Skin Cancer and Mohs Micrographic Surgery

Skin cancer is the most commonly diagnosed cancer, comprising approximately 30% of all new cancer diagnoses.

Basal Cell Carcinoma

Basal cell carcinoma (BCC) affects approximately 800,000 Americans annually, making it the most common of all cancers in human beings. Basal cell carcinoma arises from cells in the epidermis (outermost layer of skin), and although it most often occurs in sun-exposed skin, it may occur anywhere on the body.

What Causes Basal Cell Carcinoma?

The most common cause of BCC is sunlight. Sunlight can cause damage to cellular DNA and this is harmful because DNA is the *blueprint* or *map* for creating new cells. In most cases, damaged DNA is detected and repaired by one's immune system. Basal cell skin cancer forms when sun damage is too great for the immune system to detect and repair.

Who Gets Basal Cell Carcinoma?

Anyone with a history of frequent sun exposure can develop BCC. But people who have fair skin, light hair, and blue, green, or gray eyes are at highest risk. Those whose occupations require long hours in the outdoors or who spend extensive leisure time in the sun are in particular jeopardy. Dark-skinned individuals are far less likely than fair-skinned to develop skin cancer.

What Does Basal Cell Carcinoma Look Like?

Basal cell carcinoma may have a varied appearance, and is often very subtle. Regular skin examination by a dermatologist allows for detection of early, and likely smaller basal cell carcinomas. We also recommend regular self-skin examination -- as often as once a month if you are at high risk. Be sure to include the scalp, backs of ears, neck, and other hard-to-see areas. (A full-length mirror and a hand-held mirror can be very useful). Your physician will suggest the correct time frame for follow-up visits, depending on your specific risk factors, such as skin type and history of sun exposure.

Squamous Cell Carcinoma

Squamous cell carcinoma (SCC) is the second most common skin cancer and is diagnosed in more than 200,000 Americans each year. Squamous cell carcinoma arises from cells in the epidermis (outermost layer of skin), and although it most often occurs in sun-exposed skin, it may occur anywhere on the body. Although squamous cell carcinomas usually remain confined to the skin for some time, they may eventually penetrate the underlying tissues if not treated. In a small percentage of cases, they spread (metastasize) to local lymph nodes, distant tissues or organs. When this happens, they can be fatal.

What Causes Squamous Cell Carcinoma?

Chronic exposure to sunlight (ultraviolet radiation) is the most common cause of squamous cell carcinoma, and tumors most frequently appear on the sun-exposed parts of the body: the face, neck, bald scalp, hands, shoulders, arms, and back. The rim of the ear and the lower lip are especially vulnerable to the development of these cancers. Squamous cell carcinomas may also occur where skin has suffered certain kinds of injury: burns, scars, long-standing sores, sites previously treated with radiation or chronically exposed to chemicals such as arsenic. Development of squamous cell carcinoma is encouraged by medical conditions that suppress the immune system such as organ transplant medications or HIV.

Who Gets Squamous Cell Carcinoma?

Anyone with a history of frequent sun exposure can develop SCC, but people who have fair skin, light hair, and blue, green, or gray eyes are at highest risk. Those whose occupations require long hours in the

outdoors or who spend extensive leisure time in the sun are in particular jeopardy. Dark-skinned individuals are far less likely than fair-skinned to develop skin cancer.

Pre-cancerous Conditions

Certain precursor conditions, some of which result from extensive sun damage, are worth noting. They are sometimes associated with the later development of squamous cell carcinoma. They include:

- Actinic, or solar, keratosis. Actinic keratoses are rough, scaly, slightly raised growths that range in color from brown to red and may be up to one inch in diameter. They appear most often in older people.
- Actinic cheilitis. A type of actinic keratosis occurring on the lips, it causes them to become dry, cracked, scaly, and pale or white. It mainly affects the lower lip, which typically receives more sun exposure than the upper lip.

What Does Squamous Cell Carcinoma Look Like?

The development of a new growth or open sore that does not heal should prompt skin examination by a dermatologist. Early detection of squamous cell carcinoma simplifies treatment and reconstruction and decreases the chance for metastasis. We also recommend regular self-skin examination -- as often as once a month if you are at high risk. Be sure to include the scalp, backs of ears, neck, and other hard-to-see areas. Your physician will suggest the correct time frame for follow-up visits, depending on your specific risk factors, such as skin type and history of sun exposure.

Melanoma

Melanoma is the third most common skin cancer in the United States, with about 60,000 new cases diagnosed each year. Melanoma arises from pigment cells, called melanocytes that give us our skin color and are located in the epidermis (outermost layer of the skin). Although melanoma usually occurs in sun-damaged skin, it may occur anywhere on the body.
Melanoma most often remains confined to the skin for some time, but it may eventually spread via lymph or blood vessels. In some cases, melanoma may spread (metastasize) to local lymph nodes, distant tissues or organs. The likelihood of metastasis is most dependent on the thickness of the tumor at diagnosis.

What Causes Melanoma?

Excessive exposure to sunlight is the most common cause of melanoma. Sunlight causes damage to melanocyte DNA and this is important because melanocyte DNA is the *map* or *blueprint* used to create the next generation of melanocytes. Each person's immune system has the ability to repair a certain amount of sun damage to melanocyte DNA, but repair ability varies widely from person to person and is probably inherited. People with excessive sun exposure and less effective immune repair mechanisms are predisposed to form melanoma, whereas people with minimal sun exposure and more effective immune repair mechanisms are less likely to form melanoma.

Who Gets Melanoma?

Anyone with a history of frequent sun exposure can develop melanoma. But people who have fair skin, light hair, and blue, green, or gray eyes are at highest risk. Those whose occupations require long hours in the outdoors or who spend extensive leisure time in the sun are in particular jeopardy. Dark-skinned individuals are far less likely than fair-skinned to develop melanoma. *Anyone with a personal or family history of melanoma is more likely to develop melanoma.*

How Serious is Melanoma?

The prognosis of melanoma depends on variables that are unique in each case. One important variable is thickness – thick melanomas are more dangerous than thin melanomas because they have greater access to vessels that may act as vehicles for spread (metastasis). Knowledge of melanoma thickness allows the surgeon to educate patients on their prognosis and guides the formulation of an optimal treatment plan in each unique case.

What Does Melanoma Look Like?
Melanoma is varied in appearance. Regular skin examination by a dermatologist allows for detection of early, and likely smaller and thinner melanomas. We recommend regular self-skin examination -- as often as once a month if you are at high risk. Be sure to include the scalp, backs of ears, neck, and other hard-to-see areas. (A full-length mirror and a hand-held mirror can be very useful). Your physician will suggest the correct time frame for follow-up visits, depending on your specific risk factors, such as skin type and history of sun exposure.

Moles and Melanoma
Some melanomas develop in preexisting moles. Most people have at least one mole on their body, and many people have more than 40. Most moles appear in the first 20 years of life and sun exposure may increase their overall number. New moles are usually flat and may be tan, pink, brown, or black in color. Although some moles do not change over time, many become raised and lighter in color. Most moles will slowly disappear, seeming to fade in time while others may form a "stalk," making them resemble a skin tag.

People who have many moles (greater than 100) and people who have many *dysplastic* or *atypical* moles are probably at increased risk to develop melanoma. Atypical moles are often large (larger than a pencil eraser in diameter) with irregular or asymmetrical shape, and uneven color. Recognizing the early warning signs of melanoma requires skin examination and an understanding of the **ABCD's** of mole examination. Below is an introduction to the **ABCD's**:

Asymmetry occurs when a mole's shape cannot be divided into 2 mirror images.
Borders are irregular when they are ragged, jagged, or blend into the surrounding skin.
Color is irregular when there are more than 2 shades of brown, jet-black, red, white, or blue.
Diameter is too large if a mole is larger than 6mm in diameter (the diameter of a pencil eraser).

If moles display a change in these characteristics, a dermatologist should evaluate them.

Mohs Micrographic Surgery

What is Mohs Micrographic surgery?
Frederic Mohs, M.D. developed a new type of surgery to remove skin cancers in the 1930's. Up until the 1980's, Mohs surgeons used a chemical on the skin prior to surgically removing them, and therefore the procedure is sometimes referred to as Mohs Chemosurgery. In the last few decades however, the technique has evolved and now utilizes local numbing injections prior to surgical removal of skin cancers. Removed tissue is mapped and examined microscopically immediately after surgical removal. Therefore, the name has evolved into Mohs Micrographic Surgery.

Surgical Technique
The surgery involves initially removing visible tumor. An additional layer of "normal appearing" tissue is then removed as the *safety margin* (1-2mm). This layer is then frozen and processed with special stains for examination under a microscope while the patient rests in the waiting room. If microscopic "roots" of the tumor are identified, they are precisely mapped out and additional surgery is performed in these areas only.

What are the advantages of Mohs surgery?
Most importantly, *Mohs surgery offers the* **highest cure rate for skin cancer**. This is true because tissue is examined in a more meticulous manner when compared to other types of surgery. Microscopical mapping in Mohs surgery allows for removal of diseased tissue while healthy tissue is conserved. This leads to the smallest possible wound and allows for the *smallest possible scar*.

Which skin cancers need Mohs surgery?
Mohs surgery is the ideal treatment for any tumor that has a high risk of recurrence. Examples include cancers that have recurred or failed to respond to other surgical procedures. Tumors on the head and neck

or other high-risk locations for recurrence or cosmetic/functional deformity are best treated by Mohs surgery.

Will there be a large defect in the skin after the surgery?
The primary goal is to remove all the cancer. Mohs Micrographic Surgery is extremely precise and therefore allows for *tailoring* of a wound to only involve cancerous tissue. The resulting wound size will vary, but will only be slightly larger than the tumor itself was.

How is the defect repaired?
Most wounds are stitched to facilitate quick healing and minimal scarring, but occasionally wounds are allowed to heal on their own. Stitched wounds are sometimes closed in simple "side to side" fashion, but occasionally more advanced flap and grafts are required.

If reconstruction is necessary, is it done on the same day?
This is usually done the same day. Sometimes the wound needs a waiting period of days or weeks before the repair can be performed. Some repairs may require another surgical specialist. In those cases a referral is made.

Will there be much pain?
Usually the only discomfort during the operation is when the first numbing medicine is injected. There may be moderate discomfort later in the day or during the first night after the surgery, but extra-strength Tylenol and ice compresses are usually quite effective in alleviating the discomfort.

What are the chances that the cancer will recur after the surgery?
This varies with the size of the tumor, its location, and whether or not it has been previously treated. For basal cell carcinomas (not previously treated), there is less than a 3% recurrence rate - meaning at least 97 of 100 cancers treated will be cured. For squamous cell carcinomas (not previously treated), there is less than a 5% recurrence rate – meaning at least 95 of 100 cancers treated will be cured.

What are the risks of Mohs surgery?
There are risks associated with any form of surgery. Since Mohs surgery is performed as an outpatient surgery under local anesthesia, it is safer than most forms of surgery. Although Dr. Bricca uses reconstructive surgical techniques to minimize scars as much as possible, there will be some permanent scar after the surgery. Scars mature and fade considerably over a period of months. If the results are not satisfactory after several months, a surgical revision can be performed. This, however, is rarely necessary. Bleeding, infection or nerve injury can occur with any form of skin surgery.

What would happen if I choose to do nothing?
Most basal cell carcinomas and squamous cell carcinomas grow slowly, so motivation to seek treatment may initially be low. At the very least, these tumors will slowly enlarge and may eventually produce problems such as pain, infection and bleeding. With time, most tumors gradually invade into the body and, if neglected, some can spread to distant sites.

How should I prepare for the surgery?
Unless prescribed by your physician, avoid aspirin, ibuprofen, or naproxen for 10 days prior to surgery. **If you take blood thinners (i.e. Coumadin, aspirin, Plavix) for medical conditions, continue to take the medication.** Herbal supplements that may act as blood thinners include ginko biloba, green tea extract, ginger, chamomile, fish oil, and garlic. We recommend a companion accompany you for possible driving assistance after your surgery. However, due to limited waiting room space, we ask that each patient bring **one** guest. Make-up, moisturizers, perfume, cologne and jewelry should not be worn on the day of surgery. Wear comfortable clothing; a shirt or blouse that buttons rather than one that slips over the head is best. You may want to shower or wash your hair prior to surgery, as bandages may need to be kept dry for 1 to 5 days after surgery. Once your surgery begins you will need to remain in the office. You may be in the office most of the day; therefore, you may want to bring a snack or sandwich and your favorite reading material.

What should I expect on the day of surgery?
After the doctor has answered all your questions, photographs are taken, the skin is cleansed and the numbing medicine is injected. After the area is numb, the tumor is removed. This usually takes only a short time. A temporary dressing is applied and you are returned to the waiting room while the specimen is processed; this often takes 1-2 hours. If more tumor removal is required, the entire process is repeated. Once the entire tumor is removed, we will discuss what kind of reconstruction, if any, is necessary. Reconstructions are usually performed at that time. The total time for the surgery may take 3-6 hours. Once completed, a dressing will be applied and instructions for care explained. You will be given a wound care instruction sheet to assist you.

What is required after surgery?
For most cases, the surgery area is cleaned daily with tap water and then covered with a petrolatum based ointment. It is likely that you will be required to refrain from strenuous exercise for 1-2 weeks after surgery. An appointment for follow-up and possible suture removal in 5-7 days may be scheduled. If you are from out of town, this may be arranged with your local physician. Checkups in three, six and twelve months may also be recommended.

How much will my surgery cost?
The costs vary depending upon the complexity of the case. The range is from several hundred dollars to well over one thousand dollars. If extensive reconstruction is necessary, cost can reach several thousand dollars.

If you have additional questions, we will be happy to answer them on the day of your surgery.

Reconstruction of Surgical Wounds
Our office is a state of the art facility adjacent to a Medicare and State approved Ambulatory Surgery Center where reconstruction of surgical wounds is performed. Since the Ambulatory Surgery Center is adjacent to the office, we are able to remove skin cancer and reconstruct surgical wounds in a maximally efficient, and ultimately convenient fashion. Below is a brief description of wound reconstruction options:

Surgical wounds are either stitched or left to heal on their own. Many stitched wounds are closed in a simple, elliptical fashion while others require more advanced flaps or skin grafts. These more advanced procedures are reserved for areas where skin laxity is minimal and simple movement of tissue may distort cosmetic features. Dr. Bricca has extensive training, experience, and expertise in reconstructive procedures and will discuss the *pros and cons* of each option prior to determining the best course of action for your wound healing.

Dr. Bricca is an expert in the field of cancer and reconstructive surgery. He has written and published multiple articles and book chapters on these subjects, and has lectured locally, nationally, and internationally on the topics of skin cancer, Mohs Micrographic Surgery, and reconstructive surgery.