Skin Damage Associated with the Norplant Contraceptive

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Three cases of localized skin reaction in the first month after implantation of the Norplant contraceptive resulted in a partial implant expulsion and removal in one patient, and implant removal in another.

Clinical evidence of infection was absent in all patients. While lidocaine with epinephrine was used in all three patients, the cause for these skin reactions remains unclear. Physicians should be alerted to the possibility of significant skin reactions associated with this procedure.

Key words. Contraception; drug implants; skin.
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The Norplant system (Wyeth-Ayerst Laboratories, Philadelphia, Pa) is a newly introduced contraceptive implant that provides a steady-state level of levonorgestrel for 5 years.[1–5] The system consists of six flexible polymethylsiloxane (Silastic) capsules implanted subdermally into the medial upper arm. The Norplant system has been described as highly effective with minimal adverse effects.[1–7]

Most reports of local skin reactions at the Norplant insertion site have focused on infection, itching, pain, or expulsion.[1–3,5,8] The risk of infection at the insertion site and the rate of expulsion have been reported as less than 1%.[1,2,6,8] Most expulsions were associated with infection and occurred at the incision site.[8] One third of the infections and nearly two thirds of the expulsions were reported in women who had no insertion site complications during the first 2 months.[8]

The following three cases illustrate skin reactions that were observed after the insertion of the Norplant system.

Case Reports

After each patient granted informed consent, her left upper arm was washed with povidone-iodine solution and draped in sterile fashion. Five milliliters of 2% lidocaine hydrochloride with epinephrine 1:100,000 (Elkins-Sinn, Inc, Cherry Hill, NJ) was administered below the skin that had been marked with a marking pen and template. The six Norplant capsules were placed under each patient's skin in a fanlike pattern according to the manufacturer's instructions. The depth and location of the implants were approved by a supervising faculty member who had attended formal instruction courses and had been trained by other physicians proficient in Norplant insertion. All patients were discharged with the insertion site covered with steri-strips, a dry compress, and gauze wrap.

Case 1

Two days after Norplant insertion, a 17-year-old woman developed a tense blister 3 cm in diameter over the area of the implants, away from the insertion site (Figure 1). The skin of the upper arm was again cleansed with povidone-iodine solution, and the fluid aspirated (going through nonblistered skin to the underside of the blister) with a 25-gauge needle, yielding 3 mL of clear yellow fluid. Anaerobic and aerobic cultures of this fluid failed to grow any organisms. The implants were well below the blister base. The patient was placed on cefadroxil monohydrate, 500 mg twice daily, while awaiting the culture results, and the arm was bandaged.

The blister recurred on the 4th day after insertion. The blister was unroofed, with clear fluid again noted. Minimal underlying ecchymoses existed, but there was no erythema, increased warmth, or induration to suggest cellulitis. The patient remained afebrile.

On the 10th day after insertion, the patient had significant tenderness over all implants, including the implants that were not below the area of the blister. No implants were protruding through the skin, but they were removed at the patient's request because of discom-

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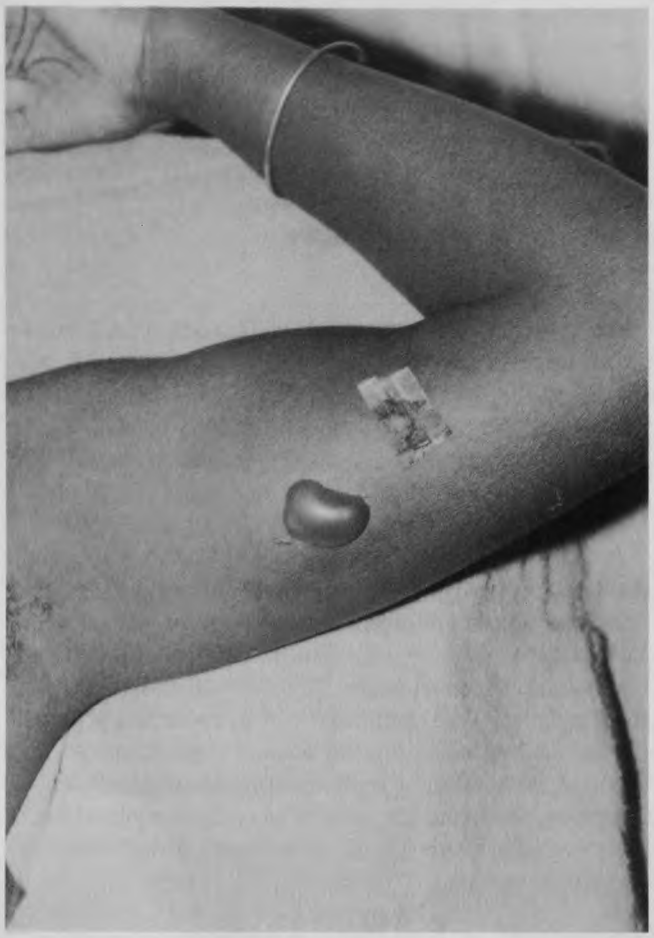

Figure 1. Tense blister noted 2 days after insertion of Norplant in the patient in case 1. The original insertion site is covered by steri-strips.

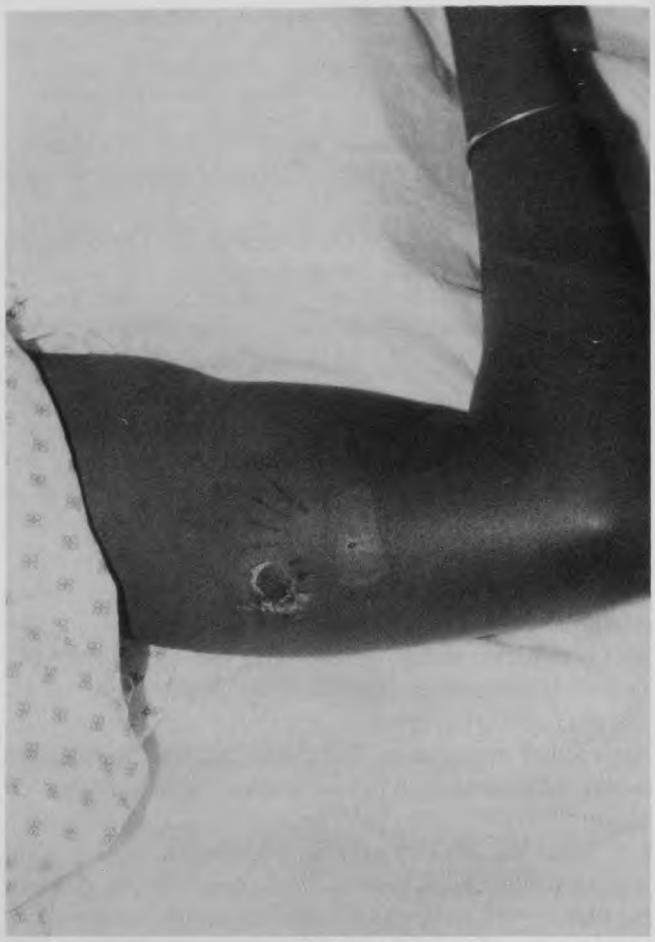

Figure 2. Enlarging skin erosion with devitalized skin from the blister noted on the arm of the patient in case 1. The capsule locations have been marked, with the original insertion site to the right.

fort. The implant locations were marked before removal (Figure 2). The patient's skin was nearly healed 1 month after the original insertion. The patient now uses oral contraceptives.

Case 2

A 22-year-old woman requested Norplant insertion 3 months after the birth of her first child. The patient's arm became sore soon after the procedure, but 2 weeks after insertion, a 1.5-cm scab had formed over the proximal portion of the implants, away from the insertion site. She kept the area bandaged, and the skin showed no sign of infection. The patient returned 1 week later with an ulceration 3-cm in diameter, and with the proximal end (away from the insertion site) of one of the implants protruding through the skin. There were no signs of infection in the surrounding skin. The protruding implant was removed, but the patient refused removal of the other implants. The patient was placed on cefadroxil monohydrate, 500 mg twice daily, owing to the open wound. The skin was treated with polymyxin B sulfate ointment and bandaged.

The patient returned 4 days later because the area of skin ulceration was enlarging (Figure 3). There was tenderness in the ulcerated area, but erythema, swelling, and induration were not present. Because of the progressive skin injury, the patient agreed to removal of the remaining implants, 3½ weeks after insertion. One percent lidocaine was used for anesthesia, and the remaining five capsules were removed through the original insertion site.

Six weeks after initial placement, the patient complained of itching and soreness at the insertion site. A 1.5-cm area of granulation tissue was healing well, and the underlying scarring appeared minimal. Again, evidence of infection was not present. The skin was com-

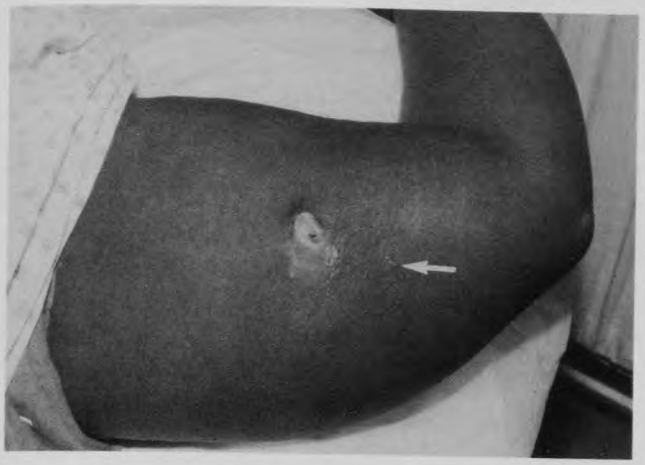

Figure 3. Enlarging area of skin erosion on the patient in case 2. A capsule was expelled through the skin erosion. The original insertion site is marked by the arrow.

pletely healed 2 months after initial insertion, at which time the Norplant system was inserted in the opposite arm without complications. Lidocaine 1% was used for the second insertion, and the skin overlying the implants has remained free of problems for 3 months.

Case 3

A 20-year-old woman did well immediately after the Norplant insertion, but 2 weeks later, noted soreness and blistering of the skin at the proximal end of the implants, away from the insertion site. Superficial local debridement of the skin revealed two shallow 1-cm ulcers, but the surrounding skin had no pus, induration, or erythema. The Norplant implants were well below a layer of scar tissue. The patient was treated with adherent ulcer dressings.

The patient eventually developed a wide band of scar tissue over the implants. She used an over-the-counter ointment to lubricate and cover the site. Despite the scarring, the patient remains asymptomatic and has retained the implants with continued positive acceptance of this contraceptive method.

Discussion

Expulsion of the levonorgestrel implants has been blamed on insertion of the capsules too near the incision, or because of associated infection.[2,3,8] These cases illustrate skin destruction and breakdown at the end of the implants away from the insertion site. The spontaneous expulsion we observed was through the overlying skin.

These skin reactions were noted within the first few weeks after Norplant insertion. Clinical evidence for infection was lacking. Negative aerobic and anaerobic cultures were obtained from the large blister on the arm of the patient in case 1. The usual crusting, pus, or warmth seen with cellulitis was not present in any of the three patients.

Additionally, the skin reactions progressed despite broad-spectrum antibiotic therapy. The pain and tenderness without pus or evidence of infection suggested a possible allergic reaction to the implants. However, polymethylsiloxane (Silastic) implants have been noted to have excellent biocompatibility in the human body.[5] True allergic reactions to the lidocaine anesthetic are believed to be very rare.[9] Other possible sources for allergic reaction include the steri-strips, adhesive tape, marking pen ink, or povidone-iodine solution.

For our first 35 levonorgestrel insertion procedures, all skin complications were associated with the administration of lidocaine with epinephrine during the procedure. The patient in case 2 underwent an uneventful second insertion using 1% lidocaine (without epinephrine). Personal communications with other physicians have revealed similar reports of localized dermal damage and necrosis when epinephrine was used in the anesthetic. Our family practice center has ceased using epinephrine for Norplant insertion.

For most dermatologic surgeries, lidocaine with epinephrine provides anesthesia with rapid onset, adequate duration, and safety.[10,11] Vasoconstrictors such as epinephrine frequently are added to prolong anesthesia, reduce systemic toxicity and absorption of the anesthetic, and control bleeding.[10] Physicians may choose an anesthetic with epinephrine for office procedures such as the Norplant insertion. The Norplant insertion manual does not specify the type of anesthetic to be used,[11] suggesting only that a very small amount of anesthetic be injected subdermally.[12]

Reports of skin necrosis caused by epinephrine have been published.[9,10,13,14] It is possible that the skin reactions observed were due to mechanical effects or vasoconstriction from epinephrine. Further investigation is needed to determine whether polymethylsiloxane or levonorgestrel interacts with epinephrine to influence the dermal blood flow.

Despite evidence implicating epinephrine, other possible causes for the skin reactions were examined. Placement of the implants too near the skin surface was considered, although trained faculty members who supervised the procedures documented appropriate subdermal location for all the implants. All insertion sites were bandaged with a dry compress and with a flexible gauze wrap, according to the manufacturer's suggestion.[12] The flexible wrap was loosely applied, and not believed to represent a constricting band. Nevertheless, our department has also begun to place a nonadherent (Telfa)

dressing below the dry compress to limit any mechanical shearing forces to the skin overlying the implants.

These patients each had a significant complication at the insertion site. The cause of the skin reactions remains unknown. Certainly, many physicians have safely inserted the Norplant contraceptive after administering lidocaine with epinephrine. Whether factors in these patients predisposed them to the reactions, or whether epinephrine plays a role is unclear. Epinephrine remains a safe addition to lidocaine for most dermatologic surgeries.[10]

Physicians should be alerted to the possibility of significant skin reactions associated with Norplant insertion. Physicians should also watch for other reports regarding the use of epinephrine during the Norplant insertion.

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