

AGRICULTURAL SKIN DISEASES

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The Role of the Health Care Provider

Farmers are exposed to outdoor environmental conditions, high levels of solar radiation, and repeated contact with irritant chemicals and plants. These factors put farmers at high risk for skin irritation and disease. Outdoor work adds additional risk of stings and bites from insects and other animals, with risk of allergic reactions. Fertilizers, pesticides, veterinary products and animal feeds, as well as feed additives may lead to skin irritation or allergic contact dermatitis.

Physicians and other health care professionals need to be aware of potential skin diseases. The frequent occurrence of skin conditions and disease is of concern because of the increasing medical insurance costs and the necessity of complying with OSHA and worker compensation laws.

In general agricultural skin diseases may be classified as contact dermatoses (either irritant or allergic), sun-induced, and skin cancers. Wisconsin farmers are at high risk for nonfatal injuries related to skin conditions, diseases and certain cancers related to chemical use and prolonged sun exposure. This chapter will familiarize the health professional with: 1. definition of the problem of agricultural skin diseases; 2. pathophysiology; 3. agricultural factors; and 4. management issues.

Learning Objectives

At the completion of this chapter the health professional should be able to:

- Name at least 3 skin disorders that are prevalent among farmers in the Midwest
- Describe the difference between irritant and allergic categories of skin disorders
- Identify management strategies for the most common skin disorders
- Recommend at least three prevention strategies to reduce the risk of skin disorders



DEFINITION OF THE PROBLEM

According to some United States statistics, skin disorders comprise more than 45% of all occupationally related diseases. Among all occupational dermatitis, irritant contact dermatitis accounts for about 80 percent. In many other parts of the world there is little record keeping of occupational health concerns such as skin disorders. Few studies have been specifically designed to look at skin diseases in farmers. A quick overview of international studies includes the following findings: skin cancers, dermatophyte infections and pesticide related skin diseases are common in farmers. In California, the highest rates of occupational skin diseases have been found in agricultural workers (Mathias & Morrison, 1998). Plants and agricultural pesticides have been the main causative agents of skin conditions, however the specific role of pesticides as a causal agent has yet to be determined. Some studies indicate that mycoses are the most prevalent of the skin diseases in farmers, estimating that 25% of the farming population is affected (Spiewak, 1998). Studies of agricultural workers have shown that skin irritation begins soon after employment, and after five years of employment affects up to 50-60 percent of the workers (Zejsda et al 1993).

PATHOPHYSIOLOGY

Contact Dermatitis

Dermatitis is a localized inflammation of the skin. In general, inflammation refers to a condition in the body when it is trying to react to a localized injury of tissues. Occupational irritant dermatitis is an inflammation caused by substances in the workplace that come in direct contact with the skin. Signs of contact dermatitis include redness, blisters, scales, or crusts. These symptoms do not necessarily occur at the same time or in all cases. This type of dermatitis is caused by chemicals that are irritating (acids, bases, fat-dissolving solvents) to the skin and is localized to the point of contact. In the workplace, irritant contact dermatitis can occur after a short, heavy exposure or a repeated or prolonged, low exposure to a substance. The appearance of contact dermatitis varies considerably according to the conditions of exposure. For example, an accidental contact with a strong irritant causes immediate blisters. Contact with a mild irritant may only produce redness of the skin. However, if the irritation continues, small lesions appear on the reddened skin; afterwards crusts and scales form. The skin damage usually heals a few weeks after the exposure ends if there were no other complications. To produce skin damage, the irritant substance must infiltrate the outer layer of the skin. Following infiltration, the substance comes into contact with cells and tissues. The substance also reacts with chemicals endogenous in cells and tissues. These reactions produce skin damage. The body's first reaction is local inflammation. The cells and tissues try to repair the damage and set up a defense response. During the body's defense response phase a person may experience pain, warmth, redness and swelling of the irritated area.

Minimal skin damage may not be visible. However when damage is severe the skin shows signs of chapping, scaling, and blistering. Some skin cells also die. Typically an irritant reaction develops within a few hours from exposure, and is at its worst after approximately twenty-four hours.



Irritant Contact Dermatitis

Factors contributing to contact irritation include: the chemical properties of the substance, the amount and concentration of the chemical coming in contact with the skin and the length and frequency of the exposure. Factors specific to individual workers are also important. Hereditary factors influence the variety of reactions seen when workers in the same family are exposed to the same irritant.

The part of the body coming into contact with the substance plays a part in the degree of reaction. The penetration of substances varies over what area of the body as been exposed. For example, the face and upper back are more easily penetrated than the legs.

Environmental factors also play a role. Hot, humid workplaces cause an agricultural worker to sweat; sweat can dissolve some types of industrial powders that may come in contact with the skin. This dissolving may increase the toxic effects of the chemical. On the other hand, sweating may also serve as a protective function, as it can dilute substances on the skin. It is best to become familiar with the chemical being used, so the farm worker can be adequately prepared during hot humid days. Working where the air humidity is low, or where the skin is wet for a prolonged period of time can cause skin chapping.

Allergic Contact Dermatitis

Another kind of contact dermatitis, allergic contact dermatitis, differs in that it is an allergic response of the skin due to contact with some allergy-causing material (such as poison ivy, or an allergen specific to the individual). Another difference is that allergic dermatitis can occur in areas of the body that did not come in direct contact with the allergy-causing material as these allergens may be air-borne. Knowing the allergens of the individual worker and his/her response to it is key to prevention. Wearing proper barrier clothing, and trading jobs with others keeps the sensitive farm worker free of contact allergic dermatitis. It is also a good idea to keep other antidotes on hand (such as epinephrine for a bee sting or asthma medication) to keep other serious allergic responses under control.

AGRICULTURAL FACTORS

The skin of an agricultural worker is exposed to an array of physical and chemical irritants. Friction against the skin while operating grinding machinery/equipment can scrape away the skin, reducing its protective action. Clothing soaked with irritants, or having open cuts or skin injuries enable irritants to penetrate the skin more easily.

According to the Finnish register of Occupational Diseases, main causes of farmers' hand eczema have been cow dander, disinfectants and detergents, wet work and rubber chemicals. Specific chemicals have been under research investigation as to their role in the development of skin cancer. However, skin cancer is a disease that has a long latent period and slow progression, so years may pass between the exposure and cancer development. For example, arsenic elevates the risk of skin cancer up to 60 years after the exposure. A number of factors predispose a farmer to dermatitis. They include age, sex, race,



temperature and humidity, prior skin disorders, skin damage and personal hygiene (NASD, 1999).

Prevention

Irritant contact dermatitis can be avoided by the following measures:

- Personal hygiene

Proper hand washing is imperative to preventing dermatitis. It may be tempting to the worker to use only water while washing hands; it is important to note that excessive use of water alone can also cause irritation to the skin by removing its natural oils. Farmers should use the mildest soap possible when hand washing. Knowing what form of soap to use can also be beneficial. For example, granules are less irritating than fine powder. To remove grease and oils from hands and arms, a waterless hand cleanser can be used. If the waterless cleansers do not remove the oil or grease, then abrasive soap may be used. Waterless cleansers and abrasive soaps should be used sparingly, however, and only when necessary.

- Substitution of a less harmful substance

Irritation may be even greater by adding soap and detergents after exposure to certain solvents; chemicals from each substance may combine and accelerate skin damage. For industrial cleaning, use the mildest detergent possible; use caution and watch for an increase in irritation.

- Enclosure of the process

The enclosure of the process refers to control measures that separate the farmers from the harmful substances they use. At times, barriers of wood, plastic or tarp may be used to enclose the material from people and animals. Always check the manufacturers label for proper enclosure. Make sure to close all containers tightly before restocking to shelves. Nonhazardous substances should be used whenever possible.

- Automation of the work/protective devices

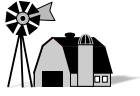
Whenever possible, use automated machinery or protective equipment for tasks that can be hazardous to your skin.

- Attention to housekeeping details

Attention to housekeeping refers to proper storage of substances, frequent disposal of waste, prompt removal of spills, and maintenance of equipment to keep it free from dust, dirt and drippings.

- Local exhaust ventilation systems

Local exhaust systems should be used and located to keep toxic substances away from the work area.



- Protective clothing

Protective clothing such as aprons and gloves should be carefully selected to prevent skin contact. Not all protective clothing resists all substances. Manufacturer requirements are listed as to kind of material, duration of recommended exposure, and time that gloves should be in contact with substances.

- Barrier creams, skin cleansers

Barrier creams should be used when protective gloves and sleeves cannot be used. Barrier creams do not offer as much protection as protective clothing and are not substitutes. Barrier creams should be selected for protection against specific chemicals and caution in use as they too can contribute to irritation problems.

- Convenient washing facilities

Washrooms should be convenient as much as possible. Farmers should carry disposable towels and soap with them and use hot water whenever possible.

All of these factors should be considered in prevention of contact dermatitis by avoiding skin contact whenever possible.

Diagnosis

Victims of irritant contact dermatitis often present to the health provider with complaints of itching or pain. While some experimental tests provide an indication of the irritant potential of substances, no single test can reliably identify irritants in specific cases (OSHA, 2000). The best way to evaluate and diagnose occupational irritant contact dermatitis is to discuss the conditions of the workplace itself. The information gathered should include a detailed list of all chemicals in the environment; a detailed description of all duties during a day's work, and any information regarding coworkers who have had similar skin problems.

Treatment

One of the key principles in treating skin disorders is that the hotter the lesion, the more benign the treatment should be. Prescribed treatments include wet dressings with normal saline, powders, creams and ointments. Usually treatment modalities begin with the wet dressings and progress to ointments (water-in-oil emulsions, inert bases) if necessary. Another key principle regarding therapy is if wet, dry it; if dry, wet it. Wet dressings are most useful in acute, inflamed lesions. The dressing causes evaporative cooling and vasoconstriction. The cool wet dressing will relieve pruritis. Wet dressings should be applied for 15-30 minute periods 3-6 times/day. Usually wet dressings need only be applied for 2-3 days to assess their effectiveness. Precautions with wet dressings include maceration, toweleling and systemic absorption.



Powders are prescribed if the lesion is sweaty and hot, such as in athlete's foot. Powders are used in intertriginous areas to decrease friction. Powders enhance drying and cooling by absorbing moisture. One caution in regards to a starch-based powder: avoid. Starch enhances bacterial growth. Powders should be applied 2-3 times/day.

Creams are most useful in nonirritable dermatoses (nonacute). They should be rubbed in thoroughly for maximum effectiveness. Creams are not very occlusive and can be applied 2-4 times daily.

Lotions are lubricating, cooling and may be drying. Lotions are useful for large areas and intertriginous areas. They are generally not occlusive if the lotion is removed from skin once a day. Lotions should be applied 2-4 times daily. Do not apply to oozing or hairy areas.

Ointments are best for dry lesions and chronic conditions. Ointments enhance penetration of some drugs. A word of caution, ointments may be cosmetically unacceptable to some patients. Intertriginous or hairy areas should not be treated with ointment.

One other treatment modality is gels. Gels are clear, nongreasy, nonstaining, nonocclusive and quick drying. Gels are most useful in treating hairy areas or the face. Medications in the above forms are effective in relieving the symptoms of skin disorders. However, the heart of treatment lies in prevention and removal of the offending substance for future safety.

Sun-Induced Problems

People who work in agriculture tend to work many hours in the sun, so they have a greater risk for sun-induced damage than the general population. Location, time of day, and genetics all make a difference to the extent of possible damage.

Sunburn

Sunburn, a common result of overexposure to sun rays, is the most common and easily visible form of sun damage. Ultraviolet radiation (or UV rays) cause a type of skin cell called melanocyte, to produce the pigment melanin as a protective measure to keep the skin from burning. When exposure to the sun is too long or intense, the melanocytes cannot produce enough pigment in time to protect the skin and it will become burned. We receive three different kinds of ultraviolet rays from the sun: UVA, UVB, and UVC. They are harmful in varying ways and degrees and can be described as follows:

UVA rays:

- Maintain the same intensity throughout the entire year
- Penetrate the skin's layer more deeply than do UVB rays
- Contribute to premature skin aging, wrinkling, and sunburn



UVB rays:

- Stronger than UVA and more intense during summer months, at higher altitudes, and closer to the equator
- Most common cause of sunburns
- Can contribute to premature aging and cataracts

UVC rays:

- Strongest and most dangerous
- Normally filtered by ozone layer and do not reach the earth

There is an easy acronym to remember that helps identify the ray with the damage it generally is responsible for:

- UVA: A for Aging
- UVB: B for Burning
- UVC: C for Caution/Danger

How much ultraviolet radiation one is exposed to depends on several factors. They include:

- Where you are located on the earth
Southern U.S. and equatorial areas of the earth are most dangerous.
- Time of day
UV is greatest when the sun is at its highest in the sky, or about midday, between 10 am to 2 pm (however, you can still burn between 2 pm and 4 pm).
- Length of sun exposure
The longer you are exposed, the greater your risk for skin damage.
- Season
Even though UV is greatest in the summer, it still reaches the earth every day. Snow reflects the sun like a mirror. Fresh snow reflects about 85% of the sun's rays. When you are on snow or ice, your face and eyes are at almost twice the risk of UV damage. Water (river or lake) will reflect an additional 5% of the sun's rays back to you.
- Elevation
The higher the elevation, the greater the UV exposure and damage.
- Whether cloud cover is present
You can get sunburned even on a cloudy day. Up to 80% of the sun's rays can penetrate light clouds, mist, and fog.



- Type of surface surrounding you (reflective/nonreflective)
Concrete can reflect 10-12% of the sun's rays.
UV rays can penetrate automobile and residential windows
- Type of clothing worn
Tightly woven, dark-colored fabrics give more protection (although they can be warmer—use caution about over-heating)

It is now known that one severe burn, or more than two blistering burns in childhood can double the risk for skin cancer. Protecting the skin during the first 18 years of life can reduce the risk of some types of skin cancer by up to 78%. It is important to note that there is no such thing as a “healthy tan” (SCF, 2001).

Risk factors for Sun-Induced Problems

There are several factors that can increase an agricultural worker's risk for sunburn (as well as skin cancer). They are:

- Having fair skin with blonde or red hair
- Light colored eyes
- Burning before you tan
- Freckle easily
- Having many moles
- Having large, pigmented skin blemishes (congenital nevi)
- Family history of skin cancer

Premature Aging

Premature aging of the skin also occurs as damage accumulates in the skin over many years. Sun-exposed skin loses its elasticity earlier than non-exposed skin, and over time will begin to form lines and wrinkles around the eyes, forehead and mouth. Over-exposure to the sun can also make the skin appear leathery and fissured—as often found at the “nape” of the neck between the collar and hairline in agricultural workers.

Spider Telangectia

Spider telangectia may also be seen in over-exposed skin. These reddened areas in agricultural workers tend to occur over the “apple” of the cheeks where fine blood vessels have broken due to repeated damage from the sun. This condition is sometimes referred to as “farmer cheeks”, as it often can be seen in the elder farmer from long hours in the sun. These broken vessels appear as fine red lines (hence the “spider” name) that are often branched or somewhat jagged. When there are many clustered over a small area, they give the appearance of a permanent red or pink blush to the cheekbones.



Increase in Moles

Nevi, or moles (which contain high amounts of melanin) may increase in number due to sun exposure. While they are generally harmless, they need to be carefully monitored as they may become pre-cancerous. Certain precursor conditions, some of which result from extensive sun damage, are worth noting. They are as follows:

- 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.
- Leukoplakia. These white patches on the tongue or inside of the mouth have the potential to develop into squamous cell carcinoma.
- Bowen's disease. This is now generally considered to be a superficial squamous cell cancer that has not yet spread. It appears as a persistent red-brown, scaly patch that may resemble psoriasis or eczema. If untreated, it may invade deeper structures.

Regardless of appearance, any change in a mole, a pre-existing skin growth, or the development of a new growth or open sore that fails to heal should prompt an immediate visit to a physician (ibid., 2001).

Eye Damage

UV rays contribute to cataracts, macular degeneration and eyelid cancers. UVB rays specifically contribute to cataracts.

Skin Cancer

Skin cancer is an occupational hazard for farmers. There is convincing evidence that sunlight is a leading factor in the development of skin cancer. Skin cancer usually can be treated without serious consequences. Although in some cases, as in malignant melanoma, skin cancer can be life threatening. Fortunately, the risk of skin cancer can be minimized through protective measures and education of the farm worker.

When exposure to sunlight continues over several years, the damaged skin has an increased chance of developing skin cancer. While the exact relationship is not clearly understood, it appears that the intermittent exposure, and exposure during childhood and adolescence are important predictors of basal cell carcinoma and cutaneous malignant melanoma (Oehme, F.W., 2001). High levels of sun exposure, as in farming, are more often associated with squamous cell tumors. Risk factors for skin cancer are



the same as those with sun-induced problems (see previous “risk factors for sun-induced problems”).

Basal Cell Cancer

Basal cell cancer is the most common of all skin cancers in North America and Europe. In fact, 800,000 Americans are affected each year. These cancers arise in the basal cells, which are at the bottom of the epidermis. Until recently, those most affected were older people, particularly men who had worked outdoors. In the last few decades, however, the average age of onset has been steadily decreasing, and more and more women are getting basal cell carcinoma.

Chronic exposure to sunlight is the major cause of almost all basal cell carcinomas (often referred to as BBC). Hence, the most exposed part of the body is where they generally occur: face, ears, neck, scalp, shoulders, and back. They can develop on non-exposed areas, but it is rare. In a few cases, contact with arsenic, exposure to radiation, complications from burns, scars or vaccinations or even tattoos are contributing factors. Anyone with a history of frequent sun exposure and who is at risk for sunburn, such as people with fair skin and light eyes can develop BBC. Dark-skinned people are far less likely to develop skin cancer, as they have more of the protective substance, melanin.

Five Warning Signs of Basal Cell Carcinoma

The five most typical characteristics of basal cell carcinoma are:

- An open sore that bleeds, oozes, or crusts and remains open for three or more weeks. A persistent, non-healing sore is a very common sign of an early basal cell carcinoma.
- A reddish patch or irritated area, frequently occurring on the chest, shoulders, arms, or legs. Sometimes the patch crusts. It may also itch or hurt. At other times, it persists with no noticeable discomfort.
- A shiny bump or nodule that is pearly or translucent and is often pink, red or white. The bump can also be tan, black, or brown, especially in dark-haired people, and can be confused with a mole.
- A pink growth with a slightly elevated rolled border and a crusted indentation in the center. As the growth slowly enlarges, tiny blood vessels may develop on the surface.
- A scar-like area that is white, yellow or waxy, and often has poorly defined borders. The skin itself appears shiny and taut. Although a less frequent sign, it can indicate the presence of an aggressive tumor.

Basal cell carcinomas, when removed promptly, are easily treated in their early stages. It is important to keep in mind, however, that this is not a trivial cancer. The larger the tumor has grown the more extensive the treatment needed. Although it rarely ever spreads to vital organs, it can damage surrounding tissue, and considerable destruction and disfigurement can occur with the necessary removal of an eye, ear, or nose. Also, people who have had one BBC are at risk for developing others



in later years. These recurrences generally occur within the first two years following surgery. Because of this recurrence risk, it is important to examine not only the sites of previous treatment, but also the entire skin surface of the body (SCF, 2001).

Squamous Cell Cancer

Squamous cell carcinoma is the second most common skin cancer after basal cell carcinoma. It affects more than 200,000 Americans each year. It arises from the epidermis and resembles the squamous cells of most of the upper layers of the skin. Squamous cell cancers are most common in the areas exposed to the sun, but can occur on all areas of the body, including mucous membranes.

Although squamous cell carcinomas usually remain confined to the epidermis for some time, they can eventually penetrate the underlying tissues if not treated in time. In a small number of cases, it has metastasized (spread) to distant tissues and organs. If this progression has happened, it can be fatal. Those cells that metastasize most often are seen on sites of chronic inflammatory skin conditions or on mucous membranes or lips.

Again, anyone with a substantial history of sun exposure is at a high risk, and those with fair-skinned, light eyes are at even greater risk. Farmers, due to their long hours in the sun are in particular jeopardy. Tumors appear most often on sun-exposed areas of the body: face, neck, bald scalp, hands, shoulders, arms and back. This carcinoma can also occur where the skin has suffered certain kinds of injury such as burns, sites of inflammatory conditions such as long-standing sores, scars, sites previously exposed to x-rays, and chemicals such as arsenic and petroleum by-products. In addition, chronic skin inflammation or medical conditions that suppress the immune system over a long time may encourage squamous cell carcinoma. Certain precursor conditions some of which result from extensive sun damage may also be associated with the development of squamous cell carcinoma (see these conditions in previous section entitled “Increase in Moles”).

Four Warning Signs of Squamous Cell Carcinoma

There are four characteristics of squamous cell carcinoma. They are:

- A wart-like growth that crusts and occasionally bleeds.
- A persistent, scaly red patch with irregular borders that sometimes crusts or bleeds.
- An open sore that bleeds and crusts and persists for weeks.
- An elevated growth with a central depression that occasionally bleeds. A growth of this type may rapidly increase in size (SCF, 2001).



Melanoma

Melanoma is the most serious form of skin cancer. However, if diagnosed and treated while it is still thin and limited to the outermost layer of the skin, it is almost 100% curable. Once the cancer metastasizes, it can be difficult to treat and become deadly. During the last 10 years the number of cases has increased more rapidly than any of the other cancer. Over 51,000 cases have been reported each year, but the numbers are probably greater than that reported.

Melanoma is a malignant tumor that originates in the melanocytes, or those cells that give us our skin, hair and eye color. It is most concentrated in moles. Most melanocytes therefore, are black or brown.

Melanomas are often described as in situ, or “in one site”, or invasive. In situ melanomas occupy only the upper part of the epidermis and are easier to treat. Invasive melanomas are more serious, as they have penetrated more deeply into the skin and may have traveled from the original tumor to other areas of the body.

Four Types of Melanoma

Melanomas fall into four basic categories. The first three begin in situ and sometimes become invasive; the fourth is invasive from the beginning.

- *Superficial spreading melanoma* is by far the most common type, accounting for about 70 percent of all cases. This melanoma travels along the top layer of the skin for a fairly long time before penetrating more deeply.

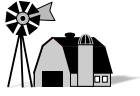
Appears as flat or slightly raised discolored patch that has irregular borders and is somewhat geometric looking. Color varies from tan, brown, black, red, blue, or white. Sometimes an old mole will change in color, or a new one will appear.

It can occur anywhere on the body, but most likely on the trunk of men, the legs of women, and on the upper back of both genders. If found in children, it is often the superficial spreading type.

- *Lentigo maligna* is similar to the superficial spreading type, as it also remains close to the skin surface.

It appears as a flat or mildly elevated mottled tan, brown, or dark brown discoloration.

This type of in situ melanoma is found most often in the elderly, arising on the most sun-exposed areas of the body: face, ears, arms, and upper trunk. This melanoma is the most common form of melanoma in Hawaii. Lentigo maligna melanoma is the malignant form.



- *Acral lentiginous melanoma* also spreads superficially before penetrating more deeply.

This melanoma differs in that it usually appears as a black or brown discoloration under the nails or on the soles of the foot, or palms of the hand. This type is the most common one found in African-Americans or dark-skinned people.

- *Nodular melanoma* is usually invasive at the time of diagnosis.

The malignancy is recognized when it becomes a bump.

The color most often seen is black, but it can be blue, gray, white, brown, tan, red, or skin tone.

The most common locations are the trunk, legs and arms, mainly of elderly people, as well as the scalp of men. This is the most aggressive of all the melanomas, and is found in 10 to 15 percent of cases.

In general, malignant melanomas are usually small brown-black or larger multicolored patches, plaques, or nodules with irregular outline. They may crust or bleed. Many of them arise in pre-existing moles (SCF, 2001).

Most people have a number of moles and brownish spots on their skin, including freckles and birthmarks. Many of those spots are normal, but some may be cancerous. Key warning signs of melanoma can be summarized using the acronym below:

The “ABC’S” of Moles and Melanoma

- “**A**” is for **Asymmetry**: Most early melanomas are asymmetrical, meaning a line drawn through the middle could not create matching halves. Common moles are round and symmetrical.
- “**B**” if for **Border**: The borders of early melanomas are often uneven and may have scalloped or notched edges. Common moles have smoother, even borders.
- “**C**” if for **Color**: Varied shades of brown, tan, or black are often the first sign of melanoma. As melanomas progress, the colors of red, blue, and white may appear. Common moles usually are a single shade of brown.
- “**D**” is for **Diameter**: Early melanomas tend to grow larger than the size of a pencil eraser, or about 1/4th inch in diameter. Common moles usually are smaller than that.

***If any of these warning signs are detected, a physician should be seen promptly.**

**MANAGEMENT ISSUES****Prevention**

The best way to prevent sun damage, and ultimately, skin cancer is to protect oneself from the sun. The following measures should be taken before going outside to work in the fields or on the farm:

- Use a sunscreen of SPF of 15 or higher. The SPF numbers are based on the time skin would normally take to burn without a sunscreen. For example, if your skin burns in 20 minutes, an SPF of 10 would protect your skin for 200 minutes, or 10 times as long. Apply 30 minutes before going outside on face ears, throat, neck, arms, and legs. Apply it liberally, uniformly, and frequently.
- Wear protective clothing such as long pants, tightly woven long-sleeved shirts, four-inch wide, broad-rimmed hats, and UV protective sunglasses.
- Avoid unnecessary exposure between the hours of 10 am and 4 pm.
- Apply UV protective window film to your farm equipment.
- Use laundry products that increase UV protection on clothing.

Coupled with a yearly skin exam by a doctor, self-examination of the skin at least every two to three months is the best way to detect the early warning signs of basal cell, squamous, or malignant melanoma. This examination can be done the following way:

Use a mirror to examine head and face, using a full-length mirror and hand mirror. Use a blow dryer to inspect your scalp.

Check hands and nails. Examine elbows, arms and underarms.

Check neck, chest, and torso. Women check under breasts.

With back to the full-length mirror, use a hand-held mirror to inspect back of neck, shoulders, upper arms, back, buttocks and legs.

Sitting down, check legs and feet, including soles, heels and toenails. Use hand mirror to examine genitals (SCF, 2001).



Diagnosis

After the physician's examination, the diagnosis of basal cell, squamous, and melanoma is confirmed with a biopsy. This procedure requires a small piece of tissue be excised and taken to the laboratory for microscopic examination. If tumor cells are present, treatment (which usually begins with surgery) is required. Early detection and diagnosis remain the best weapon in fighting skin cancer, as it dramatically increases the rate of recovery and long-term survival.

Treatment

Since basal cell and squamous cell carcinomas have similar treatments, they will be described together in the following paragraphs (melanoma treatment will be discussed following this section).

Fortunately, basal cell and squamous cell carcinomas have several effective treatments for eradication. The choice of treatment is based on the type, size, location, and depth of penetration of the tumor, as well as the patient's age and overall health. Treatment often is performed on an outpatient basis in an office or clinic.

Excisional Surgery

In this procedure, the physician removes the entire growth and an additional border of normal skin as a "safety margin". A local anesthetic is often used for the reduction of pain or discomfort during the procedure, but generally this discomfort is minimal and pain afterward is rare. The surgical site is then closed with sutures, and the tissue sent to the laboratory for microscopic examination to determine if all the malignant cells have been removed. If they have been removed, the treatment is complete.

Curettage and Electrodesiccation (Electrosurgery)

In this procedure, cancerous tissue is scraped from the skin with an instrument called a "curette" (a sharp, ringed instrument). A heat-producing electric needle is used to destroy any residual tumor, and controls bleeding. Sometimes this is done twice to ensure complete removal of the tumor.

Cryosurgery

In cryosurgery, tumor tissue is destroyed by freezing it with liquid nitrogen. It is effective for the most common tumors, and is the treatment of choice for patients who have bleeding disorders or an intolerance to anesthesia. Redness, swelling, blistering and crusting can occur following this treatment. This treatment may also be repeated to ensure complete destruction of the malignant cells.

**Mohs Micrographic Surgery (microscopically controlled surgery)**

Mohs microscopic surgery saves the greatest amount of tissue, as the surgeon successively removes only very thin layers of the tumor. Layer by layer, the tissue is removed with follow-up microscopic examination. This procedure is repeated until the site is tumor-free. It has the highest cure rate, is most often used on tumors that have recurred, and is used frequently on those locations that are difficult to treat such as the eye, ears, and nose.

Radiation Therapy

A radiation therapist directs X-ray beams at the tumor, where the beams slowly destruct it over time. These treatments are performed several times a week, lasting approximately one to four weeks. Radiation therapy is ideal for some elderly or for other individuals whose health is poor.

Laser Surgery

For squamous cell carcinomas, laser surgery can be used to either excise the tumor, much as the scalpel does, or to destroy it by vaporization; a procedure similar to electrosurgery. The main advantage of this relatively new surgery is that it seals blood vessels as it cuts, making it useful for patients with bleeding disorders (SCF, 2001).

Treating Melanoma

Anyone who has had a diagnosis of melanoma is understandably worried. However, practically every person with a thin, localized melanoma is cured by appropriate surgery. Again, the sooner the cancer is detected, the better the results. However; even those with more advanced stage disease can look forward to better outcomes, as the cure rate continues to rise.

Outpatient Surgery

In most cases, the surgery for thin melanomas can be done in the doctor's office or as an outpatient procedure under local anesthesia. New approaches to surgery remove much less of the normal skin around the tumor than in the past, reducing the severity of the scar considerably. Wound healing takes about one to two weeks, and scars are usually small and improve over time.

If the melanoma has progressed beyond its original site, it is likeliest to have reached the lymph node closest to the tumor. If it has, and is palpable, it will be surgically removed and sent to the lab for presence of malignant cells. If any are found, treatments that stimulate the immune system and/or chemotherapy will be recommended.



Chemotherapy

Several drugs that act on cancer cells are being used in the treatment of melanoma. They are sometimes used one at a time or in combinations. They also may be used in conjunction with drugs that act on the immune system. Dacarbazine (DTIC) is the most frequently used anticancer drug. A combination of DTIC and carmustine (BCNU), cisplatin and tamoxifen is coming into more widespread use. Other agents that may be used include: vindesine, vincristine, vinblastine and bleomycin.

Immunotherapy

A number of newly developed treatments are being designed to help the body's own immune system help itself. Among the immunotherapies, experimental vaccines are gaining attention with patients that have Stage III and IV disease. These vaccines are given to people to prevent the melanoma from getting worse, and to promote long-term survival.

Another type of immunotherapy (or "biologic therapy") makes use of chemicals that occur naturally in the body. Stage III patients may be advised to take interferon-alpha, which is produced by our own lymphocytes (white blood cells) to attack viruses or tumor cells. High-dosage interferon alfa-2b ("Intron A") is the only systemic drug to improve five-year survival of Stage III patients that has been approved by the FDA.

Tumor-necrosis factor, also produced by lymphocytes, is another naturally occurring tumor-fighting substance. Both this substance and interferon-alpha also prevent the formation of new blood vessels that would otherwise supply and nourish the tumor.

Gene Therapy

One of the newest forms of therapy, gene therapy, is based on creating alterations in the melanoma cells themselves. The cells are removed from the patient, grown outside the body, and treated to increase in number. They are then introduced with genetic material that changes the melanoma cells by stimulating the growth of two types of white blood cells, granulocytes and macrophages. These help the melanomas be more readily recognized by the immune system and killed (SCF, 2001).

Possibilities for the Future

Many patients, especially those with advanced disease, are participating in numerous clinical trials to gain information for future treatments. Although some are not yet available to the general public, the advancements and variety in treatments hold promise for the future, giving hope to people with melanoma.