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Case Report

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Pustular Acne Eruption After Nexplanon Fracture in an Active-Duty Service Member

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ABSTRACT

Introduction: Long-acting reversible contraceptives (LARCs) like Nexplanon are increasingly popular among active-duty service women for their convenience and benefits to women's health and military readiness. While generally safe and effective, rare instances of Nexplanon fractures were asymptomatic and discovered during removal, with only two cases linking abnormal uterine bleeding to the broken device. In this unique case, a patient experienced a traumatic Nexplanon fracture during combat training leading to onset of pustular acne within 24 hours.

Case: A 21-year-old nulliparous active-duty service member presented to the ED with sudden onset of pustular acne on her face following Nexplanon fracture during combat training. Physical exam was significant for an extensive amount of pustular acne from her mental to infraorbital region. Palpation was significant for a midline defect in the Nexplanon, that was confirmed during removal by an OBGYN.

Discussion: Many synthetic progestins (P4), including etonogestrel found in the Nexplanon, are derived from 19-nortestosterone, and the association between synthetic P4 and acne is well-established. P4-only contraceptives having a stronger association with acne than contraceptives containing both estrogens and P4. Yet, the presence of a dose-dependent response between synthetic P4 and acne vulgaris remains inconclusive. The rapid onset of pustular acne in this patient suggests a potential dose-dependent reaction, especially since device breaks can lead to a slight increase in etonogestrel levels.

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Introduction

Unintended pregnancy rates among active-duty service members (ADSM) significantly surpass those in the general population. In 2012, unintended pregnancy in the United States was 51%, while rates among ADSM reached up to 65%, varying by branch of service [1-9]. This disparity likely stems from the unique challenges ADSM encounter in accessing reproductive care and family planning services. Therefore, this population is most apt to benefit from long-acting reversible contraceptives (LARCs) for both menstrual control and pregnancy prevention, especially while deployed and in training environments. Nexplanon is the most effective LARC for pregnancy prevention, boasting greater efficacy than surgical sterilization and can be easily placed without a pelvic exam [10,11].

Nexplanon, containing the active metabolite etonogestrel (ENG), is derived from the prodrug, desogestrel, a gonane originally synthesized from 19-nortestosterone. ENG exerts its effects by binding to receptors within the hypothalamic-pituitary-gonadal axis, resulting in varying effects depending on the target tissue. When binding receptors in the pituitary, it suppresses ovulation by inhibiting follicle stimulating hormone and luteinizing hormone. At the level of the genital tract, it acts to thicken cervical mucus and decrease ciliary movement within the fallopian tube. Although it is approved by the Food and Drug Administration as safe, effective, and reversible contraception for up to 3 years, both longitudinal and pharmokinetic studies demonstrate efficacy up to 5 years. While generally low-risk, common side effects include changes in menstrual bleeding, headaches, acne, and breast pain, with a manufacturer-reported adverse reaction rate of approximately 10%. Rare complications, such as device fracture, have an unknown frequency, as majority of patients are asymptomatic or a few have reported abnormal uterine bleeding (AUB). Presented below is a case of a patient experiencing a Nexplanon fracture during combat training, followed by the rapid onset of pustular acne on her face [12,13].

Case Presentation

A 21-year-old nulliparous ADSM was sent to the emergency department (ED) by her command after she reported discomfort and noticing a bruise near her Nexplanon site during combat training. In the ED, a fracture was noted in her Nexplanon, but no concerns for damage to surrounding structures, therefore she was sent home with short interval follow up with gynecology (OB/GYN). However, less than 24 hours later there was a dramatic onset of pustular acne from her mental to infraorbital region with previously clear skin (Figure 1, A-C). Her command once again advised her to seek medical evaluation, leading to an urgent visit with OB/GYN.

During the Nexplanon removal, there was a palpable midline defect; therefore, the incision for removal was made parallel to

the device at the level of the defect. The extraction was completed without complication and the midline fracture was confirmed (Figure 1, D).

Before this incident, the patient was content with her Nexplanon and had not experienced AUB or adverse effects during the year and a half the device had been in place. Despite the device fracture, she expressed a strong inclination towards getting another Nexplanon following the removal.

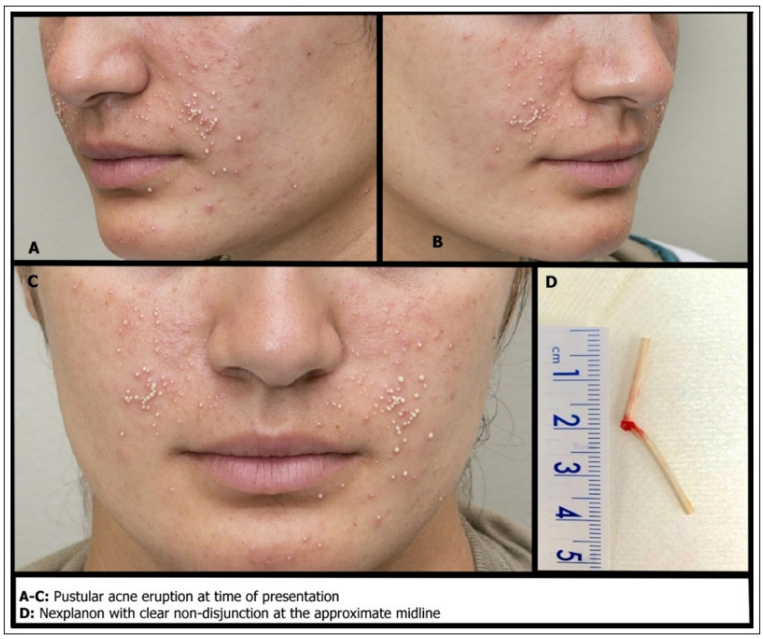

Figure 1

Discussion

The Nexplanon has been shown to be highly effective, safe, and reversal contraception with an acceptable side effect profile of up to 10%. Although more severe complications, such as device fracture, are rare, this case report demonstrates that clinical consequences from these complications can be seen. Additionally, given that the device itself is proprietary information, data concerning whether the device is still functioning as birth control after fracture is unknown. The limited case reports that have been reported after device fracture have either shown no symptoms or AUB, which is a known side effect of the Nexplanon itself. To our knowledge, this is the first case report associating Nexplanon fracture with rapid onset of pustular acne.

The etiology of our patient's symptoms is unknown as the specific reservoir type utilized by Nexplanon has not been disclosed. The types of implantable polymeric medication delivery devices are categorized into either reservoir type implants or monolithic type implants. In reservoir type implants, the polymer forms a permeable barrier around a medication core, enabling timed release through diffusion. Conversely, in monolithic type implants, the drug is dispersed throughout the permeable polymer, facilitating slow diffusion over the device's lifespan (Figure 2) [14].

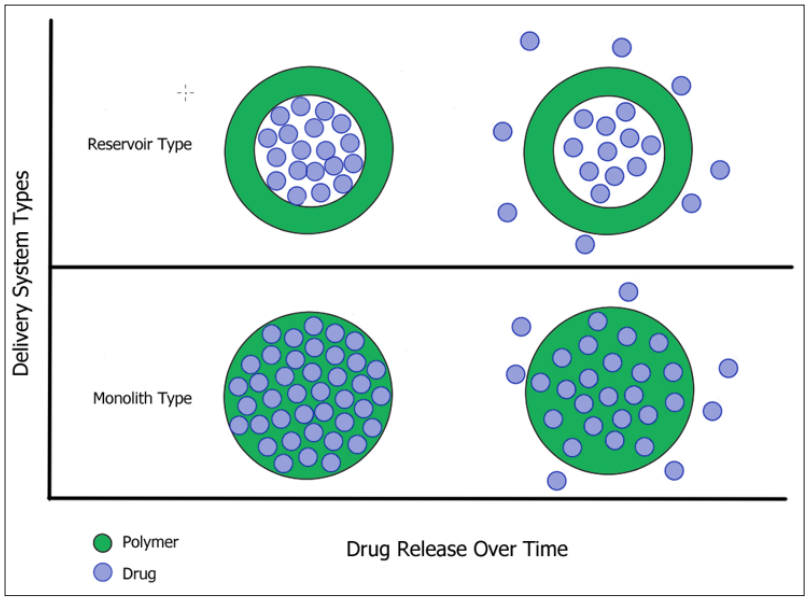

Figure 2

The examination of data from other reported cases of fractured Implanon/Nexplanon devices in conjunction with the physical assessment of the broken device in our patient, suggests a monolithic delivery system, as no evident hollow core was observed upon device inspection. However, given the rapid onset of symptoms in our patient, a reservoir-type device would be more consistent if her symptoms were indeed a result of a substantial efflux of ENG following the device fracture. After a case report of a fractured Implanon, the manufacturer performed in vitro studies on the Implanon/Nexplanon while in drug development. During these studies, the device was intentionally damaged (bent and/or carved with a blade) which resulted in only slightly increased release of ENG. However, there are no longitudinal studies examining the levels of ENG following device damage/fracture to determine if it remains effective birth control for the full lifespan of the device as advertised [15].

Unfortunately, ENG levels were not performed on this patient to determine if this level was above or below anticipated concentrations. If the ENG levels were significantly higher than anticipated, this would have suggested a reservoir type device. Therefore, her sudden onset of acne could be related to the enormous release of ENG since synthetic P4 are derived from 19-Nortestosterone and have androgenic properties due to their affinity for androgen receptors. However, although there is an association between acne and elevated androgen level, there is insufficient evidence to show correlation between acne severity and androgen level[9]. Despite this, our most robust hypothesis for her symptoms would be the dramatic release of an androgenic progesterone into the bloodstream, which has not been specifically studied [16,17].

Currently, the proprietary information of Nexplanon device makes it impossible to draw a clear conclusion of whether device breakage compromises efficacy of the device. Regardless, as stated in previous case studies, a shared decision-making model should be used with the patient when considering plan of care after identification of device disruption. Practitioners who prescribe or care for individuals with Nexplanon should be aware to counsel patients that there is a rare possibility of device breaking with unknown device efficacy afterwards. Therefore, patients should be encouraged to present immediately if a palpable defect is noted or trauma to this area to divulge into patient centered decision making.

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