A PATIENT'S GUIDE to MOHS MICROGRAPHIC SURGERY

Microscopically Controlled Surgery for Skin Cancer

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A Checklist Before Surgery

Please read this patient guide thoroughly. It should answer many of your questions. Please contact our staff with any further questions.

- We recommend that you eat a light breakfast, take all your morning medications, and bring any medications required for one day.
- To prevent excessive bleeding during and after surgery, **stop taking any aspirin**, **Coumadin, Plavix, ticlopidine (Ticlid), non-steroidal anti-flammatory agents (ibuprofen, Motrin, Advil, Nuprin), naprosyn (Alleve) and Vitamin E at least one week before surgery. In addition herbal supplements gingko biloba, ginger, garlic, feverfew and echinacea should be discontinued one week before surgery.**
- If you have a medical condition, such as a heart murmur mitral valve prolapse or if you've had joints surgically replaced for which you take antibiotics before dental or surgical procedures, let us know so we can help make these antibiotics available before your surgery.
- To improve wound healing, don't smoke before or after surgery.
- Be prepared to stay all day. We suggest you arrange for a friend or family member to drive you home after surgery. Please do not bring any small children.

Skin Cancer

How common is skin cancer?

Skin cancer is the most common form of cancer in humans. According to the American Cancer Society, over 1,000,000 new cases of skin cancer will be diagnosed this year in the United States. The incidence of skin cancers increases yearly.

What causes skin cancer?

A tumor is defined by the abnormal, uncontrolled growth of cells. Benign tumors tend to grow in single locations and may require removal if they interfere with a body function. Malignant tumors are termed cancers. In addition to causing local destruction of normal structures, cancers may recur in the same location after treatment, and can spread to other parts of the body, a process termed "metastasis."
The largest factor causing skin cancer is ultra-violet radiation found in sunlight. Most skin cancers occur on the sun-exposed parts of the body: the head, neck, arms and hands. An individual's risk of skin cancer depends upon many factors. Fair-skinned people who sunburn easily are at greater risk than those who are dark and tan easily. Outdoor occupations and long hours of outdoor recreation are also associated with a greater tendency to form skin cancer. Skin cancers may also occur because of genetics or in those people exposed to X-rays, coal tar, or chemicals such as arsenic.

Three types of skin cancer account for over 90% of all skin cancers

Basal cell carcinoma is the most common, accounting for about 80% of all skin cancers. It is a slowly growing cancer, which does not tend to metastasize, but can cause destruction of skin tissue locally. A basal cell cancer, which may invade into cartilage and bone, can result in complete loss of these structures if left untreated. Basal cell carcinoma typically begins as a persistently pink or pearly white area, which later may break down to form an ulcer or bleed.

Squamous cell carcinoma is the second most common skin cancer (about 12% of skin cancers). It grows more quickly than basal cell cancer, and also may spread (metastasize) to lymph nodes and internal organs, sometimes causing death. Squamous cell cancers begin as raised red scaly areas which persist over months.

Melanoma, is the least common, but most aggressive type of skin cancer. Family members of those who have had melanoma and individuals who have had a number of severe or blistering sunburns during childhood appear to have an increased risk of developing melanoma. The prognosis depends on the melanoma's depth. Thin melanomas can be easily cured; deep melanomas are harder to remove and may have metastasized to internal organs when discovered. Melanoma and death from melanoma are increasing every year. Melanoma may begin in a pre-existing mole or may arise as a new brown (pigmented) lesion. Usually melanomas have an irregular shape, ill-defined borders, and variable color (brown, blue, red, white, black, or some combination of these colors.)

Preventing Skin Cancer

Skin cancer prevention depends on limiting exposure to ultraviolet radiation, and on early detection (a physical examination by a dermatologist to discover and treat pre-cancers and cancers in their early stages).

The risk of developing skin cancer appears to correlate directly with a person's total lifetime dose of ultraviolet radiation. Sunscreens should have a Sun Protection Factor (SPF) of at least 15, should protect against ultraviolet A and B light, and should be used on a daily basis on exposed skin of the head, neck, hands and arms. In addition, wearing protective clothing can reduce ultraviolet light exposure. We will be happy to provide you with a list of recommended sunscreens and UV-protective clothing.

Individuals who have had one skin cancer have an increased chance of discovering another skin cancer within two to three years.

Therefore, those who have had one skin cancer should be examined by a dermatologist at least once a year.

Skin Cancer Treatment

There are four goals when treating skin cancer:

- Completely remove the cancer
- Preserve normal skin
- Preserve function
- Provide an optimal cosmetic result

To be cured, skin cancers must be destroyed or removed. They may be treated by cryotherapy (freezing), curettage and electrodesiccation (scraping and burning with an electric needle), excision (surgical removal), radiation therapy, or Mohs micrographic surgery. For primary, untreated skin cancers, the non-Mohs surgery methods may offer a cure rate of 90-95%. For recurrent, previously treated skin cancers, non-Mohs surgery methods may offer cure rates of only 60-80%.

Mohs Micrographic Surgery

Mohs micrographic surgery was created by Dr. Fred Mohs when he was a medical student over forty years ago. It is a meticulous and precise surgical technique used for removing skin cancers. This procedure has gained wide acceptance for skin cancer treatment in the last fifteen years. The name "micrographic" comes from "micro," indicating the use of a microscope, and "graphic," indicating that a detailed map or drawing of the tumor is made during the treatment.

The Mohs procedure requires the following three steps:

1. Remove the visible tumor to determine the initial tumor borders.
2. Remove a thin disk of skin around and underneath the borders.
3. Examine the removed skin under the microscope and draw a map of where skin cancer remains.

If cancer is still present, the patient returns to the surgery room to remove only the area of skin where the cancer remains. These steps are repeated in cycles until the tumor is totally removed. In this way, a careful, accurate, and complete removal of the skin cancer is achieved with minimal removal of normal surrounding skin.

Mohs Surgery: Advantages

The Mohs technique has a number of advantages over other methods of treatment. Because no guess-work is involved in determining where the cancer's edge lies, a minimum of normal skin is removed and only normal structures involved with cancer are sacrificed. In other words, the cancer is completely removed while normal tissues are conserved. This procedure results in the smallest possible skin tissue defect and therefore the smallest possible scar results. In addition, the surgeon is the pathologist and immediately examines the removed tissue. The surgeon can directly compare what he sees in the patient's skin and under the microscope. This is not the case when the tissue is sent to an outside person for interpretation. Finally, the cure rates for skin cancers treated with Mohs technique are superior to those achieved by other methods.

Mohs surgery provides cure rates for primary (untreated) and recurrent (previously treated) basal cell and squamous cell cancer of > 97%. While Mohs technique give the best possible chance for cure, it is not a 100% guaranteed cure.

Before Surgery

Our first concern is providing you with excellent medical care for your skin cancer. This requires some preparation before surgery. Your physician should review with you your medical and surgical history, any drug allergies, and your medications to prevent problems from occurring during and after surgery. These meetings will also be used to determine if any laboratory tests, X-rays, or evaluations by other physicians are necessary before surgery.

Please bring a complete list of medications, including the dose and number of times you take them each day. Also bring a day's supply of your medications and a list of any medications to which you are allergic. You should stop taking aspirin, ibuprofen, Coumadin, ticlopidine (Ticlid), Vitamin E, or other blood-thinning agents for one week before and after surgery. If your physician has recommended that you not stop these medications, let us know so that we can discuss this matter with your physician. The surgery will be performed in an outpatient surgery unit. Hospitalization for Mohs surgery is rarely required. Due to the nature of the surgery, you will spend most of your time in our waiting room while our Mohs technician processes the tissue specimen, usually 30 to 45 minutes. While the surgery will be completed as quickly as possible, you should plan to spend the whole day with us. Please do not make other plans or appointments for the day. We recommend that you be accompanied by a friend or relative who can drive you home after surgery.

The Day of Surgery

After you check in for surgery, you will be escorted to an outpatient surgery suite. A staff member will prepare you for surgery by checking your medications and medical history, photographing the skin cancer and obtaining your signed informed consent for surgery. A staff member will then cleanse and numb the area of the cancer using a local anesthetic. A mixture of short and long acting anesthetic is used, which allows you to be pain free within minutes, and lasts for hours. Surgery will begin with the removal of a small piece of skin including the cancer. Any bleeding will then be stopped using cautery, and a bandage will be applied to the area. You will then be escorted back to the waiting room while the tissue is processed for microscopic examination by the surgeon.

During this time you may relax, read or visit with friends. If the tissue examination demonstrates that cancer still remains in the skin, you will return to the surgery suite where additional skin will be removed in the areas where the cancer remains. On average, Mohs surgery requires two or three stages to completely remove the skin cancer.

After Surgery

When the cancer is completely removed, the surgical area will be measured and photographed. At this point we will discuss your options for managing the surgical wound. Whether the wound is allowed to heal on its own or is reconstructed, you will leave the outpatient surgery suite with a pressure dressing over the wound and written instructions describing wound care. In the days after surgery you may experience the following:

Pain

During surgery, pain is prevented by the use of local anesthetic injections. Typically this anesthetic loses its effect in 3-6 hours. While Tylenol alone usually takes away further pain, occasionally we will prescribe a stronger pain medication.

Bleeding

Great care will be taken to seal all blood vessels during surgery and a pressure dressing will be applied before you leave the surgery unit. These two measures should prevent any significant bleeding. Occasionally post-operative bleeding occurs. Those individuals who are on blood thinners, drink alcohol before or after surgery, or who stretch or traumatize the wound within the first few days after surgery may be more prone to this type of bleeding. If bleeding soaks through the pressure dressing, apply firm, even pressure with your hand for a full twenty minutes. If this does not halt the bleeding, call our office at (505)872-4700 or go to the nearest emergency room.

Bruising

Bruising around the operative site is a common side effect. This will resolve as do other bruises. The eyelids and cheeks are particularly

sensitive to bruising. Bruising of one or both eyes may even occur when they are not directly involved with the surgery.

Swelling
Some swelling (edema) may occur within the first few days after surgery. The thin skin around the eyes is particularly sensitive to this. This is typically worse in the morning and improves after you get up and move around. Swelling will be at its worst the first day after surgery and should gradually resolve over two to three days. Sleeping with the surgical site elevated will help to minimize post-operative swelling.

Scarring
Scars always result from surgery of the skin. Scars that occur
after surgery are minimized if the defect after cancer removal is small. This is one of the major advantages of Mohs surgery- the cancer is removed leaving the smallest defect possible. Small scars are generally less noticeable than large scars. A second procedure to reconstruct the wound often improves the cosmetic outcome by placing the scar lines in the natural grooves in the skin.

Numbness
At times, the area surrounding your operative site will be numb to the touch. This area of anesthesia (numbness) may persist for several months or longer. In some instances, it may be permanent. If this occurs, please discuss it with your physician at your follow-up visit.

Wound Healing without Reconstruction

Healing by spontaneous granulation involves letting the wound heal by itself. This offers a good chance to observe the wound as it heals after removal of a difficult tumor. Experience has taught us that there are certain areas of the body where nature will heal a wound as nicely as further surgical procedure. Sometime a wound will be left to heal, with the knowledge that if the resultant scar is unacceptable, some form of cosmetic surgery can be performed at a later date.
If the wound is allowed to heal by itself (or granulate in), the dressing must be changed every day until healing is complete. All wounds normally drain, and dressings are changed daily to rid the wound of such drainage. The nurses will teach you how to change the dressing and will give you preprinted instruction.
If the wound is allowed to granulate in, it usually heals in four to eight weeks- depending on the size of the wound and on how quickly an individual tends to heal. When healing is well advanced, you will be permitted to stop the daily dressing changes.

Reconstruction

To achieve an optimally functional and cosmetic outcome, and to speed wound healing, a skin flap or graft may be required to reconstruct the wound. This may be performed on the day of surgery or may be delayed. Delayed reconstruction does not significantly increase the risk of infection or poor healing. Your options for reconstruction will be discussed after your skin cancer has been removed.

After the skin has healed

In healing surgical wounds, the skin lays down collagen (rope-like) molecules to knit together the sides of the wound. Blood vessels will grow into the area to provide nutrients to the healing wound. The collagen strands are first placed quickly and randomly to hold the wound edges together. At the same time the epidermis (the top layer of skin) grows over the wound to seal it. For up to a year after the epidermis has re-sealed the wound, the collagen molecules are remodeled according to the stretch and stress placed on the wound.

During this activity you may experience a number of sensations. Initially, the wound will feel tight, but should relax within weeks. Occasional itching or twinges of pain may occur. A scar may remain raised and pink for many months, but should finally become flat and pale in a year or so . Occasionally, scars become thick, raised red scars known as hypertrophic scars or keloids. Persistently red and raised scars should be treated immediately. Please contact our office if this type of scarring persists over two months. The process of scar remodeling can be speeded by gentle massage using Vaseline and lotion. You may begin massaging the wound a week after the skin surface is re-sealed, or stitches have been removed.

During skin surgery small nerves are cut. This results in numbness around the wound. Usually the skin will remain numb for several months until tiny nerve fibers grow back into the area. A period of heightened skin sensitivity signals their regrowth. The skin sensation then gradually returns to normal.

If we have chosen to let your wound heal by itself, the resulting scar will usually be quite acceptable. Occasionally the initial scar may not be ideal. In this case your scar can be revised to improve the appearance.

Follow-up Visits

If your surgical wound has been reconstructed, you will be asked to return for suture removal and usually once more to judge wound healing. Occasionally revision of the scar or graft may be required necessitating more visits. Our goal is to have you return as soon as possible for a

follow-up with one of our dermatologist for long term surveillance for skin cancer.

Other Cutaneous Surgery & Laser Center Services

- Surgical removal of benign and malignant skin lesions
- Surgical removal and management of atypical (dysplastic) moles and melanoma
- Laser treatment of vascular (red) and pigmented lesions, warts, tattoos, and other lesions
- Treatment and management of hypertrophic scars and keloids
- Skin resurfacing (chemical & laser peels, scar revision)
- Collagen and Botox injections
- Sclerotherapy