



CASE REPORT AND LITERATURE REVIEW

Migration of a Subdermal Contraceptive Implant into Left Pulmonary Artery: A Case Report and Literature Review

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Abstract

Long-acting contraceptives including subdermal implants are reversible methods considered as first-line choice from National and International Guidelines due to their high efficacy not related to patient adherence. We report the first Italian case of an asymptomatic Nexplanon migration to a pulmonary artery in a 36-year-old Caucasian female patient. On chest CT a radiopaque foreign body, with a thread-like appearance, approximately 40 mm long and approximately 4 mm thick, located endo-luminally between the left lower interlobar branch and a segmental branch of the left pulmonary artery tributary to the apical segment of the lower lobe was found. A successful removal of the implant displaced in left pulmonary artery via right transfemoral venous access was performed by endovascular surgeon. Healthcare providers training in subdermal implant insertion is needed for correct device placement in order to reduce risk of complications.

Keywords

Contraception, Implant, Complications, Gynecology, Pulmonary

Introduction

The use of long-acting reversible contraception (LARC) including intrauterine device and subdermal

implants is increasing worldwide in the last years and progressively replacing the conventional short-acting contraceptive methods (SARC) such as pills, vaginal ring or patch. Long-acting contraceptives are reversible methods considered as first-line choice from National and International Guidelines due to their high efficacy not related to patient adherence [1-3]. The risk of unintended pregnancy with subcutaneous implant is about 0.05% in one year [4,5] and, since it contains only a progestin, no great contraindications for its use are reported [6]. Subdermal implant is a 4 cm long and 2 mm-thick nonbiodegradable rod containing 68 mg of Etonogestrel (ENG), coated with barium sulphate making it detectable on X-ray and Computed Tomography (CT) [7]. It is inserted sub-dermally superficial of the triceps muscle in the non-dominant upper arm approximately 8-10 cm cranially to the medial epicondyle of the humerus and posterior of the bicipital sulcus using a device supplied by the manufacturer. The release of etonogestrel is continuous and the maximum serum concentrations are reached within the first two weeks after insertions decreasing gradually over time. It effectively inhibits ovulation in nearly 100% of cycles in all women [8], moreover it acts by increasing

the viscosity of cervical mucus and alterations in the endometrium.

Complications following insertion and extraction of the implant are rare and most commonly minor and localized at the implantation site such as local pain, infection or skin hyperpigmentation [9]. However, insertion errors include placing the device either too superficially or too deeply in the upper arm, the last more frequent in very thin women often with severe worries. About that, a known and extremely rare complication is intravascular migration of the contraceptive implant to the pulmonary vessels. The risk of intravascular insertion is estimated at 1.3 per million subcutaneous implants sold globally [10]. To date, there have been less than 15 previously published cases of contraceptive implant intravascular migration causing implant pulmonary embolism. We report the first Italian case of asymptomatic Nexplanon migration to a pulmonary artery in a young Caucasian female patient. The report was described after patient' consensus was given.

Case Description

In April 2024, a 36-year-old Caucasian woman referred

to the Department of Obstetrics and Gynecology of "San Camillo" Hospital in Rieti, complaining dysmenhorrea and failure to appreciate subcutaneous contraceptive implant (Nexplanon) placed in her left arm about one month before in her country. This was her third consecutive implant chosen for dysmenorrhea and desire of contraception. According to the patient, she had never been able to palpate this third implant. She had a normal body weight, with a BMI value of 27 and her past medical history was uneventful.

At inspection, patient left upper arm presented two millimetric scars of the previous and most recent insertion respectively, without evidence of hematoma or skin alterations (Figure 1). On palpation by health care professionals the implant could not be found in her left upper arm. Thus, she was submitted to an ultrasound of the upper and lower arm with a linear probe without implant discovery. Subsequently, an X-ray of the upper left arm was performed but no implant was identified. Then the patient underwent a chest X-ray with detection of a thin and elongated foreign body of approximately 35 mm in size located in correspondence with a branch of the left pulmonary artery. No pleural effusion or



Figure 1: Patient left upper arm, blue circle is for scar of previous implant insertion, red circle is for most recent implant insertion.

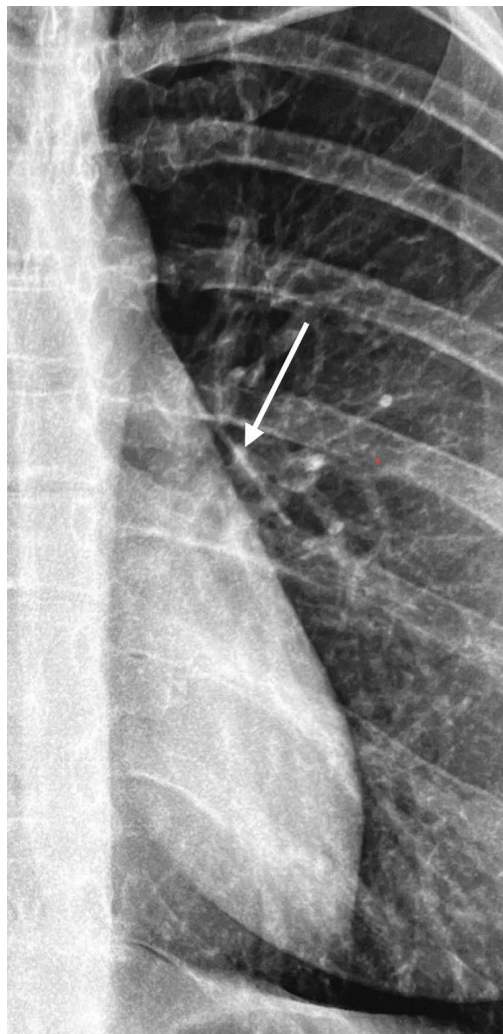


Figure 2: Chest X-ray image showing implant in the left lung.

pneumothorax were revealed (Figure 2). In order to obtain further information on location of the implant a chest computed tomography with vessels study (vascular-CT) was performed. A radiopaque foreign body, with a thread-like appearance, approximately 40 mm long and approximately 4 mm thick was found. It was located endo-luminally between the left lower interlobar branch and a segmental branch of the left pulmonary artery tributary to the apical segment of the lower lobe. No evident opacification defects of thrombotic nature in the areas examined were detected. There were no signs of parenchymal damage, including necrosis, infection or other pulmonary pathology within the lung adjacent to the implant rod or elsewhere. No signs of pleuro-pericardial effusion were found (Figure 3). Blood tests and hormonal dosage were within normal ranges. Upon detailed history taking the patient could not remember any symptoms of dyspnea or chest discomfort after the implant insertion or during the period the implant was *in situ*, nor did she remember any hematoma or pain occurring at the insertion site.

In light of the vascular-CT report, the patient was sent to the vascular surgeon for removal of the dislocated

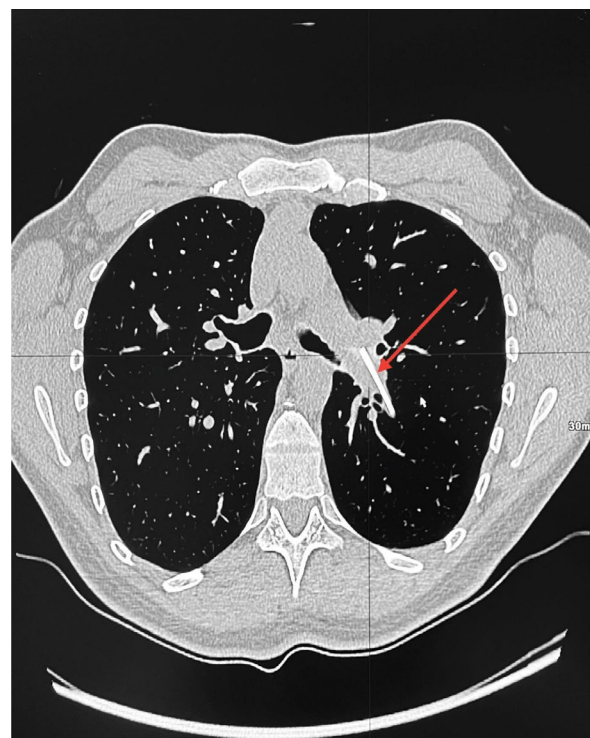


Figure 3: CT chest image showing migrated implant into the left pulmonary artery branch.

device. Thus, two days after vascular-CT the patient was submitted to removal of implant displaced in left pulmonary artery via right transfemoral venous access. No intra or postoperative complications occurred. The patient was discharged the day after the procedure in good general health condition with prescription of low molecular weight heparin for thrombotic events prevention. The follow up of the patients was uneventful and six months after the procedure the patient is in good general condition.

Discussion

Hormonal contraception is based on short-term or long-term acting contraceptives. The first category includes oral progestin or estrogen-progestin pills, vaginal ring, transdermal patches, the second one involves intrauterine systems and implantable contraceptives. The subcutaneous implant is considered worldwide as the most efficacious long-term acting contraceptive device, with a rate of unintended pregnancy of about 0.05% in one year [6]. The absence of interference by patients' compliance is the main reason for its great efficacy. The insertion of subcutaneous implant requires great expertise of healthcare professionals because of possible insertion errors that could produce significant complications. It is inserted under local anesthesia subdermally superficial of the triceps muscle in the non-dominant upper arm approximately 8-10 cm cranially to the medial epicondyle of the humerus and posterior of the bicipital sulcus using a device supplied by the manufacturer. Medical complications associated with contraceptive implants include menstrual disturbances,

headache, weight gain, acne, dizziness, mood disturbances, nausea, lower abdominal pain, hair loss, loss of libido, pain at the implant site, neuropathy, and follicular cysts [11]. Complications following insertion and extraction of the implant are rare (0.3%) [12] and most commonly minor and localized at the implantation site such as local pain (2-3%) [13] infection (0-1.4%) [11] or skin hyperpigmentation (10-11%) [14]. However, a wrong insertion is possible mainly in very thin patients. A known and extremely rare complication of incorrect insertion is intravascular migration of the contraceptive implant to the pulmonary vessels. The risk of intravascular insertion is estimated at 1.3 per million subcutaneous implants sold globally [10]. Few cases of subdermal implant migration with pulmonary embolization of the device have been described in the literature. In such cases, patients may be completely asymptomatic or present with symptoms such as dyspnea, hemoptysis, or chest pain [15]. The most apparent explanation for implant migration is insertion into the basilic vein at the time of insertion. Endovascular approach, as performed in our case, is the recommended first option for retrieving implants that have migrated to the pulmonary arteries due to low post operative morbidity and high success rate. Unfortunately, the endoscopic removal of these migrated devices is not always feasible and free of complications, as reported in the case of Mallak, et al. [15] in which attempt to remove the contraceptive implant by endovascular approach was unsuccessful and the implant was left *in situ*.

Conclusions

Subdermal implants are usually safe and effective contraceptive methods. Insertion should be practiced by trained medical professionals, however rare complications such as implant migration could be possible. In our case, the implant migrated to a branch of the left pulmonary artery emphasizes the need for a careful patient monitoring and prompt intervention for device removal. The migrated implant was successfully found and removed using endovascular techniques without any consequences for the patient. This case, jointly with other previous cases reported in the literature, underlines the importance of healthcare providers training in subdermal implant insertion and patients' education about device palpation and potential risks and complications.

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