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Case Report

Nexplanon removal from intramuscular implantation in biceps: case report[☆]

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ABSTRACT

Contraceptive implant devices are relatively safe devices, but complications arise when implants become nonpalpable, and cannot be safely removed. In this case report, we describe the location of an implant in the subfascial plane of the upper arm, the diagnostic imaging findings we encountered during the workup, and the procedure necessary to remove it. We demonstrated that if the device is in close proximity to the fascia, it may be difficult to distinguish from the fascia on magnetic resonance imaging. Nonetheless, fluoroscopy and ultrasound easily distinguished the device from the surrounding tissue and allowed localization intraoperatively.

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Introduction

Implantable contraceptive devices have become more common in recent years [1]. Sold under brand name Nexplanon and Implanon (Merck & Co, Whitehouse Station, NJ), the device in this report is a rod-shaped, etonogestrel eluting implant [2,3]. They last for up to three years, offering long-acting reversible contraception in women. The implants are normally inserted subdermally, in the medial side of the upper

arm, just proximal to the medial epicondyle. Retrieval complications are rare occurrences seen in rods inserted too deeply or those that migrated and cannot be palpated under the skin [4,5]. In this case report, we describe the location of an implant in the subfascial plane of the upper arm, the diagnostic imaging findings we encountered during the workup, and the procedure necessary to remove it. We demonstrated that if the device is in close proximity to the fascia, it may be difficult to distinguish from the fascia on magnetic resonance imaging.

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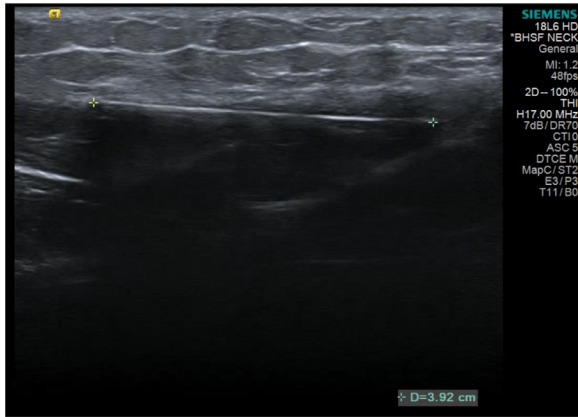


Fig. 1 – The Nexplanon implant can be seen as a linear echogenic shadowing structure measuring approximately 4 cm in length in close proximity to the bicep's fascia.

Nonetheless, fluoroscopy and ultrasound easily distinguished the device from the surrounding tissue and allowed localization intraoperatively.

Case report

A 21-year-old female with a history of a Nexplanon implant in her left arm for 3 years, presented to our office for implant removal. She was referred by her obstetrician because they were unable to localize the device in the subcutaneous tissue. During the visit, the device was localized by ultrasound in the upper arm (Fig. 1). However, the preoperative ultrasound was unable to provide sufficient details to determine the exact location of the device in relation to other anatomic landmarks. Upon communication with the implant device company, we determined that it could be localized via fluoroscopy, ultrasound, and MRI. We found that the device could be visualized by 2 out of 3 methods. In our patient, the implant was not identified on preoperative MRI, in all sequences used, irrespective of the imaging plane (Fig. 2). The patient was scheduled for surgery under local anesthesia with sedation due to the deep nature of the device. Fluoroscopy and ultrasound guidance were used intraoperatively to localize the device (Fig. 3). An incision site was marked using fluoroscopy and ultrasound. An incision was made over the device. Blunt dissection was performed to the level of the fascia (Fig. 4). The fascia was divided, and the device was found to be directly below the fascia of the biceps brachii muscle (Fig. 5). The device was removed (Fig. 6). Final fluoroscopy images demonstrated complete removal of the implant (Fig. 7).

Discussion

Implanon and Nexplanon (Merck & Co, Whitehouse Station, NJ) are devices inserted in the upper arm to release etonogestrel slowly over three years. In general, removal is an of-

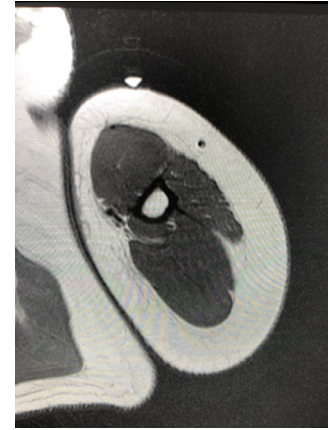


Fig. 2 – Pre-operative MRI, axial plane, of the upper arm. The implant was unable to be discriminated from other anatomic landmarks.



Fig. 3 – Pre-operative fluoroscopy image localizing the device. The Nexplanon can be seen parallel to the humerus in the lower part of the image.

fice procedure that requires minimal effort. The devices are normally palpable on exam and do not require imaging for localization [6]. However, an implant that has migrated, or inserted too deeply, may be non-palpable on examination. In these cases, the device may be localized by imaging methods. Both devices can be visualized by MRI and ultrasound [7]. Nexplanon, unlike Implanon, was modified to contain barium sulfate, making it radiopaque, and visible on radiography or fluoroscopy [3]. This radiopaque feature was designed to facilitate better localization during insertion and removal. Removal complications still occur despite modifications [4]. In one clinical trial, they reported 5.3% adverse reactions [8]. The most common complication was fibrosis around the implant removal site (4.4%) [8]. Nerve injury involving the medial antebrachial cutaneous nerve has also been reported [9]. In more complicated cases, orthopedic surgeons and hand surgeons may be called in due to the proximity to important anatomic structures such as the median nerve, ulnar nerve,



Fig. 4 – Intraoperative photograph showing device below the bicep's fascia.

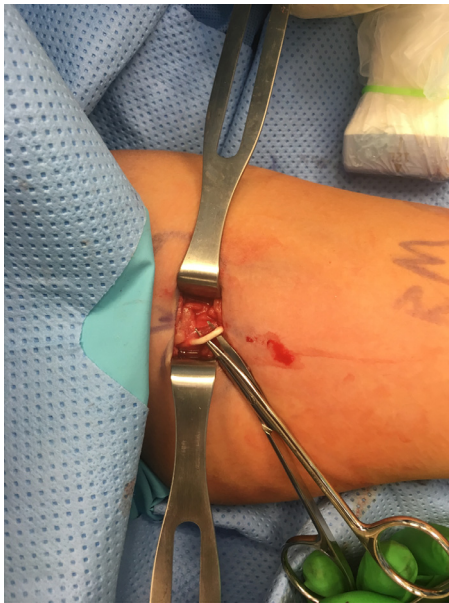


Fig. 5 – Intraoperative photograph of the device after splitting the fascia and pulling the device out of the wound.

and brachial artery. Contraceptive implant embolization into the pulmonary vasculature have also been reported. If previously discussed methods do not localize the device in the arm, chest radiograph or computed tomography (CT) should be considered for possible central embolization [10].

In this specific case, the device could not be palpated because it had been placed or migrated into a subfascial location. We were able to locate the Nexplanon device on fluoroscopy and ultrasound. Interestingly, the preoperative MRI did not localize the device due to the close proximity to the fascia of the biceps. We have provided images of the appearance of the

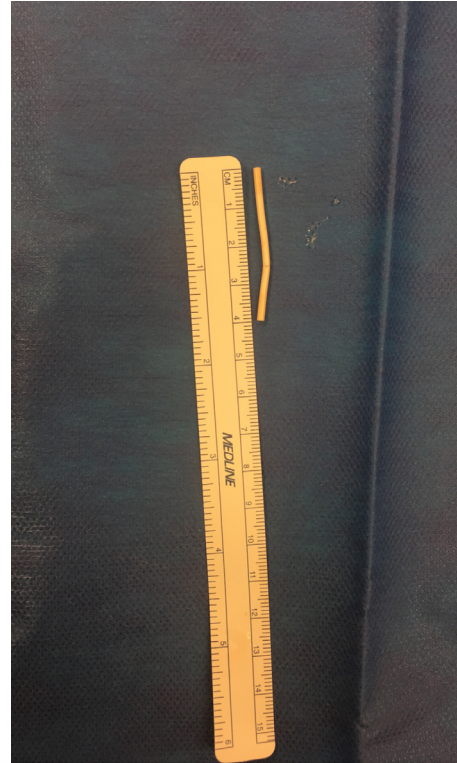


Fig. 6 – Clinical photograph of the device that was removed. A photograph of the explanted Nexplanon.



Fig. 7 – Post-operative fluoroscopy image demonstrating complete removal of the device.

device on ultrasound and fluoroscopy in the hopes of helping other surgeons in a similar situation to recognize the device on those imaging modalities.

Patient Consent

Per the local Institutional Review Board consent was exempt due to this being the case of research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimen with the information being recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

REFERENCES

- [1] Kavanaugh ML, Jerman J, Finer LB. Changes in use of long-acting reversible contraceptive methods among U.S. women. *Obstet Gynecol* 2015;126(5):917–27. doi:10.1097/AOG.0000000000001094.
- [2] Implanon (etonogestrel implant) [package insert]. Whitehouse Station, NJ: Merck & Co., Inc.; 2019. http://www.merck.com/product/usa/pi_circulars/i/implanon/implanon_pi.pdf
- [3] Nexplanon (etonogestrel) [package insert]. Whitehouse Station, NJ: Merck & Co., Inc.; 2019. https://www.merck.com/product/usa/pi_circulars/n/nexplanon/nexplanon_pi.pdf
- [4] Pillai M, Gazet AC, Griffiths M. Continuing need for and provision of a service for non-standard implant removal. *J Fam Plann Reprod Health Care* 2014;40(2):126–32. doi:10.1136/jfprhc-2013-100619.
- [5] Chevreau J, Krief D, Abou Arab O, Zitoun M, Foulon A, Sergent F. Factors associated with removal difficulties of etonogestrel-containing contraceptive implants (Nexplanon®). *Eur J Obstet Gynecol Reprod Biol* 2018;224:81–4. doi:10.1016/j.ejogrb.2018.03.019.
- [6] Shulman LP, Gabriel H. Management and localization strategies for the nonpalpable implanon rod. *Contraception* 2006;73(4):325–30. doi:10.1016/j.contraception.2005.10.009.
- [7] Merki-Feld GS, Brekenfeld C, Migge B, Keller PJ. Nonpalpable ultrasonographically not detectable Implanon rods can be localized by magnetic resonance imaging. *Contraception* 2001;63(6):325–8. doi:10.1016/S0010-7824(01)00209-8.
- [8] Mommers E, Blum G-F, Gent TG, Peters KP, Sørđal TS, Marintcheva-Petrova M. Nexplanon, a radiopaque etonogestrel implant in combination with a next-generation applicator: 3-year results of a noncomparative multicenter trial. *Am J Obstet Gynecol* 2012;207(5):388.e1–388.e6. doi:10.1016/j.ajog.2012.08.002.
- [9] Brown M, Britton J. Neuropathy associated with etonogestrel implant insertion. *Contraception* 2012;86(5):591–3. doi:10.1016/j.contraception.2012.05.014.
- [10] Wilcox KK, Turcer F, Soltes GD, Shin DS. Endovascular retrieval of contraceptive implant embolized to pulmonary artery. *Radiol Case Rep* 2018;13(6):1285–8.