risk of injecting into the muscle.

Administer the solution by pressing slowly and steadily on the plunger. Withdraw the needle from the skin and release the skinfold, if necessary. Explain to family caregivers that the needle should not be recapped in order to avoid accidentally puncturing themselves. Dispose of the needle in the appropriate safety container. Remember, needles cannot be placed directly in the household garbage because of the risk of harm to the sanitation workers.

How to Use This Series

- Read the article, so you understand how best to help family caregivers manage medications.
- Encourage the family caregiver to watch the video at http://links.lww.com/AJN/A75.
- Ask the family caregiver if she or he has any questions.

Instruct the caregiver to note the time, dose, and site of the injection, especially if insulin is being given and the caregiver is rotating sites.

Address questions and how to manage problems. It's imperative that nurses allow the family caregiver to perform a return demonstration to identify learning gaps and confirm understanding. If the family caregiver makes any mistakes, encourage her or him to try again from the beginning, with self-correction. Family caregivers may feel more comfortable practicing on an injection pad at first, but they should be encouraged to perform a monitored injection using the care recipient prior to doing so at home unsupervised.

Be sure to discuss common adverse effects of the injection as well as how the family caregiver should address these, should they occur.

Provide written materials to family caregivers that they can refer to at home. Most manufacturers include culturally appropriate pictorial instruction sheets with their products. If these are not included, be sure to provide a handout. The font should be at least 14 point to ensure it's easy to read.

Provide contact information for the patient's health care provider, nurse, or pharmacist, should the family caregiver have additional questions while caring for the patient at home. Remind the caregiver that mistakes are likely to happen. It is important that she or he understands what to do and who to call should they occur.

VIDEO CASE EXAMPLE

Go to http://links.lww.com/AJN/A75 to watch a video that shows a nurse instructing Mr. and Mrs. Davis in the technique for subcutaneous administration of insulin using a syringe.

This is Mr. Davis's first time administering an injection. In the video, the nurse allows Mr. Davis to practice on an injection pad. This is recommended if one is available. The nurse has prepared for an initial demonstration as well as a return demonstration by Mr. Davis. The nurse speaks respectfully to both the patient and the family caregiver, carefully explaining the steps as he demonstrates the injection. He then coaches Mr. Davis through the steps, checking to be sure both Mr. and Mrs. Davis understand the rationale of each.

The risk of lipohypertrophy with insulin administration is not broached in the video and needs to be discussed if the caregiver will be administering insulin. Taking time to review contributing factors for lipohypertrophy, its effects on absorption, and strategies to avoid its development will help the caregiver to successfully master the subcutaneous injection technique. ▼

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