

Removal of a subdermal contraceptive implant (Implanon NXT) that migrated to the axilla by C-arm guidance

A case report and review of the literature

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Abstract

Rationale: To report the distant migration of a subdermal contraceptive implant and to suggest that C arm-guided technique is one of the feasible options for removal of the device migrated to the axilla.

Patient concerns: A 41-year-old multipara with tingling sensation in the left axilla was referred for removal of an Implanon NXT which could not be palpated by physical examination or detected by ultrasound scanning. Finally, the device was detected by computed tomography and found migrating to the left axilla.

Diagnosis: Migration of Implanon NXT to the left axilla abutting the brachial plexus.

Interventions: The device was removed by C arm-guiding.

Outcomes: The patient went home without any procedure-related complications.

Lessons: The incidence of distant migration of a subdermal implant is possible and should be checked up regularly. If the device cannot be palpated or detected by ultrasound at the original implanting site, this should be concerned. Since the single-rod subdermal implant is radiopaque, it can be detected by roentgenography. In this case the distant migration was detected in the axilla, therefore using C arm-guided technique is feasible for the removal of the migrating device. After reviewing the literature, totally 10 cases of distant migration were reported including 2 cases of migration which were advanced further to the pulmonary artery as an embolization.

Abbreviations: CT = computed tomography, TM = trademark.

Keywords: contraceptive implant, Implanon NXT, migration of the subdermal implant

1. Introduction

Implanon NXT (Merck & Co. Inc., Whitehouse Station, NJ) is the only single-rod long acting (for 3-year use) subdermal hormonal contraceptive implant currently available in Korea. In 2006, Implanon was approved by the FDA. In 2011, Implanon

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NXT or Nexplanon (the same products with different brand names) with a redesigned inserter intended to minimize deep insertion was released in the market. There was no change in its active ingredients (68 mg etonogestrel) in the new device except barium that allows for easier localization by radiographical evaluation. Although Implanon is a highly effective contraceptive implant, there are several side effects. Migration or embolization of Implanon is a rare, but distinct complication. There were no reports of Implanon migration in Medline until 2004. Oloto and Bromham^[1] reported that Norplant migration >2 cm had never been reported; however, Evans et al^[2] reported 2 cases of Implanon migration; the distal ends of the Implanon rods were located at 11 cm and 7.3 cm from the insertion site, respectively. A prospective study conducted by Ismail et al^[3] reported that the prevalence of Implanon migration >2 cm was 1% (1/100). Furthermore, a case of potentially life-threatening embolization of Implanon into the pulmonary artery has been reported.^[4] Thereafter, several cases of migration or embolism of Implanon, Implanon NXT, or Nexplanon have been reported in the literature (Table 1).^[5–9] We report a successful removal of an Implanon NXT that had migrated to the left axilla by an intraoperative C-arm guiding procedure.

2. Case presentation

A 41-year-old multipara with a subdermal contraceptive implant (Implanon NXT) that had been inserted 3 years ago was referred from a private clinic after a failed detection of the device despite

Table 1**Reported cases of high-grade migration or embolism of subdermal implant from the insertion site.**

Case	Author	Published year	Product name	Direction of migration	Degree of migration (cm)	Method of localization	Specific note
1	Evans et al ^[2]	2005	Implanon	Cranial	11	USG	Norplant removal before Implanon insertion; located in the right axilla
2	Evans et al ^[2]	2005	Implanon	Cranial	7.3	USG	Norplant removal before Implanon insertion; located close to the neurovascular bundle in the upper arm
3	Prosch et al ^[11]	2008	Implanon	Cranial	8	USG	—
4	Prosch et al ^[11]	2008	Implanon	Cranial	4	USG	—
5	Baek et al ^[5]	2012	Implanon	Cranial	15	USG	Located in the left axilla
6	Mama et al ^[6]	2013	Implanon	Cranial	6	MRI	Located adjacent to the ulnar nerve
7	Berhe et al ^[7]	2014	Implanon	Cranial	12	USG	Located along the left axilla and under the investing fascia of the brachialis muscle
8	Patel et al ^[4]	2014	Implanon*	Cranial	—	Roentgenogram	Embolism to the pulmonary artery
9	O'Brien et al ^[8]	2015	Implanon*	Cranial	—	CT	Embolism to the pulmonary artery
10	Piessens et al ^[12]	2017	Nexplanon	Cranial	9	Roentgenogram	Located in the left axilla

CT=computed tomography, MRI=magnetic resonance imaging, USG=ultrasonography.

* Supposed to be Implanon NXT or Nexplanon due to being described as radiopaque in the articles.

ultrasound scanning. She had a tingling sensation in her left arm. The symptom started 3 weeks before visiting the clinic and persisted on the medial side of her left upper arm with vague boundaries. The device had been inserted in the left upper arm and the 1-cm scar at the insertion site was easily observed, which was located 8 cm cephalad from the medial epicondyle. She was a full-time housewife and reported that there was no significant weight change since implant insertion and she had no repetitive strenuous activity. On physical examination, the device was not palpable at the expected site near the insertion scar. Therefore, three-dimensional computed tomography (3D-CT) of the left shoulder was performed. The images showed a 4-cm linear

foreign body located anterior to the axillary vessels, abutted the brachial plexus, and medial to the coracobrachialis muscle (Fig. 1). Therefore the migration of the Implanon to the axilla was confirmed.

During the removal procedure for the migrating device, we used the C-arm to identify the location of the migrating Implanon NXT, then used 2 pieces of Kirschner wire to mark the device place as the guiding procedure (Fig. 2). After hydrodissection with infiltration of 2% lidocaine, a 2-cm long incision was made along the axillary crease at the presumptive caudal portion of the migrating Implanon NXT. As the subcutaneous dissection proceeded, a dense, encapsulated, linear foreign body was identified. After removing the fibrotic capsule, a white rod-shaped Implanon NXT, which was adjacent to the axillary vessels and brachial plexus, was exposed (Fig. 3). The Implant was successfully removed which was 13 cm cephalad to the site of insertion. The formation of fibrotic capsule was noted to be

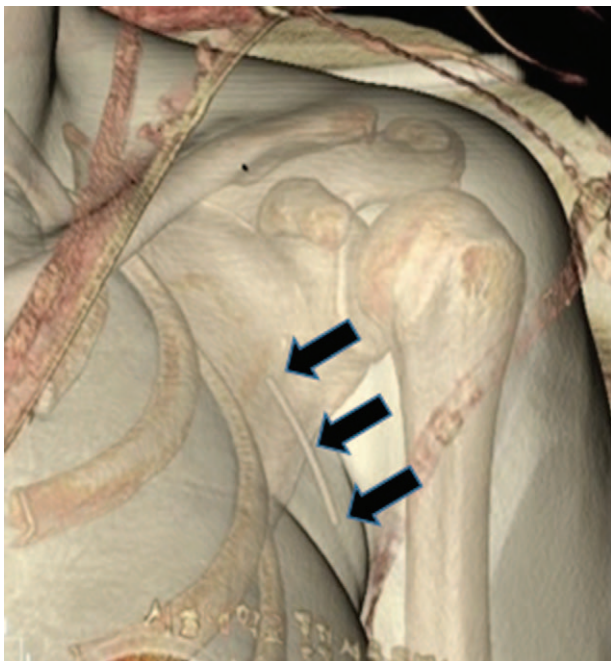


Figure 1. Three-dimensional computed tomography imaging of the left shoulder demonstrating a linear foreign body at the left axillary area. The foreign body (black arrows) is located anterior to the axillary vessels and medial to the coracobrachialis muscle.

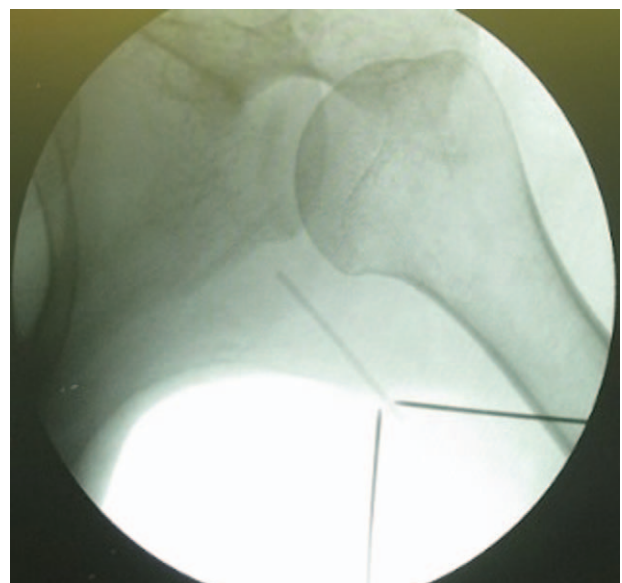


Figure 2. Localization of an Implanon NXT implant using a C-arm and 2 pieces of guide Kirschner wire.

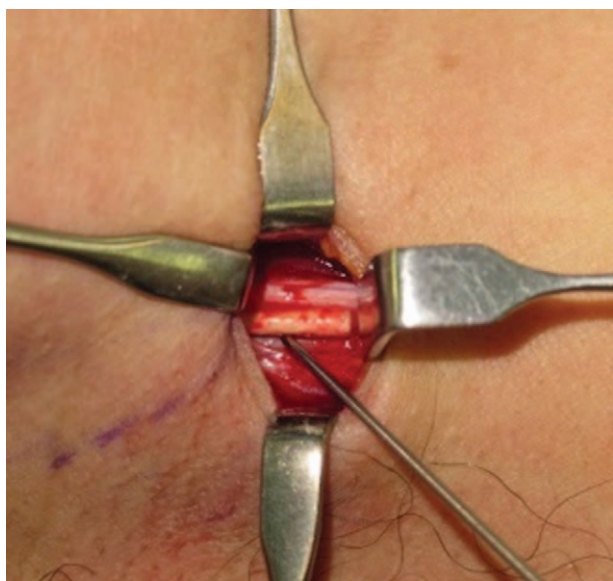


Figure 3. Implanon NXT implant abutting the brachial plexus at the time of surgical removal.

combined with the adventitia of the peripheral neurovascular bundle, and suspected that the Implanon NXT migrated along with the neurovascular bundle in the groove between the biceps and triceps muscles. After irrigation the dead space, the wound was closed layer-by-layer with 4-0 Vicryl and 5-0 Ethilon (Ethicon, Somerville, NJ) with a compressive dressing. Finally, the patient healed without complications and the tingling sensation of the left arm subsided.

3. Discussion

Reported complications associated with Implanon insertion include bleeding, hematoma formation, insertion failure (retention of the implant in the insertion needle), and difficult implantation.^[10] Complications related with device removal are implant breakage, a non-palpable rod, and difficult device removal secondary to deep implantation or fixation of the implant to adjacent tissues^[10] Besides, a non-palpable Implanon is caused by one of the following possibilities: deep implantation, migration, or embolism.

High-grade migration (defined as >2 cm displacement) of an Implanon is rare. A prospective study of 100 women revealed a 1% rate of significant migration cranially or caudally.^[3] In 2008, Prosch et al^[11] reported 2 cases of high-grade cranial migration of Implanon among 21 non-palpable Implanon implants. The degrees of migration were 4 cm and 8 cm, respectively. Thereafter, a few cases of high-grade migration^[5-9] and embolism^[4,8] of Implanon or Nexplanon have been reported in the literature (Table 1). No reasonable explanation for the migration of the subdermal implant rods was found. One possible explanation is a faulty insertion technique by an inexperienced physician, that is, inserting the device too deep or advancing the introducer instead

of withdrawing the sheath.^[2] Indeed, deep implantation, not migration, was the basis for most of the non-palpable cases.^[11,12] High-grade migration of Implanon is a very rare event. Therefore, erroneous insertion by an unskilled physician is unlikely. Another theoretic cause can be a drastic change in body weight during the period between insertion and removal, or strenuous activity, although there have been no such cases reported. Substantial weight loss after device insertion may cause reduction in support by surrounding tissues, which in turn may increase the likelihood of cranial or caudal migration. In addition to weight change, strenuous activity may contribute to mobility of subdermal implants. Unfortunately, the cases reported in the literature, including our case, were not consistent with the above reasons.

Furthermore, 2 cases of Implanon migration to the pulmonary artery were reported by Patel et al^[4] and O'Brien et al^[8] Among these cases, 1 was a non-palpable implant case; and the other presented with dyspnea with pneumothorax. The authors suggested that inadvertent placement into the basilica vein during the procedure or insertion into the deeper loose areolar tissue was a possible explanation. These 2 cases highlight a rare, but potentially life-threatening complication associated with Implanon insertion.

In conclusion, a subdermal implant user needs regular check-ups to make sure if the device is remained in the proper place. Therefore, if the previously implanted subdermal contraceptive device is not palpable, clinicians should consider the possibility of not only deep implantation, but also distant migration or pulmonary artery embolization. In addition, because Implanon NXT or Nexplanon has radiopaque characteristics, it can be detected by roentgenography and intraoperative C-arm detection with a Kirschner wire guiding may be a useful technique for removal of a migrating implant in the axillary area.

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