Treatments for Skin Cancer: How do They Stack Up?

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Despite greater public awareness of the risks of skin cancer and widespread use of preventive measures, in the United States each year there are more than 800,000 new cases of basal cell carcinoma, more than 350,000 new cases of squamous cell carcinoma, and nearly 42,000 new cases of melanoma.[1] We have at our disposal several effective treatments to eradicate these tumors. Mohs micrographic surgery, however, is the gold standard for the treatment of cutaneous and mucosal neoplasms. No other treatment offers such a high cure rate with minimal cosmetic disruption. It's especially appropriate in cases where the tumor is large, recurrent, indistinctly demarcated, or situated near vital functional or cosmetic structures. My intent here is to review the available treatments both for precancerous lesions and skin cancers and to discuss their relative merits.

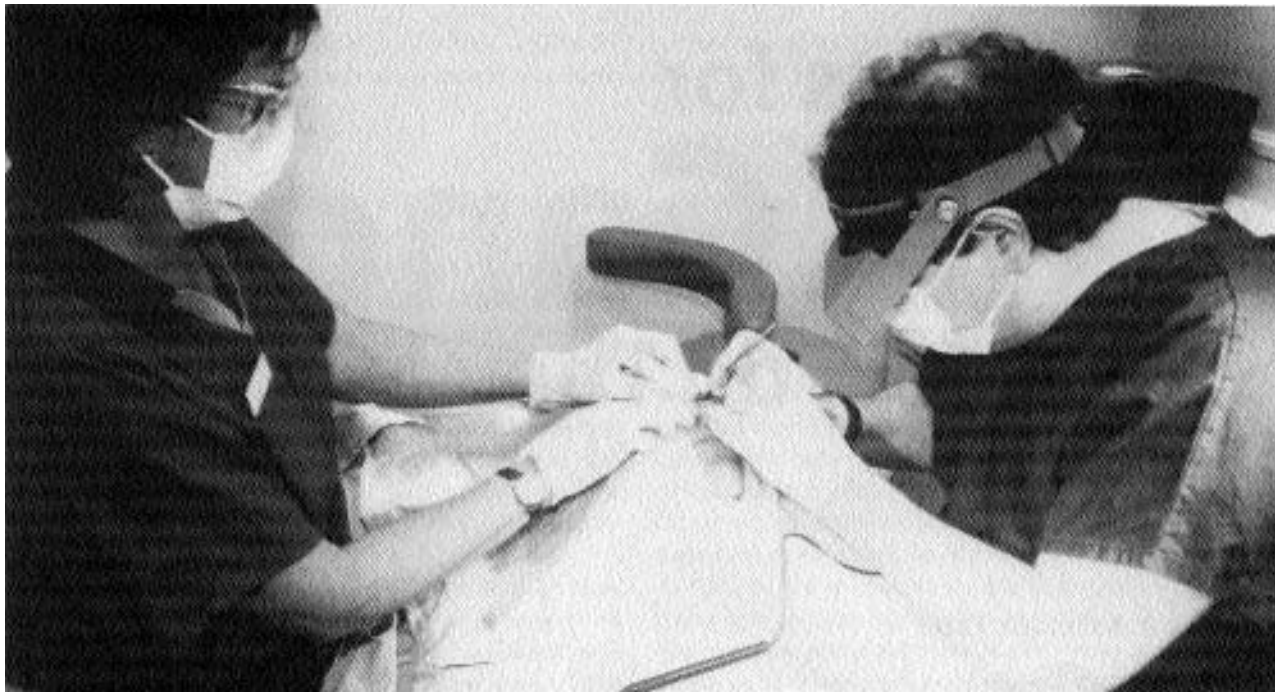
FLUOROURACIL FOR AKs

Treatment of actinic keratosis depends on the number of lesions, the extent of involvement, and the patient's overall health. If there are just a few lesions and little evidence of actinic damage, you could use any of several destructive techniques - cryotherapy, curettage, electrodesiccation, chemical cauterization, or excision. Destructive procedures have the usual complications and sequelae of scarring, loss of pigmentation, infection,and recurrence.

One to five percent 5-fluorouracil cream or solution (Efudex, ICN Pharmaceuticals) can be particularly useful in cases of moderate actinic damage because it is able to treat subclinical lesions. Currently coming to market, Carac (Dermik Laboratories) offers fluorouracil in a 0.5% concentration. When using 5-FU, monitor patients closely for possible bacterial infection of ulcerated lesions. Patients vary in the treatment time necessary to destroy the lesions. Treatment typically requires four to six weeks for complete to near-complete clearance. Carac is expected to shorten the treatment duration to a maximum of four weeks, but clinical experience with the product is limited at this time.

Unfortunately, 5-FU can produce unsightly cosmetic results during use. The treated area becomes red, ulcerates, undergoes erosion, and then heals as pinkish, younger-looking skin that is slightly depressed compared to the surrounding yellowish, sun-damaged tissue. The pinkish color fades over time, but you can still see a difference between the healed areas and the surrounding skin that did not ulcerate. I prefer to treat the patient in sections: six weeks of treatment in one section, two weeks to let it heal, and then move onto the next area. In many cases, patient may be doing this for an entire year. Retreatment with 5-FU may be necessary several years later for actinic keratoses that continue to develop on sun-damaged skin untouched by the earlier treatment.

Some doctors advocate using Efudex less vigorous-



Dr. Balin performing Mohs micrographic surgery to remove a cancerous lesion from the tip of the nose of an elderly gentleman.

ly for instance, treating for just a week or two. In that case, the 5-FU will eliminate the precancerous cells at the surface, but cells in the dermal layer are not destroyed; they will continue to grow. Incomplete 5-FU treatment, therefore, will mask a tumor, and when it surfaces it is likely to be larger than before. When using fluorouracil, it is critical to ensure that you treat the site to completion.

Carac is said to cause less irritation than Efudex and to produce quicker improvement. That may be the case, but only after we have long-term experience with Carac in the field will we know whether its use may also allow recurrence owing to incomplete treatment.

DERMABRASION

When there is extensive involvement and numerous actinic keratoses, dermabrasion may be the treatment of choice. It can effectively eradicate large numbers of actinic keratoses, particularly when they involve the face and scalp.[2] Dermabrasion has an advantage over 5-FU in that you sand off not only the precancerous lesions but also the areas of sun-damaged skin, preventing further lesions from developing over time. It produces a more pleasing cosmetic result than 5-FU does because it destroys the skin uniformly and the skin then heals evenly. Dermabrasion also yields quicker results than you get with 5-FU; reepithelialization and recovery generally happen within five to 10 days.

Treatment with a CO_2 laser will do essentially the same thing as dermabrasion. The laser does not penetrate quite as deep as dermabrasion, but the damaged cells in actinic keratoses are primarily in the epidermis, so the laser goes deep enough to destroy them. Laser therapy treats the sun-damaged skin as well as the precancerous tissue. Laser surgery has the advantage of relatively simplicity: dermabrasion requires a higher degree of operator skill than laser surgery.

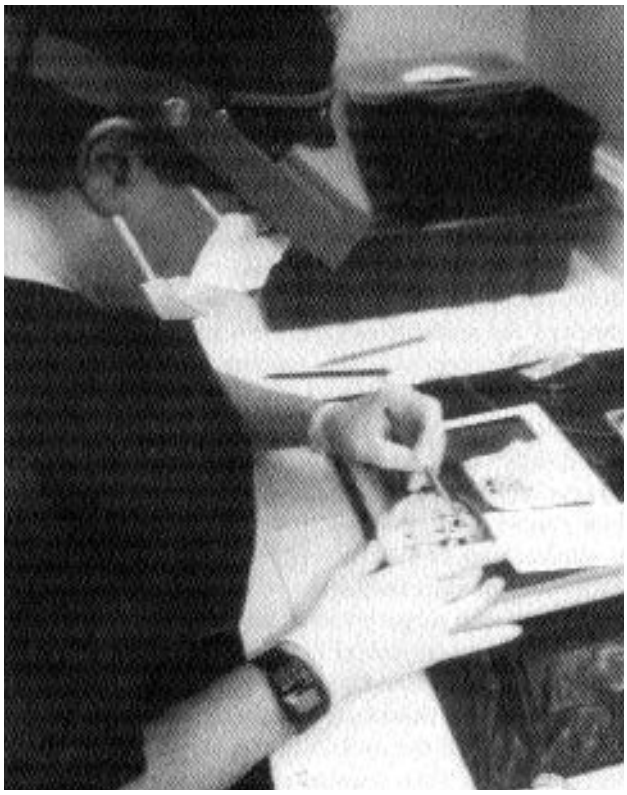
It's also worth mentioning that topical tretinoin inhibits the progression of actinic keratoses. This treatment has not been found to eradicate the precancerous cells entirely, because we know that once you stop tretinoin treatment, the actinic keratoses come back. But it's a safe and effective adjunctive therapy.

TREATMENT OPTIONS FOR SKIN CANCERS

There are basically five ways to eradicate skin cancers: burning, freezing, X-ray radiation, surgical excision, and excision by Mohs micrographic surgery. Each has advantages and disadvantages.

Burning of the tumor requires electrodesiccation, cautery, or a laser. Burning is quick, and it requires minimal operative skill. The clinician neither has to know how to do incisional surgery nor how to apply stitches.

The major disadvantage of burning the tumor is that you don't really know precisely where to burn. You



Dr. Balin preparing the specimen for dermatopathology evaluation.

burn the tissue without knowing whether you've gotten all the tumor or whether there may be residual tumor cells remaining. Because of that, a certain percentage of these tumors may recur. A second drawback of burning is that you leave a black scab that takes two to three months to heal. It heals as a sunken white scar.

A second way to treat a skin cancer is to freeze it with cryosurgery. This technique has the advantage of being quick and easy to perform; often, no injection of anesthesia is required. However, it shares the same disadvantage as burning in that you don't know exactly where to freeze. There's no way to tell if the freezing goes deep or wide enough or if there is residual cancer that you haven't gotten. With cryosurgery, a certain percentage of the tumors will recur. The freezing procedure leaves a blister that later forms a scab. It takes one to two months to heal, and it heals as a flat or depressed white scar.

Freezing involves an extra problem to consider when compared to burning. Freezing a cancer cell doesn't kill the cell, it actually preserves it. However, when the cell thaws, a slow thawing process results in intercellular ice crystals rupturing the cell membrane, causing cell death. Unfortunately, not every cell ruptures as it thaws, only a percentage of them. That is why the freeze-thaw cycle is repeated several times. These spared cells, together with ones that were inadequately treated in the first place, may later produce a recurrence.

X-ray radiation therapy represents a third approach to treating skin cancers. X-rays, of course, kill cancer but X-rays can also cause cancer to develop. It takes about 10 years after exposure to get cancer from X-rays, so X-ray therapy is appropriate for certain patients. One of the more practical problems with X-rays is that patients must receive fractional treatments. The person has to come in for multiple visits and receive a fraction of the dose each time. It's a nuisance to have to return every day for a lesion that otherwise can be taken right off. But for certain selected patients, this may be appropriate therapy.

A fourth way to remove skin cancers is standard surgical excision. When you excise a tumor, you observe the breadth of the lesion, go a certain distance outside the borders, and cut out the skin. You send the excised skin to a lab for analysis. A technician cuts a section analogous to slicing a tomato or a loaf of bread and checks the surface of the section for evidence of cancer cells. The trouble is that, theoretically, it would require thousands of cross-sectional cuts to ensure that the entire tumor and any roots were removed. Generally a lab makes just one slide, or perhaps two to four if the piece of skin is large.

Conventional surgery therefore has two problems. One is that you remove more skin than is necessary. The second is that even if the lab reports that the cancer is entirely removed, you cannot be sure. It all depends on whether or not there happened to be a root at the site where they took their section.

MOHS MICROGRAPHIC SURGERY

Mohs micrographic surgery avoids these problems. Originally developed in the 1930s by Frederick E. Mohs, MD, and later refined from a fixed-tissue to a fresh-tissue technique, the procedure once known as "chemosurgery" essentially involves excising cancerous tissue serially and examining the undersurface and edges of the section for evidence of remaining cancer. Of all the skin cancer treatments, Mohs surgery offers the highest cure rate (greater than 99 percent), the least likelihood of recurrence, minimal potential for scarring or other disfigurement, and unmatched precision.[3-5]

Many types of tumors have been excised successfully using the Mohs technique. Although there is some disagreement among experts about the indications, the procedure is especially appropriate for certain cases:

- Large tumors
- Tumors with indistinct borders

- Tumors near vital functional or cosmetic structures
- Recurrent tumors for which other treatments have failed

MOHS TECHNIQUE

As a Mohs surgeon who has performed thousands of procedures, I will now share with you my perspectives on the technique. The Mohs surgeon performs a dual role as both surgeon and pathologist. First, the surgeon removes the visible portion of the tumor by excision or curettage. With the scalpel blade held at a 45 angle to the skin, the surgeon then excises a layer of tissue from the base of the site. The clinician divides this layer into sections, color-codes them with dyes, and makes reference marks on the skin to indicate the source of these sections. This yields a map of the surgical site.

The undersurface and edges of each section are now examined under the microscope for evidence of remaining cancer. If there are cancer cells, the surgeon marks their location on the map and returns to the patient to remove another layer of skin at the corresponding site. This layer is then examined microscopically for additional cancer cells. This process continues layer by layer until there are no detectable cancer cells. Our precise technique is well described by Dr. Willis Cottel in his article, "Mohs Surgery, Fresh-Tissue technique."[6]

Conventional excision yields specimens that are examined microscopically in breadloaf-type sections, which may not allow accurate examination of the tumor margins. In the Mohs procedure, the orientation and sectioning of the specimens allow you to examine the deep and lateral margins of the tumor. This enables detection of subtle microscopic strands of tumor.[6] The problem with conventional surgical sectioning is reviewed by Dr. Richard Bennett and colleagues in their article "The Meaning of Surgical Margins."[7]

The duration of the procedure will vary depending on the size and location of the skin cancer. Another variable is the type of reconstruction needed. Most cases involve one to three surgical stages. The excision itself only takes about 10 minutes. The sectioning, marking, and microscopic analysis make take up to two hours for each stage. We instruct patients to report first thing in the morning and tell them to count on spending most of the day. They should bring a book or something else to keep busy while waiting for the lab work.

The size and shape of the final defect will dictate wound treatment. Our approach generally is to stitch the wound closed, although some wounds can be allowed to heal by nature. Larger defects may require skin flaps or skin grafts. You can revise any resultant surface anomalies through surgical revision, spot dermabrasion, or laser resurfacing. In cases involving extensive defects, you may which to use a multidisciplinary team approach, working with a reconstructive surgeon. Adjunctive radiation therapy may be indicated in cases of deep tumors, extensive perineural spread, and where there is a likelihood of lymphatic spread.[9]

CONCLUSION

Mohs micrographic surgery is considered the gold standard for removal of cutaneous and mucousal neoplasms. Clinicians can offer patients unmatched long-term cure rates and the best possible cosmetic results. I personally believe that Mohs surgery is superior to all of the other methods of skin cancer removal. I think that every patient should be given the option of having their cancer removed by Mohs surgery irrespective of its clinical size or location. Mohs surgery is an ideal technique for dermatologists to perfect. It combines our expertise in surgery and in dermatopathology, and allows us to remove cancer from our patients far better than doctors not skilled in treating the skin.

I believe that thorough training in Mohs surgery should be part of the residency training program of all dermatologists. Thus, instead of artificially restricting a superior therapy because there are not enough doctors who perform Mohs surgery, this valuable technique will be available to help all of our patients. Until Mohs surgery is included in the curricula of all of our dermatology residency programs, you can contact the American College of Mohs Micrographic Surgery and Cutaneous Oncology at (800) 500-7224 to obtain information about training and fellowship programs.■

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