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The reliability of site determination methods in ventrogluteal area injection: A cross-sectional study

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ABSTRACT

Background: While administering medication through intramuscular injection, the ventrogluteal site must be used instead of the dorsogluteal site, and it is of great significance to locate the ventrogluteal site correctly.
Objective: To determine the reliability of two different methods used to determine the ventrogluteal site in intramuscular injection practice.
Design: A cross-sectional study.
Settings: A university hospital in Istanbul.
Participants: The study population comprised 120 randomly selected healthcare personnel at a university hospital.
Methods: The ventrogluteal site was determined using the geometric (G method) and V method and these sites were scrutinized under ultrasonography. It was investigated whether there was any anatomic vessels or neural structure present, and also determined the thickness of subcutaneous tissue, musculus gluteus medius, and musculus gluteus minimus.
Results: Of the participants, 65.8% were female and the average age was 32.30 years and body mass index was 25.31 kg/m^2. The results showed that G and V methods were statistically significant in terms of variables. It was also found that sex affects subcutaneous tissue thickness and the skin-bone margin in the G and V method, and that body mass index determines subcutaneous tissue, musculus gluteus medius thickness and skin-bone margin.
Conclusion: When the ventrogluteal site is used for intramuscular injection purposes, the site must be determined in line with the geometric method.
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What is already known about the topic?

- Intramuscular injection (IMI) is one of the most used practices in health care institutions.
- The textbooks and references contain inconsistencies regarding IMI techniques. Currently, IMIs are most often administered at the dorsogluteal site. However, some studies state that the dorsogluteal site should not be used for IMI and other literature does not recommend the use of this site.
- The dorsogluteal site is said to be the riskiest site for IMI because it is rich with vessels, is close to the sciatic nerve, and its subcutaneous tissue is thick.
- The ventrogluteal site is recommended instead of the dorsogluteal site for administering medication.

What this paper adds

- This study is thought to hold great significance in that it provides the basis for an alternative method to determine the ventrogluteal site.
- This study will contribute to the literature about IMI to the ventrogluteal site.

1. Introduction

In the last few decades, several advances have been made in healthcare and therefore in healthcare implementation. To adapt to such changes and advancements, it is imperative that healthcare professionals use such scientific advances as the basis for standard operating protocols and implement evidence-based practices. Intramuscular injection (IMI) is one of the frequently performed tasks in the healthcare institutions.

Although IMIs appear easy to administer, they can lead to complications such as abscess, necrosis, infection, tissue irritation, contracture, hematoma, chronic pain, periostitis, and injuries to the blood vessels, bone, and nerves. The most serious complication is nerve injury (Nicoll and Hesby, 2002; Potter and Perry, 2009; Small, 2004; Wynaden et al., 2005). Injection practices that are not evidence-based can cause peripheral nerve injuries, such as when the needle is inserted between a nerve and its sheath/fascicle, which leads to the development of a mass lesion after an injection is administered. Although the nerve is not directly injured in the latter case, the medication itself could cause neuronal damage. The same situation may occur if medication is injected near a nerve or if it accumulates at the epineural level, i.e., injecting medication in or adjacent to a peripheral nerve is one of the most important factors in nerve continuity impedance and should thus be avoided in IMI (Kaya et al., 2012).

Individuals' sex and body mass index (BMI) should be taken into account with IMI techniques. The correct needle length is important in order to reach muscle tissue. The needle length should be chosen that is appropriate for the IMI injection site, the weight of the individual, muscle mass, and subcutaneous fat at the injection site (Boyd et al., 2013; Burbridge, 2007; Kroger et al., 2012; Malkin, 2008; Palma and Strohfus, 2013).

IMI is known to predispose individuals to many risks. Therefore, it is vital to decide whether IMI is necessary. Common IMI sites include the vastus lateralis/lateral femoral, ventrogluteal, and deltoid muscles. Currently, IMIs are most often administered at the dorsogluteal site (Beyea and Nicoll, 1995; Carter-Templeton and McCoy, 2008; Nicoll and Hesby, 2002; Potter and Perry, 2009; Small, 2004). However, some studies state that the dorsogluteal site should not be used for IMI (Nicoll and Hesby, 2002; Potter and Perry, 2009; Small, 2004), and other literature does not recommend the use of this site (Craven and Hirnle, 2009; Walsh and Brophy, 2011). The dorsogluteal site is considered to have the highest risk of complications when used for IMI because it contains a denser concentration of blood vessels, is close to the sciatic nerve, and has thicker subcutaneous (SC) tissue (Nicoll and Hesby, 2002; Small, 2004). Sciatic nerve injuries are often caused by the administration of medication to the dorsogluteal site (Beyea and Nicoll, 1995; Small, 2004). The ventrogluteal site is suggested as an alternative site for medication administration (Nicoll and Hesby, 2002; Potter and Perry, 2009; Small, 2004).

The ventrogluteal site is identified (V method) for IMI as follows: If the injection is to be administered to the left side, (1) the nurse positions their wrist parallel to the patient's left femur and places the palm of their right hand over the patient's greater trochanter. When using this method, nurses use their right hand for the left side of the groin, and vice versa. (2) The thumb is positioned on the patient's groin, and the index finger is placed on the anterosuperior iliac spine; the middle finger is then pointed toward the gluteal site in the opposite direction of the iliac osteophyte. (3) The index and middle fingers create a V-shape, and the injection site is the middle of the V-shape (Fig. 1; Berman et al., 2008; Craven and Hirnle, 2009; Potter and Perry, 2009; Taylor et al., 2008).

Meneses (2007) proposed the geometric method (G method) for locating the ventrogluteal site, reporting that it had 100% reliability. The bony prominences are taken as reference, and imaginary lines are drawn in between the bone ends to determine the puncture point for IMI according to the G method. With this, an imaginary line is drawn from the greater trochanter to the iliac crest of the iliac tubercule, then to the anterosuperior iliac spine, and from the greater trochanter to the anterosuperior

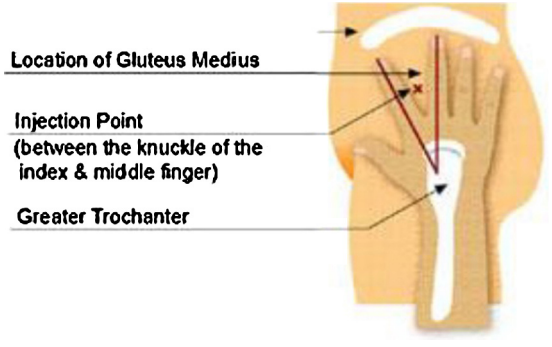

Fig. 1. Determination according to the V method of intramuscular injection site in ventrogluteal area.

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