A Rare Journey of a Contraceptive Implant Migrating to the Proximal Humerus: A Case Report from Oman

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Abstract

Subdermal contraceptive implants are considered one of the most effective and reversible methods of contraception available worldwide. While generally safe, their hormonal constitution can cause side-effects such as mood changes and acne. Rarely, serious complications such as implant migration into deeper anatomic structures, including the axillary and thoracic regions, may occur. This report presents the case of a 29-year-old female who attended the birth spacing clinic of a primary health care center in Oman requesting the removal of a contraceptive implant. X-ray imaging revealed that the implant had migrated to the medial aspect of the proximal humerus. The patient was admitted to the orthopedic surgery department and successfully underwent removal under general anesthesia without complications. This case underscores the importance of early recognition and appropriate management of such rare complications.

Keywords: Contraceptive Devices, Female; Desogestrel; Drug Implants; Device Removal; Foreign Body Migration; Case Report; Oman.

Introduction

Implanon-NXT® (Organon & Co., Jersey City, New Jersey, United States), sometimes marketed as Nexplanon®, is a single-rod contraceptive implant that provides effective pregnancy prevention for a period of three years.[1] The implant is composed of a sterile, single-rod progestin contraceptive preloaded into a stainless-steel needle within a disposable applicator for ease of insertion. It consists of a semi-rigid ethylene vinyl acetate rod measuring 40 x 2 mm and contains 68 mg of etonogestrel, a 3-keto derivative of desogestrel, as well as barium sulfate to allow for visualization by X-ray or other imaging modalities.[2,3] The implant is designed to be inserted subdermally into the inner side of the non-dominant upper arm, approximately 8–10 cm above the medial epicondyle. Recent evidence suggests that the efficacy of the implant may extend up to five years, rather than the previously established three-year period.[2] The primary mechanisms of action of subdermal contraceptive implants include inhibition of ovulation and increased cervical mucous viscosity, which prevents sperm from penetrating the cervical opening.

As these contraceptive devices gain popularity, early recognition of potential complications has become increasingly important. Commonly reported side-effects include irregular menstrual bleeding, weight gain, acne, headaches, and breast tenderness.[4] However, contraceptive implants can also lead to rare but serious complications, such as migration to axillary, pulmonary, or thoracic structures through embolization. Implant migration is defined as the displacement of the device at least two centimeters from the initial insertion site.[4] This may result in damage to nearby anatomic structures, including important nerves or blood vessels. The incidence of implant migration is 0.26%, with 0.05% requiring surgical removal under anesthesia and 0.02% involving complete loss of the implant.[4]

In cases where the implant is non-palpable under the skin, imaging is critical for accurate localization. Initial evaluation typically includes arm ultrasound or X-ray due to the implant's radiopaque and hyperechoic properties.[5] If the implant cannot be visualized with these modalities, further investigations, such as chest radiography or computed tomography (CT) angiography, may be warranted to identify distant migration. Etonogestrel blood levels can also assist in confirming the presence of the implant.[6] The mechanisms underlying implant migration remain poorly understood but may involve factors such as patient anatomy (e.g., low body mass index), improper insertion technique, or external forces.[7] This case highlights the rarity and clinical significance of implant migration, emphasizing the need for prompt recognition, appropriate imaging, and timely management.

Case Report

A 29-year-old female with no past medical history presented to the birth spacing clinic at Seeb Health Center, a primary health care facility in Muscat, Oman, on April 27th, 2023. She sought the removal of her Implanon-NXT® implant, which had been inserted in her left arm on December 31st, 2020, as she wished to conceive. During the clinical assessment, the implant was found to be non-palpable at the expected insertion site. Upon local examination of the left arm, a foreign body was palpated on the medial aspect of the proximal humerus, without any overlying skin changes or swelling. X-ray imaging of the left arm confirmed the proximal and deep displacement of the Implanon-NXT® along the medial aspect of the proximal humerus [Figure 1].

Figure 1: X-ray of the left upper arm and shoulder of a 29-year-old female showing migration of a contraceptive implant to the medial aspect of the proximal humerus.

The patient was subsequently referred to the orthopedic surgery team at a tertiary hospital. She was admitted and underwent surgical removal of the foreign body under general anesthesia. A linear incision was made at the proximal humerus, revealing that the implant had migrated superficially and was situated intramuscularly. The removal procedure was completed without complication, and no further follow-up was required.

Discussion

Implant migration is a rare but significant complication associated with subdermal contraceptive implants, with the axillary region being the most common site for displacement.[4,8] Consequently, when the implant is not palpable in the upper limb, the axilla should be the first area to investigate. Other potential migration sites include

the biceps muscle, near the ulnar nerve below the deep fascia, adjacent to the median nerve, and in rare cases, even within the pulmonary artery.[4,9] Although the latter situation is rare, it can be a life-threatening event necessitating immediate medical attention.[4] In the present case, the implant migrated to the medial aspect of the proximal humerus, as confirmed through X-ray imaging, with surgical intervention required for removal.

The most critical risk factor for implant migration is improper insertion technique. The implant should be inserted subdermally on the inner side of the non-dominant upper arm, approximately 7 cm above the elbow crease and below the groove between the biceps and triceps. Inadequate placement may result in the device being inserted into a vein, located in the sulcus between the biceps and triceps muscles, or even intramuscularly.[6] Many instances of misplacement are asymptomatic and are only identified during the removal process.[7,9] However, some patients may experience pain, discomfort, or dyspnea.[8] In one case, a patient reported a lump at the insertion site, later determined to be a resolved hematoma.[10] In another report, the implant migrated to the brachium of the left arm, with the patient describing ulnar-sided numbness and intermittent electrical sensations, radiating especially to the fifth digit of her left hand.[11] In more severe cases, implant migration can cause significant complications. For example, one patient experienced migration to the lower left pulmonary lobe, requiring removal via video-assisted thoracoscopic surgery without resection.[12]

In cases where the implant is not palpable, imaging modalities such as ultrasonography, X-ray, CT, or magnetic resonance imaging should be employed to accurately localize the implant and facilitate its removal.[5] Ultrasonography is the first-line of imaging for non-palpable implants and is particularly effective for assisting in the removal of deeply inserted implants as it provides real-time guidance.[8,13] However, when migration occurs, especially to deep tissue near bones or vital structures, or when the implant is surrounded by dense tissue like scar tissue, more advanced imaging techniques such as X-ray or CT are essential for precise localization due to their broader field of view and the radio-opaque nature of the implant.

A comprehensive literature review by Guilbert *et al*. documented 148 cases of contraceptive implant migration reported between 2000 and early 2023.[7] In addition to the cases documented by Guilbert *et al*., we have identified nine additional recent reports, including the present case, as detailed in Table 1.[11,14-20] These reviews highlight that most contraceptive implants migrate to the pulmonary blood vessels, with many patients remaining asymptomatic and migration being an incidental discovery. When implants are non-palpable, migration may be suspected, particularly if neurological symptoms, such as tingling or discomfort in the fingers, are present.

Early detection and timely intervention are essential to prevent complications arising from implant migration. Health care providers need to be aware of this possibility, especially as the use of contraceptive implants becomes more widespread. Proper training in correct insertion techniques, coupled with the use of appropriate imaging techniques for implant localization, could reduce the risk of migration-related complications. Additionally, patients should be educated on the importance of regularly palpating the device to promptly identify any signs of migration. Enhanced clinical guidelines for managing implant migration, along with continuous education for health professionals, may help reduce the incidence of such complications, ensuring patient safety.

Conclusion

Although implants are highly effective contraceptive devices provided at the primary care level, proper follow-up, patient education on palpating the implant, and provider training in correct insertion techniques are critical to prevent migration and ensure patient safety. In particular, health care providers should remain vigilant of the risk of implant migration and receive specialized training in correct implant placement. Additionally, comprehensive patient education is essential, with a focus on the importance of regular self-checks to ensure the correct position of the implant. Patients should be encouraged to seek immediate medical assessment if they suspect any issues with the implant's location. Early recognition of implant migration can facilitate timely intervention and prevent further complications.

Table 1: Literature review of recently published cases of contraceptive implant migration[11,14-20]

Author and year of report	Age of patient	Implant brand	Mode of discovery	Migration location	Imaging confirmation	Intervention	Outcome
Enabi *et al.*[14] (2023)	38	Implanon-NXT®	Patient-reported (non-palpable implant)	Subsegmental branch of the left lower lobar artery	X-ray and computed tomography	Surgical removal under moderate sedation	Successful
Alotaibi & Al-Otaibi[11] (2024)	31	Implanon-NXT®	Symptomatic (neurological)	Left brachium	X-ray	Surgical removal using fluoroscopy under local anesthesia	Successful
Asaad *et al.*[15] (2024)	32	Implanon-NXT®	Symptomatic (neurological)	Perineurium of the ulnar nerve	X-ray	Surgical removal under local anesthesia	Successful
Gil-Santos *et al.*[16] (2024)	20s	Implanon-NXT®	Incidental	Segmental branch of the left lower lobar artery	Computed tomography	Percutaneous extraction and *en bloc* removal	Unknown
Grange *et al.*[17] (2024)	19	Nexplanon®	Patient-reported (non-palpable implant)	Segmental branch of the left lower lobar artery	Computed tomography and angiography	Surgical removal using fluoroscopy under general anesthesia	Unknown
Maybury *et al.*[18] (2024)	22	Nexplanon®	Incidental	Distal branch of the left pulmonary artery	X-ray and computed tomography	Video-assisted thoracoscopic surgery and segmentectomy	Successful
Sparsø *et al.*[19] (2024)	Unknown	Unknown	Incidental	Inferior lobe of the right lung	X-ray and computed tomography	Wait-and-see (migrated implant left in place)	Unknown
Wali & BinBakr[20] (2024)	30	Implanon-NXT®	Incidental	Axilla	X-ray	Surgical removal using fluoroscopy	Successful
Current case (2025)	29	Implanon-NXT®	Incidental	Proximal humerus	X-ray	Surgical removal under general anesthesia	Successful

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