

# *Treatment of Perichondritis with a Quinolone Derivative—Norfloxacin*

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## CASE REPORT

**Abstract.** Auricular perichondritis is an uncommon complication following surgery of the external ear. *Pseudomonas aeruginosa* is the most commonly associated pathogen. Presented is a patient with auricular perichondritis successfully treated with norfloxacin, a newly available, orally administered antibiotic with antipseudomonal activity.

### INTRODUCTION

Perichondritis of the external ear represents an uncommon but potentially serious consequence of auricular trauma and/or surgery. The most common bacterial pathogen associated with auricular perichondritis is *Pseudomonas aeruginosa*.<sup>1,2</sup> In more severe cases, hospitalization is required for intensive local care (debridement, drains for infusion of local antibiotics), as well as intravenous antibiotics with antipseudomonal activity. Before the introduction of 4-quinolone antibiotics, there had not been an oral antibiotic with good antipseudomonal activity. Norfloxacin, a recently available 4-quinolone, is reported to have excellent antipseudomonal activity after oral administration.<sup>3</sup> Reported here is a patient who, following Mohs surgery, had auricular perichondritis successfully treated as an outpatient with norfloxacin.

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Reprints are not available.

### CASE REPORT

A 64-year-old white man presented to the Cutaneous Surgery and Oncology Unit, Department of Dermatology, at the University of Michigan with a history of recurrent basal cell carcinoma involving the concha of the right auricle. The tumor had been initially treated by electrodesiccation and curettage in 1957. In 1959, the tumor was treated by excision and a third recurrence was treated in 1970 by x-ray therapy. In 1984, Mohs micrographic surgery was employed to treat the fourth recurrence. Unfortunately the basal cell carcinoma again recurred, leading to Mohs micrographic surgery on March 30, 1987.

The clinical exam revealed an ill-defined nodule overlying the right concha and measuring 1.5 × 1.3 cm. No palpable lymph nodes were detected and there were no other significant physical findings.

Because of the location and recurrent nature of the tumor, Mohs surgery, fresh tissue technique, was employed. A tumor-free plane was found after two stages with a final defect size of 2.1 × 1.9 cm (Fig. 1). Perichondrium was intact and we decided to allow the wound to heal by second intention. Careful patient instructions regarding proper wound care were given.

The patient returned in seven days with complaints of ear pain, tenderness, and swelling, but no complaint of fever or chills. On exam, the entire right auricle was noted to be edematous, erythematous, and tender to touch. A yellow discharge was seen in association with the surgical defect.

A culture of the wound was obtained followed by local debridement and cleaning. The patient was instructed to continue local wound care with dilute

acetic acid soaks t.i.d. followed by Bacitracin ointment and bandage. He was also started on cephalixin 250 mg P.O. q.i.d.

The patient returned in three days with no discernible improvement in his clinical condition (Fig. 2). He was afebrile but the ear remained swollen, erythematous, and tender. The culture from his

wound grew *Pseudomonas aeruginosa* which was resistant to cephalixin (Table 1). The organism was sensitive to ticarcillin and gentamycin, which are both administered intravenously. The organism was found also to be sensitive to a new 4-quinolone antibiotic, norfloxacin, recently released for oral administration.

**TABLE 1**  
Wound Culture Right Ear  
Culture Result—Numerous *Pseudomonas Aeruginosa*

Susceptibility Test	MIC	mcg/ml	Interpretation
Amikacin	<	4.00	Sensitive
Ampicillin	>	16.00	Resistant
Cefazolin	>	32.00	Resistant
Cefamandole	>	32.00	Resistant
Cefoxitin	>	32.00	Resistant
Chloramphenicol	>	16.00	Resistant
Gentamicin	<	2.00	Sensitive
Piperacillin	<	4.00	Sensitive
Ticarcillin	<	32.00	Intermediate
Trimethoprim/Sulfamethoxazol	>	4.00/76.00	Resistant
Tobramycin	<	2.00	Sensitive
Imipenem	<	4.00	Sensitive
Timentin	<	16.00	Sensitive
Ceftriaxone	<	16.00	Sensitive
Ceftazidime	<	4.00	Sensitive
Norfloxacin	<	16.00*	Sensitive

\*Urine



**FIGURE 1.** Post Mohs defect for recurrent basal cell carcinoma of the right external ear.



**FIGURE 2.** Inflammation, edema, and purulent exudate at the site of surgery 7 days postoperatively.



FIGURE 3. Marked improvement after 2 weeks of norfloxacin 400 mg P.O. b.i.d.

Cephalexin was discontinued on day 3 and the patient began norfloxacin 400 mg P.O. b.i.d. The patient experienced marked subjective improvement within 48 hours. On his follow-up exam 7 days after initiation of norfloxacin, the erythema, swelling, and tenderness were negligible (Fig. 3). The norfloxacin was given for a total of 21 days and the patient experienced a subsequently uneventful convalescence (Fig. 4).

#### DISCUSSION

While perichondritis of the auricle is an uncommon complication following surgical procedures, it can be difficult to manage. Meticulous wound care and broad spectrum antibiotics have been the mainstays of therapy for less severe cases, whereas advanced cases have required hospitalization for more intensive care, including systemically administered antibiotics. Because of the high frequency of *Pseudomonas* isolates in auricular perichondritis, it is surprising that more cases have not required intravenous antibiotics. The introduction of the 4-quinolone class of antibiotics marks the first antibiotics available per oral route for use in the treatment of systemic *Pseudomonas* infections.

Norfloxacin was the first 4-quinolone antibiotic available in the United States. Norfloxacin and



FIGURE 4. Wound 2 weeks following norfloxacin therapy.

other agents in this class were initially evaluated for use in urinary tract infections. It was found that this new class of antibiotics exhibits broad activity against many gram positive and gram negative bacteria, including *Pseudomonas* species and *Staphylococcus aureus*.<sup>4,5</sup> Norfloxacin is available only as an oral preparation and is generally well tolerated. Side effects have been uncommon (2–4%), the most common complaints being nausea, headache, and light-headedness.

While norfloxacin to our knowledge has not been reported for the treatment of auricular perichondritis, its spectrum of activity, low incidence of adverse reactions, and oral administration prompted its use in our patient. The excellent response obtained in this patient merits further investigation of this drug in the treatment of auricular perichondritis.

#### REFERENCES

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4. Cynamon MH, et al. The role of 4-quinolones in the treatment of infections. *Comp Ther* 13:37–43, 1987.
5. Holmes B, et al. Norfloxacin: A review of its antibacterial activity, pharmacokinetic properties and therapeutic use. *Drugs* 300:482–513, 1985.

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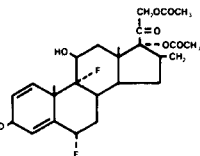
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#### CLINICAL PHARMACOLOGY

Topical corticosteroids share anti-inflammatory, antipruritic and vasoconstrictive actions. The mechanism of anti-inflammatory activity of the topical corticosteroids is unclear. Various laboratory methods, including vasoconstrictor assays, are used to compare and predict potencies and/or clinical efficacies of the topical corticosteroids. There is some evidence to suggest that a recognizable correlation exists between vasoconstrictor potency and therapeutic efficacy in man.

#### Pharmacokinetics

The extent of percutaneous absorption of topical corticosteroids is determined by many factors including the vehicle, the integrity of the epidermal barrier, and the use of occlusive dressings. Topical corticosteroids can be absorbed from normal intact skin. Inflammation and/or other disease processes in the skin increase percutaneous absorption. Occlusive dressings substantially increase the percutaneous absorption of topical corticosteroids. Thus, occlusive dressings may be a valuable therapeutic adjunct for treatment of resistant dermatoses. (See DOSAGE AND ADMINISTRATION.) Once absorbed through the skin, topical corticosteroids are handled through pharmacokinetic pathways similar to systemically administered corticosteroids. Corticosteroids are bound to plasma proteins in varying degrees. They are metabolized primarily in the liver and are then excreted by the kidneys. Some of the topical corticosteroids and their metabolites are also excreted into the bile.

#### INDICATIONS AND USAGE

Topical corticosteroids are indicated for relief of the inflammatory and pruritic manifestations of corticosteroid-responsive dermatoses.

#### CONTRAINDICATIONS

Topical steroids are contraindicated in those patients with a history of hypersensitivity to any of the components of the preparation.

#### PRECAUTIONS

##### General

Systemic absorption of topical corticosteroids has produced reversible hypothalamic-pituitary-adrenal (HPA) axis suppression, manifestations of Cushing's syndrome, hyperglycemia, and glucosuria in some patients. Conditions which augment systemic absorption include the application of the more potent steroids, use over large surface areas, prolonged use, and the addition of occlusive dressings.

Therefore, patients receiving a large dose of a potent topical steroid applied to a large surface area or under an occlusive dressing should be evaluated periodically for evidence of HPA axis suppression by using the urinary free cortisol and ACTH stimulation tests. If HPA axis suppression is noted, an attempt should be made to withdraw the drug, to reduce the frequency of application, or to substitute a less potent steroid.

Recovery of HPA axis function is generally prompt and complete upon discontinuation of the drug. Infrequently, signs and symptoms of steroid withdrawal may occur, requiring supplemental systemic corticosteroids.

Children may absorb proportionally larger amounts of topical corticosteroids and thus be more susceptible to systemic toxicity. (See PRECAUTIONS—Pediatric Use.)

If irritation develops, topical corticosteroids should be discontinued and appropriate therapy instituted.

In the presence of dermatological infections, the use of an appropriate antifungal or antibacterial agent should be instituted. If a favorable response does not occur promptly, the corticosteroid should be discontinued until the infection has been adequately controlled.

#### Information for the Patient

Patients using topical corticosteroids should receive the following information and instructions:

1. This medication is to be used as directed by the physician. It is for external use only. Avoid contact with the eyes.
2. Patients should be advised not to use this medication for any disorder other than for which it was prescribed.
3. The treated skin area should not be bandaged or otherwise covered or wrapped as to be occlusive unless directed by the physician.
4. Patients should report any side effects of local adverse reactions especially under occlusive dressing.
5. Parents of pediatric patients should be advised not to use tight-fitting diapers or plastic pants on a child being treated in the diaper area, as these garments may constitute occlusive dressings.

#### Laboratory Tests

The following tests may be helpful in evaluating the HPA axis suppression:

Urinary free cortisol test  
ACTH stimulation test

#### Carcinogenesis, Mutagenesis, and Impairment of Fertility

Long-term animal studies have not been performed to evaluate the carcinogenic potential or the effect on fertility of topical corticosteroids. Studies to determine mutagenicity with prednisolone and hydrocortisone have revealed negative results.

#### Pregnancy Category C

Corticosteroids are generally teratogenic in laboratory animals when administered systemically at relatively low dosage levels. The more potent corticosteroids have been shown to be teratogenic after dermal application in laboratory animals. There are no adequate and well-controlled studies in pregnant women on teratogenic effects from topically applied corticosteroids. Therefore, topical corticosteroids should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

#### Nursing Mothers

It is not known whether topical administration of corticosteroids could result in sufficient systemic absorption to produce detectable quantities in breast milk. Systemically administered corticosteroids are secreted into breast milk in quantities not likely to have a deleterious effect on the infant. Nevertheless, caution should be exercised when topical corticosteroids are administered to a nursing woman.

#### Pediatric Use

Pediatric patients may demonstrate greater susceptibility to topical corticosteroid-induced HPA axis suppression and Cushing's syndrome than mature patients because of a large skin surface area to body weight ratio. Hypothalamic-pituitary-adrenal (HPA) axis suppression, Cushing's syndrome, and intraocular hypertension have been reported in children receiving topical corticosteroids. Manifestations of adrenal suppression in children include linear growth retardation, delayed weight gain, low plasma cortisol levels, and absence of response to ACTH stimulation. Manifestations of intraocular hypertension include bulging fontanelles, retracted eyelids, and bilateral papilloedema.

Administration of topical corticosteroids to children should be limited to the least amount compatible with an effective therapeutic regimen. Chronic corticosteroid therapy may interfere with the growth and development of children.

#### ADVERSE REACTIONS

The following local adverse reactions have been reported with topical corticosteroids, but may occur more frequently with the use of occlusive dressings. These reactions are listed in approximate decreasing order of occurrence:

1. Burning 2. Itching 3. Irritation 4. Dryness 5. Folliculitis 6. Hypertrichosis 7. Acneiform eruptions 8. Hypopigmentation 9. Perioral dermatitis 10. Allergic contact dermatitis 11. Maceration of the skin 12. Secondary infection 13. Skin atrophy 14. Striae 15. Milium

#### OVERDOSAGE

Topically applied corticosteroids can be absorbed in sufficient amounts to produce systemic effects. (See PRECAUTIONS.)

#### DOSAGE AND ADMINISTRATION

psorcon Ointment should be applied to the affected area as a thin film from one to three times daily depending on the severity or resistant nature of the condition.

Occlusive dressings may be used for the management of psoriasis or recalcitrant conditions. If an infection develops, the use of occlusive dressings should be discontinued and appropriate antimicrobial therapy initiated.

#### HOW SUPPLIED

psorcon Ointment 0.05% is available in the following size tubes

15 gram

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Prognosis for Recurrent Stage I Malignant Melanoma. DS Reintgen, R Vollmer, CY Tso, HF Siegler. Arch Surg 122:1338-1342, 1987.

This retrospective study analyzed 1,504 (35.9%) patients out of 4,185 who had metastases after treatment of their initial malignant melanoma. Initial recurrence site was local (skin, in-transit, or regional lymph nodes) and made up 62.5% of head and neck primaries, 77.3% of trunkal tumors, and 85.6% of extremity melanomas. One third of the head and neck melanomas had their initial recurrence systemically. There was an increased risk of initial recurrence even after a 5-year latency period. Survival figures dropped from 88 to 42% in this group. Survival by site of recurrence was greatest for local disease > lymph node disease > systemic involvement. Statistical analysis of factors contributing to a worse prognosis after a recurrence were thickness of lesions, ulceration, a short disease-free interval, wide-local excision only, a primary extremity tumor, and older age of the patient.

R. STEVEN PADILLA, M.D.

Refinements in Combined Chemical Peel and Simultaneous Abrasion of the Face. CE Horton, RC Sadove. Ann Plast Surg 19:504-509, 1987.

The authors describe their technique of the use of a Baker's phenol formula chemical peel and immediate dermabrasion of the same facial area via a wire brush, which they have performed in over 500 cases since 1973. They feel the combined approach retains the advantages of both procedures while eliminating some of their disadvantages. Eyelids are treated with peeling alone. One patient developed a hypertrophic scar which resolved with conservative management.

HUBERT T. GREENWAY, JR., M.D.

Zoster-like leiomyomata. PA Guerra, M Polimeni, G Santoro, SP Cannavo, Derm Clin 7:52-56, 1987 (Italian).

The authors report a case of a 35-year-old man with zoster-like multiple cutaneous leiomyomata of pilar origin; the patient had many papulonodular elements that were aching spontaneously. He had recurrent and severe neuralgic attacks of pain provoked by physical stimulation, emotion, and change of temperature.

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J. Dermatol. Surg. Oncol. 14:4 April 1988

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