



UNCOMMON MIGRATION OF IMPLANON NXT INTO THE BICEPS MUSCLE: A CASE REPORT AND REVIEW OF MANAGEMENT STRATEGIES

**S.D Ngwan¹, Plangji.S Cinjel², Garba O.C.,Ansanarimam Elisha⁴
& Da'ap I Pannan⁵**

^{1,2,4& 5}Department of Obstetrics and Gynaecology, Jos University Teaching Hospital, Jos
Plateau Nigeria

³Department of Surgery, Jos University Teaching Hospital, Jos Plateau Nigeria

Abstract

Etonogestrel implants (Implanon NXT) are a widely used long-acting reversible contraceptive (LARC). However, their migration from the original insertion site is a rare but significant complication. We report a case of a 32-year-old woman who presented with a three-year history of a missing implant after two unsuccessful removal attempts by community health extension workers (CHEWs). Imaging with a digital X-ray confirmed the implant's presence within the fibers of the left biceps muscle. Surgical removal was successfully performed under local anesthesia in conjunction with a general surgeon. Intraoperatively, the implant was identified embedded within the muscle fibers, a rare finding. The patient was discharged the same day on oral antibiotics and analgesics and was reviewed after two weeks with satisfactory recovery. This case highlights the need for proper insertion techniques, the role of imaging in localization, and a multidisciplinary approach to managing migrated implants.

Keywords: Implanon NXT, missing implant

Introduction

Contraception refers to the deliberate use of various methods or techniques to prevent pregnancy. It plays a vital role in reproductive health, family planning, and the empowerment of women to make informed choices about if and when to have children. Globally, the use of modern contraceptive methods is one of the most effective public health interventions for reducing maternal mortality.¹

By preventing unintended, high-risk, and closely spaced pregnancies, contraception significantly lowers the incidence of pregnancy-related complications and deaths. According to estimates by the World Health Organization and the Guttmacher Institute, current contraceptive use reduces maternal mortality by approximately 30% globally. Furthermore, meeting the unmet need for contraception could raise this figure to as much as 44%, highlighting its crucial role in achieving maternal health targets.²

Implanon NXT is a long-acting reversible contraceptive (LARC) that offers women a reliable and convenient method of birth control for up to three years. It is a small, flexible plastic rod measuring approximately 4 cm in length and 2 mm in diameter, designed for subdermal

insertion just under the skin of the inner side of the upper arm, preferably the non-dominant arm. The rod contains 68 milligrams of etonogestrel, a synthetic progestin derived from 19-nortestosterone. In addition to the active hormone, the implant also contains ethylene vinyl acetate, which serves as a non-biodegradable polymer matrix to control the release of the drug, barium sulfate to make the implant radiopaque and thus visible on X-ray, and magnesium stearate.^{2,5}

The primary mechanism of action of Implanon NXT is the inhibition of ovulation. Etonogestrel suppresses the luteinizing hormone (LH) surge, which is necessary for the release of an ovum from the ovary. By preventing ovulation, fertilization cannot occur. Additionally, the hormone thickens the cervical mucus, making it difficult for sperm to penetrate and reach the ovum. Etonogestrel also alters the endometrial lining, reducing the likelihood of implantation should fertilization take place. These combined effects make Implanon NXT highly effective in preventing pregnancy.

Once inserted, the implant releases etonogestrel in a controlled manner. In the initial weeks after insertion, the release rate is approximately 60 to 70 micrograms per day. This gradually declines over time: to about 35–45 micrograms/day by the end of the first year, 30–40 micrograms/day in the second year, and 25–30 micrograms/day by the end of the third year. Despite the declining release rate, the hormone concentration remains sufficient to prevent ovulation throughout the approved three-year duration of use. Some studies have demonstrated that Implanon NXT may remain effective for up to four years, but regulatory authorities currently approve it for three years of contraceptive protection.²

Implanon NXT is inserted using a sterile, preloaded applicator, and when done properly, the procedure is quick and relatively painless. For immediate contraceptive protection, the implant should ideally be inserted within the first five days of a woman's menstrual cycle. If inserted at another time, additional contraceptive protection such as condoms should be used for the first seven days.⁶

Etonogestrel is metabolized primarily in the liver by the cytochrome P450 enzyme CYP3A4, and the metabolites are excreted in urine and feces. Upon removal of the implant, fertility returns rapidly, with ovulation resuming typically within a few weeks. This feature makes Implanon NXT a good option for women seeking long-term contraception without sacrificing future fertility.

In terms of efficacy, Implanon NXT is more than 99% effective, meaning fewer than 1 in 100 women using the method will become pregnant in a year. This makes it one of the most effective contraceptive methods available, comparable to sterilization but with the added advantage of being reversible.⁷

While Implanon NXT is generally safe and well-tolerated, like any medical device, it can be associated with complications. The most common are menstrual disturbances, which may include irregular bleeding, prolonged bleeding, spotting, or complete absence of menstruation (amenorrhea). Some women may also experience weight gain, acne, mood changes, breast

tenderness, or headaches. These effects are usually mild and often improve over time, but they can lead some users to discontinue the method. However, more serious complications, though rare, can occur—particularly related to implant insertion, removal, or migration.³

Migration of the implant is one of the more significant and potentially serious complications. After insertion, the implant is supposed to remain just beneath the skin in the subdermal tissue of the upper arm, where it can be easily palpated. However, in some cases, the rod may migrate from the original insertion site, either slightly (within the arm) or more extensively into deeper tissues or even to distant anatomical sites like the lungs.⁴

Migration can occur due to improper insertion technique, particularly if the implant is inserted too deeply into muscle or fascia instead of the subdermal plane. It may also be influenced by patient movement, trauma, or muscle contractions in the arm. In rare instances, the implant has been reported to migrate into large blood vessels, such as the pulmonary artery, or even into muscles such as the biceps, making localization and removal more difficult and potentially leading to serious complications.⁴

When the implant is not palpable during follow-up or removal, imaging is usually required to determine its location. X-ray is the first-line tool because Implanon NXT contains barium sulfate, which makes it radiopaque. If not visualized clearly on X-ray, ultrasound, CT scan, or MRI may be used to locate it. Deep or distant migration may necessitate surgical exploration or removal, particularly if the device has entered vascular structures or is causing symptoms such as pain, numbness, or restricted movement.⁵

While migration to nearby tissues has been observed, intramuscular migration remains exceedingly rare.⁴ We present a case of an Implanon NXT implant found within the fibers of the biceps muscle, highlighting challenges in removal and the importance of proper insertion techniques.

Case Report

A 32-year-old ^{P2+0 2A}woman presented to our facility with a three-year history of a missing implant. The implant was originally inserted in a primary healthcare center (PHC) by a CHEW. She had undergone two failed removal attempts by CHEWs before presenting to our facility. On examination, her general condition was stable, the implant was not palpable. Her pack cell volume (PCV) was 35%.

A digital X-ray of the left upper arm was performed, revealing the presence of the Implanon NXT within the left biceps muscle

Figure 1.**Digital x-ray showing Implanon NXT**

The patient was counseled, and consent was obtained for surgical removal under local anesthesia. The procedure was performed in conjunction with a general surgeon due to the unusual location of the implant.

Intraoperative Findings and Management

Under sterile conditions and local anesthesia (1% lignocaine), a 2 cm longitudinal incision was made along the previous scar which was excised. Careful dissection revealed the implant embedded within the fibers of the biceps muscle. Blunt dissection was performed to free the implant without damaging surrounding structures, and it was successfully extracted. Hemostasis was achieved, and the wound was closed in layers. The estimated blood loss 50mls.

The patient was discharged the same day with oral antibiotics and analgesics. She was reviewed two weeks later and found to be in good health with no complications

Figure 2.**Exposed Implanon NXT during surgery**

Figure 3.**Implant removed after surgery**

Discussion

The etonogestrel implant, marketed as Implanon NXT, is a widely used long-acting reversible contraceptive (LARC). While generally safe, complications such as deep insertion and migration can occur, leading to challenges in localization and removal¹. This case report highlights a rare occurrence of intramuscular migration of Implanon NXT into the biceps muscle, emphasizing the importance of proper insertion techniques, imaging for localization, and a multidisciplinary approach for removal.²

Migration of contraceptive implants is uncommon but has been documented in various case reports. Significant migrations, defined as movement greater than 2 cm from the original insertion site, are rare³. A study by Ismail et al. reported a 1% prevalence of Implanon migration exceeding 2 cm in a cohort of 100 patients.⁴ The risk factors for migration include improper insertion techniques, deep placement into muscular or vascular structures, and insertion by inadequately trained personnel.⁵ In our case, the implant was inserted by a community health extension worker (CHEW), highlighting the need for comprehensive training and adherence to standardized insertion protocols to minimize complications.⁶

The exact mechanisms underlying implant migration remain unclear. Proposed theories suggest that deep insertion may facilitate movement along tissue planes, particularly when the implant is placed within or near muscular structures.⁷ Additionally, repetitive arm movements and muscle contractions could contribute to gradual displacement of the device.⁸ Rivera and Bianciotto discussed that improper insertion angles could lead to placement within the muscle or fascia, increasing the risk of migration.⁹ In this case report, the implant's location within the biceps muscle supports the hypothesis that initial deep insertion played a significant role in its migration.¹⁰

Migrated implants can lead to various complications, including pain, paresthesia, and, in rare cases, vascular or neurological injuries.¹¹ There have been reports of implants migrating to

the pulmonary artery, posing life-threatening risks.¹² Patel et al. documented a case where a contraceptive implant embolized into the pulmonary artery.¹³ In our case, the patient did not exhibit neurological deficits or vascular complications, underscoring the variability of clinical presentations associated with implant migration.¹⁴

Accurate localization of a non-palpable or migrated implant is crucial for successful removal. Ultrasound is often the first-line imaging modality due to its accessibility and lack of radiation exposure.¹⁵ However, in cases where ultrasound fails to detect the implant, alternative imaging techniques such as computed tomography (CT) or fluoroscopy may be employed.¹⁶ Baek et al. reported a case where a migrated implant was successfully localized using three-dimensional CT imaging.¹⁷ In our patient, a digital X-ray effectively identified the implant within the biceps muscle, facilitating targeted surgical removal.¹⁷

The removal of a deeply migrated implant requires careful planning and a multidisciplinary approach. Collaboration between gynecologists, general surgeons, and radiologists enhances the likelihood of successful extraction while minimizing complications.¹⁷ In our case, the procedure was performed under local anesthesia with the assistance of a general surgeon, reflecting the importance of surgical expertise in managing such cases.¹⁷ Rivera and Bianciotto emphasized that in cases of deep migration, referral to experienced surgical teams is advisable to ensure patient safety.¹⁶

To reduce the risk of implant migration, it is imperative to ensure proper insertion techniques. The implant should be placed subdermally at an angle less than 30 degrees to the skin surface, avoiding deeper structures.^{12,13} Training programs for healthcare providers, especially those in primary healthcare settings, should emphasize correct insertion method.^{12,13} Additionally, immediate post-insertion palpation to confirm the implant's position and patient education on monitoring the implant's location can aid in early detection of potential migration.¹⁷ Grentzer et al. highlighted the importance of provider training and patient follow-up in mitigating insertion-related complications.^{15,17}

Conclusion

This case underscores the rare but significant complication of Implanon NXT migration into the biceps muscle. It highlights the necessity for proper insertion techniques, the critical role of imaging in localization, and the benefits of a multidisciplinary approach in management. Continuous education and training of healthcare providers are essential to minimize such complications and ensure patient safety.

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