Case report

Arm flexion during ultrasound assists localization of an intramuscular etonogestrel contraceptive implant

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Abstract

A nonpalpable etonogestrel implant was identified by high-frequency ultrasound in the biceps muscle 4–6 mm below the skin. Active elbow flexion resulted in proximal movement of the implant relative to the ultrasound probe, suggesting localization in the muscle. This maneuver may assist in verifying intramuscular placement prior to surgical excision.

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1. Introduction

Etonogestrel implants (Implanon® and Nexplanon®) are highly effective, long-acting reversible contraceptive devices consisting of a single flexible rod containing 68 mg of etonogestrel [1]. In 2011, the implant was modified to include barium thereby allowing localization with plain x-ray and computerized tomography (CT), and the applicator was redesigned to facilitate proper subdermal insertion [2]. When inserted properly, in accordance with the manufacturer’s instructions, the implant should be readily located via simple palpation.

When the device cannot be readily palpated following insertion or at removal, three scenarios are possible. At least 50% of pregnancies associated with the utilization of etonogestrel implants can be attributed to noninsertion. In other words, the device either fell out of the insertion device prior to placement or was never released. Alternatively, local and distant migration from the site of placement has been reported. Finally, an implant can be inserted deeper into the subcutaneous fat or even into the biceps or triceps muscles [3–5].

Ultrasoundography is considered the first-line imaging modality to identify the location of a nonpalpable implant. In the following case, an etonogestrel implant was localized in the biceps muscle via ultrasound, and active flexion and extension of the elbow during ultrasound examination proved to be a simple maneuver causing the implant to “move” with muscle flexion.

2. Case report

A 21-year-old female (body mass index: 21.4 kg/m²) underwent Implanon® insertion in an outpatient setting without complications. The procedure note stated that the implant was palpable immediately after insertion. She returned 3 years later desiring removal of the implant in order to achieve pregnancy, but it was not palpable by the patient or the physician. The implant was identified by ultrasound using a 10-MHz probe. The well-described bright ultrasonic echo of the implant with posterior acoustic shadowing was observed (Fig. 1). The device was located near the site of insertion angulated 4–6 mm below the skin. Suspecting intramuscular insertion, the examiner elicited flexion and extension of the elbow by the patient while keeping the ultrasound probe stationary. The implant was found to move both proximally and distally with flexion and extension of the elbow, respectively, suggesting intramuscular placement into the biceps muscle. A magnetic
A 36-year-old patient presented to the clinic for a routine contraceptive check. During the examination, it was noted that the contraceptive implant was not palpable. Further imaging was pursued, including magnetic resonance imaging (MRI), and the implant was identified to be intramuscularly located. The implant was subsequently removed via a 2-cm incision with ultrasonic guidance under general anesthesia without complications. The use of general anesthesia in the operating room was by patient request. Patient consent was obtained in preparation of this report.

### 3. Comment

Intramuscular insertion of the etonogestrel implant is rare. In the largest published series of implants removed in the operative setting, 11 of 28 were intramuscular with the majority located just under the muscular aponeurosis [4]. Ultrasound localization using a 10- to 15-MHz wavelength is considered the primary imaging modality to localize nonpalpable implants [3,5]. MRI (or CT and plain x-ray with Nexplanon) can be employed when ultrasound localization fails. Color-flow ultrasound, MRI and CT can identify proximity to nearby vascular structures that might complicate removal [6]. For those with verified intramuscular placement, removal in the operating room under general anesthesia has been most commonly described although others have successfully removed intramuscular implants under local analgesia and sedation by interventional radiology or under sonographic guidance in the outpatient setting [4–7].

Active flexion and extension of the elbow while an ultrasound probe is held stationary over the skin surface causes the intramuscularly placed implant to “move” out of the visualized ultrasound plane as the biceps (or triceps) muscle contracts. This maneuver has not been hereunto described in the literature. This clinical finding is absent when the device is located in the subcutaneous tissue (personal experience).

A positive “flexion test” suggests intramuscular placement and the need for additional imaging to assess nearby neurovascular structures prior to planning implant removal. Further study of this maneuver is warranted via case series or additional reports.

### References

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