Antibiotic Prophylaxis for Full-Face Laser Resurfacing

Is It Necessary?

Zoran Gaspar, MB,BS, FACD; Carl Vincuillo, MB,BS, FACD; Timothy Elliott, MB,BS, FACD

Objective: To evaluate the need for antibiotic prophylaxis when performing full-face laser resurfacing.

Method: Prospective study of 31 patients undergoing full-face laser resurfacing, 17 with and 14 without antibiotic prophylaxis.

Observation: Four of 14 patients without antibiotic prophylaxis had microbiologic and clinical evidence of infection. None of the 17 patients with antibiotic prophylaxis had clinical infection. Early treatment prevented adverse sequelae in the 4 patients who developed infection.

Conclusion: Antibiotic prophylaxis against *Staphylococcus aureus* is useful but not essential, because meticulous wound care and close clinical monitoring of patients daily with routine bacterial swabs can detect infection early.

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LASER RESURFACING of facial skin to treat acne scarring or premature photoaging has become a popular technique. The potential complications are well outlined in the literature and include transient and persistent erythema; pruritus; milia or aciniform eruption; bacterial, candidal, or viral infection; contact dermatitis; hyperpigmentation; hypopigmentation; and scarring. One particular concern is the difference in expert opinion regarding the use of antibiotics to prevent bacterial infection and the potential consequences of severe bacterial infection, including delayed healing, persistent erythema, dyschromia, and scarring. The study design is a prospective microbiologic assessment of patients undergoing full-face laser resurfacing (FFLR). The objectives of the study were to determine whether antibiotic prophylaxis for FFLR is essential and whether there are any adverse outcomes to patients who take prophylactic antibiotics.

RESULT

Thirty-one patients were in the study, 29 women and 2 men. Fourteen patients received no antibiotic prophylaxis, and 17 were given cephalaxin as an antibiotic prophylaxis. All 31 patients had bacterial swabs preoperatively and on postoperative days 1, 3, and 7.

Preoperative swabs of the anterior nares showed *Staphylococcus aureus* in 5 of the 31 patients. Three of the 5 were already taking cephalaxin at a dosage of 500 mg twice daily, beginning 1 day before FFLR. The *S aureus* responded to this antibiotic in all cases. Two other incidental findings were *Enterobacter gergoviae* and a *Pseudomonas* species that was not identified. Only 1 of the 31 patients had swabs that showed no abnormalities during the 7-day study. There was no difference in the rate of healing or in the side-effects profile between the groups with and without antibiotic prophylaxis. A summary of results in both groups is shown in the Table.

PATIENTS NOT TAKING ANTIBIOTIC PROPHYLAXIS

The most common organism found in these patients was *S aureus*. It was present by postoperative day 3 in 7 of the 14 patients in this group. Four patients were prescribed antibiotics because of clinical evidence of infection. Two of these patients received 250 mg of fluclaxolin sodium every 6 hours, 1 patient received 250 mg of cephalaxin every 6 hours, and the...
PATIENTS AND METHODS

Full-face laser resurfacing was performed with a rapid scanning carbon dioxide laser (Feathertouch/Silk-touch, Sharplan Laser Corporation, Allendale, Calif). The procedure was performed by 1 of 2 experienced laser operators (C.V. or T.E.). Treatment varied among patients depending on the indications for the procedure; generally, 1 to 3 passes were used and total fluences rarely exceeded 30 J/cm². Patients were randomly allocated into 2 groups. One group received 500 mg of cephalexin hydrochloride twice daily, beginning the day before the procedure and continuing for 5 to 10 days. The other group received no antibiotic prophylaxis. All patients received 500 to 1000 mg/d of valacyclovir hydrochloride for 10 days, beginning the day before surgery.

Full-face laser resurfacing was undertaken in a fully accredited day surgery facility with the use of general anesthesia. Preoperative bacterial swabs were taken from the anterior nares. Aqueous chlorhexidine gluconate was used as a preoperative disinfectant. A closed wound dressing was used postoperatively, consisting of a hydrogel water and mesh dressing (2nd Skin; Spenco Medical Corp, Little Rock, Ark). In the hospital, dressings were changed daily for the first 3 days, and the skin was cleansed with isotonic sodium chloride solution to remove slough before the application of new dressings. Dressings were changed during the day if they became soiled, especially around the mouth and eyelids. Areas of treated skin that could not be covered by the dressing were coated with white petroleum jelly. At the completion of the third postoperative day, dressings were left off and the skin was covered with petroleum jelly. Bacterial swabs were taken on postoperative days 1, 3, and 7 and sent for microscopy, culture, and antibiotic sensitivity testing. Swabs were taken from the forehead, lower eyelids and upper cheeks, upper lip, and mandibular area. A standard protocol for collection of swabs was used; after cleaning the skin with isotonic sodium chloride solution, a standard cotton-tipped swab was rolled across the relevant site. All other topical applications and cosmetics were withheld during the first 7 days following surgery.

In the postoperative phase, patients in the group without prophylactic antibiotics were given antibiotics if clinically significant bacterial infection developed. This diagnosis was based on the results of the bacterial culture and the physician’s clinical assessment of the patient’s condition. Clinical indications of infection were persistent nonhealing areas, local areas of excess slough, and excess pain.

### SUMMARY OF POSTOPERATIVE RESULTS IN 14 PATIENTS WITH AND 17 PATIENTS WITHOUT ANTIBIOTIC PROPHYLAXIS

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Day 3</th>
<th>Day 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>With</td>
<td>Without</td>
<td>With</td>
</tr>
<tr>
<td>Swabs positive for \textit{Staphylococcus aureus}</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Swabs positive for group B streptococcus</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Swabs positive for other bacteria</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Patients with clinical infection</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Data are given as number.

PATIENTS TAKING ANTIBIOTIC PROPHYLAXIS

None of the patients taking prophylactic antibiotics had clinical evidence of bacterial infection; thus, no patient required a change in his or her antibiotic profile.

In these patients, several Gram-negative organisms were cultured. The incidence of \textit{S aureus} increased at postoperative day 7 in patients in whom cephalexin therapy had been discontinued at day 5. However, by this stage, the skin was almost healed and the positive cultures did not correlate with clinical infection. Again, there was no difference in the swab results from the various facial sites. In addition, there was no difference in symptoms or clinical outcomes between the patients taking cephalexin for 5 days and those taking it for 10 days.

### COMMENT

The use of antibiotic prophylaxis for FFLR is a controversial issue. Nanni and Alster recently reported a retrospective study of 500 consecutive cases of cutaneous laser resurfacing with no bacterial infections, using 1 g of intravenous cefazolin sodium intraoperatively followed by 500 mg of azithromycin on postoperative day 1 and 250 mg for at least 4 days for FFLR. An open technique of postoperative wound care was used. Walia and Alster, in a retrospective study of 133 consecutive patients undergoing carbon dioxide laser resurfacing, showed that the rate of infection was significantly higher in patients receiving routine intraoperative (cephalexin) or postoperative (azithromycin for 5 days) antibiotics. The most common organisms found were \textit{Pseudomonas} and \textit{Serratia} species. The authors concluded that prophylactic antibiotics are not necessary, especially if good postoperative care is followed. Bernstein et al retrospectively assessed 50 patients undergoing FFLR. The patients took 250 mg of dicloxacillin sodium 4 times a day, beginning the day before the procedure and continuing for 1 week. They found no instance of documented infection. Similar results were found by Alster and West in 50 patients treated for acne scarring. Waldorf et al also retrospectively looked at 47 patients undergoing facial laser resurfacing and found that 3 had clinical impetiginization, although no cultures had been
obtained. These 3 patients were not taking antibiotics and did not receive aggressive wound care. Other patients in the study by Waldorf and colleagues received 250 mg of dicloxacillin once per day or 333 mg of erythromycin twice a day for 1 week throughout the re-epithelialization.

Finally, Sriprachya-Anunt et al\(^6\) retrospectively assessed infection rates in 395 patients undergoing laser resurfacing for facial wrinkles. They defined infection as a positive culture in the presence of signs or symptoms of infection. They found an overall infection rate of 4.3%. However, the rate of infection increased 7-fold (from 1.35% to 9.82%) with a change from routine oral antibiotic prophylaxis (250 mg/d of azithromycin or a similar antibiotic for 7 days) to intranasal mupiricin and gentamicin sulfate otic solution, and the use of occlusive dressings rather than the open technique postoperatively. The most common organism was *Pseudomonas aeroginosa*, followed by *S aureus* and *Staphylococcus epidermidis*. The study also found several combinations of Gram-positive and Gram-negative organisms. The authors recommended the use of 500 to 750 mg of ciprofloxacin hydrochloride twice daily for 5 to 7 days, beginning the morning of surgery, as a broad-spectrum antibiotic for prophylaxis, especially if using an occlusive dressing technique. A small study by Ross et al\(^7\) reported that 2 of 4 patients without antibiotic prophylaxis undergoing FFLR developed local *S aureus* infection, whereas none of 4 patients with Gram-positive prophylaxis had negative cultures 2 days following surgery. The authors commented that waiting for signs of infection before prescribing antibiotics increased the risk of scarring. This was not the case in our 4 patients who developed infection. One of the patients with antibiotic prophylaxis in the study by Ross et al developed a Gram-negative infection. Although some of our patients had Gram-negative organisms on culture, there were no clinically significant infections.

In our study, 4 of 31 patients had clinical evidence of infection. Early diagnosis as a result of daily monitoring and early treatment ensured no adverse sequelae. All 4 of the infections occurred in the 14 patients who were not taking preoperative antibiotic prophylaxis. In all cases of infection, the presumed organism responsible was *S aureus*. Of the 4 patients with infection, only 1 had a preoperative anterior nares swab that grew *S aureus*. Thus, it does not appear that positive preoperative anterior nares swabs are predictive of risk of postoperative infection.

All but 1 of the 31 patients had a positive culture result during the study, but these were largely colonizing organisms and did not appear to be causing disease. Fifteen of the 31 patients grew *S aureus* at some point following their FFLR. In patients not taking antibiotics, 8 of 14 grew *S aureus* sometime during the study, but only 4 of these patients required treatment for infection.

The patients receiving preoperative antibiotics grew several organisms in culture. We believe this is due to antibiotic induced selection; however, the organisms did not cause any significant infections or sequelae.

Despite the many articles about antibiotic prophylaxis in laser resurfacing, there is still much controversy and disagreement. This has been further demonstrated in 2 recent articles\(^8,9\) in which experienced laser operators express opposing viewpoints in the argument for and against antibiotic prophylaxis.

We conclude that antibiotic prophylaxis against *S aureus* is useful but not essential. Meticulous wound care and close clinical monitoring of patients daily with routine bacterial swabs can detect infection early. Timely treatment will prevent adverse sequelae. If the patient cannot be closely observed, antibiotic prophylaxis is useful to prevent infection. We have found that most patients will show organisms on culture at some point during the 7 days following FFLR, but this does not always indicate clinically significant infection. Finally, we have not found any need to use antibiotics to prevent Gram-negative organisms in the antibiotic prophylaxis regimen.

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**REFERENCES**

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Correction

Error in Byline. In the Observation by Gaspar et al titled “Antibiotic Prophylaxis for Full-Face Laser Resurfacing: Is It Necessary?” published in the March 2001 issue of the ARCHIVES (2001;137:313-315), the name of the second author was misspelled in the byline on page 313 and in the Table of Contents on page 259. The bylines in both places should have appeared as follows: “Zoran Gaspar, MB,BS, FACD; Carl Vinciullo, MB,BS, FACD; Timothy Elliott, MB,BS, FACD.”