

Skin cancer education in transplant recipients

In the past 20 years, long-term survival for solid-organ transplant recipients has improved dramatically; about 223 000 patients are alive in the United States with organ transplants today. As survival rates improve, however, the morbidity and mortality associated with lifelong immunosuppressive therapy is increasing in significance. Skin cancer is common among recipients of all major organ transplants, including the kidney, liver, heart, lung, and pancreas. Although skin cancer is the most common cancer in transplant recipients, many cases can be prevented by sun protection, skin self-examinations, and physician examinations. Because transplant recipients visit the transplant clinic frequently, clinicians have ample opportunities to teach patients about the importance of prevention and detection of skin cancer. At a routine visit, the clinician should inquire about sun protection practices, especially for tanned, light-skinned, or freckled patients or patients who are planning a warm-weather vacation or time in the sun during the summer. Skin cancer education should be integrated into the care of transplant patients as part of their numerous visits to the transplant clinic. Although some transplant recipients may resist adopting new behaviors at first, use of the ample clinic opportunities for patient education can dramatically reduce their risk of skin cancer. (*Progress in Transplantation*. 2008;18:232-242)

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Notice to CE enrollees:

A closed-book, multiple-choice examination after this article tests your ability to accomplish the following objectives:

1. Identify the risk factors for development of skin cancer in solid-organ transplant recipients
2. Describe the components of a successful skin cancer prevention program for transplant recipients
3. Discuss ideas for transplant recipient education regarding skin cancer prevention

In the past 20 years, long-term survival for solid organ transplant recipients has improved dramatically; it is estimated that 223 000 patients are alive in the United States with organ transplants today.¹ As survival rates continue to improve, however, the morbidity and mortality associated with lifelong immunosuppressive therapy are becoming increasingly significant.²

Skin cancer is common among recipients of all major organ transplants, including the kidney, liver, heart, lung, and pancreas.³⁻¹³ Cancers of the skin and lip are the most common, accounting for 40% to 50% of all cancers after transplant.¹⁴ Squamous cell carcinoma (SCC) is the most common cancer in transplant recip-

ients and occurs 65 to 250 times more often in transplant populations than in the general population.¹⁵⁻¹⁷ Melanoma has been estimated, in most studies, to be 2 to 8 times more common in transplant recipients than in the general population.¹⁸⁻²² Risk reduction via skin self-examination and physician examination has been recommended to prevent many of these cancers, but few patients make use of these practices, in part, because the patients lack sufficient education.²²⁻²⁷ To date, only researchers in one study²⁸ in a transplant dermatology clinic have attempted to improve early detection. No studies have been performed in organ transplant clinics.

Skin cancer, melanoma and nonmelanoma, is the most common form of cancer in the United States.^{29,30} More than 1 million skin cancers are diagnosed annually,³¹ and in contrast to other cancers that have decreasing mortality rates (eg, breast, prostate, colorectal, and cervical cancer), mortality rates for melanoma have increased 28% in the past 25 years.³²⁻³⁴

The purpose of this article is to inform practitioners about the effects of skin cancer for transplant recipients and to review successful screening and counseling principles that can lead to the detection of early skin cancers or precursors and improve the quality of life for transplant recipients.

Melanoma

Melanoma is the most common serious form of skin cancer, a malignant growth that originates in melanocytes, the pigment-producing cells of the skin. Most melanomas are various shades of brown, but black, blue, or pink melanomas can be found. Sun exposure, number of moles on the skin, skin type, genetics, personal history of previous malignant growth, and a history of being immunocompromised, which includes taking immunosuppressive medications, are factors that increase the risk of melanoma. The drugs that transplant recipients take to prevent their body from rejecting the transplant do so by suppressing the immune system. A key mechanism conferring increased risk for cancer among transplant patients appears to be the immunosuppression used. The incidence of skin cancer is proportional to the level of immunosuppression; CD4 counts are substantially lower in transplant recipients with cutaneous carcinomas than in those without such lesions.

Early melanoma is recognized clinically by the appearance of the lesion and/or by a change in the shape, color, or surface of an existing mole. The ABCDEs for the recognition of melanoma are Asymmetry, Border irregularity, Color variation, Diameter greater than 6 mm (the width of a pencil head eraser), and Evolution over time (Figure 1).

Melanoma is classified into 4 subtypes. Superficial spreading melanoma, which accounts for 70% of all melanomas, can be located on any anatomic site, with preference for the back in men and back of the legs in women. Lentigo maligna melanomas, which represent 4% to 10% of all melanomas, are usually located in chronically sun-exposed skin in older patients, frequently on the head and neck; clinically, lentigo maligna melanoma appears as a macular (flat) lesion. Nodular melanoma accounts for an estimated 10% to 15% of melanomas and can manifest as a rapidly enlarging elevated or polypoid lesion, often blue or black. Finally, acral lentiginous melanoma manifests as darkly pigmented, flat to nodular lesions on palms, on soles, and subungually. This form of melanoma is the only one in which sunlight is not thought to play a causative role.

Once the melanoma is identified, it is classified by severity into stages, which gives information about thickness, depth of penetration, and the degree to which the melanoma has spread. The type and stage are then used to determine treatment. Surgical excision is the treatment for localized melanoma; chemotherapeutic regimens are the treatments for metastatic disease.

Nonmelanoma Skin Cancer

Nonmelanoma skin cancer is the most common cancer in the United States. In the general population, 20% of nonmelanomas are SCC and 80% are basal cell carcinoma; in kidney transplant recipients, about 30% are SCC and 70% are basal cell carcinoma.³⁵ SCC has

a higher mortality rate than basal cell carcinoma because of the higher rates of metastasis in SCC. In general, non-melanoma skin cancers are associated with cumulative sun exposure and occur most frequently in areas maximally exposed to the sun (eg, the face, back of hands, and forearms).

Basal Cell Carcinoma

About 90% of basal cell carcinoma occurs on sun-exposed areas such as the face, nose, neck, ears, scalp, and arms. Typical basal cell carcinomas appear as slowly growing, shiny, skin-colored to pink translucent papules with telangiectasia and a “pearly” rolled border (Figure 2). Basal cell carcinoma rarely metastasizes and is usually curable. Although the mortality rate is low, basal cell carcinoma can result in significant morbidity due to invasive local growth, with disfigurement and destruction of skin, bone, and cartilage.

Squamous Cell Carcinoma

SCC typically occurs in areas of skin that are heavily damaged by sun exposure, most commonly the head or neck, back, forearms, and dorsum of the hand. SCC typically appears as a discrete scaly erythematous papule on an indurated base, either on normal-appearing skin or on an actinic keratosis. The lesion may grow over time and become ulcerated, itchy, or painful, or start bleeding (Figure 3).

Actinic Keratoses

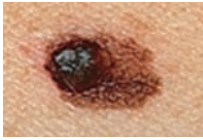
Many SCCs arise from actinic keratoses, which are 0.1- to 1.0-cm white or pink precursor lesions that appear rough, scaly, and sometimes manifest as an erythematous papule.³⁶ These lesions typically occur on the forearms, hands, face, and scalp. Estimates of progression of actinic keratoses to SCC range from 0.025% to 20%.^{37,38} The treatment for actinic keratoses includes topical application of 5-fluorouracil and an antibiotic. If treated early, nearly all actinic keratoses can be removed before they become skin cancers (Figure 4).

Skin Cancer in Transplant Recipients: Epidemiology and Etiology

Although skin cancer is the most common cancer in transplant patients, many cases can be prevented by sun protection, skin self-examinations (Figure 5), and examinations by physicians.³⁹

Melanoma has been estimated, in most studies, to be 2 to 8 times more common in transplant recipients than the general population.¹⁸⁻²² More than 1 primary lesion, tumor aggressiveness, possible metastasis, and occurrence in younger individuals are characteristics of these transplant-associated cancers.^{2,21}

SCC occurs 65 to 250 times more frequently in transplant recipients than in the general population, even in areas with only moderate sun exposure.^{15-17,40}



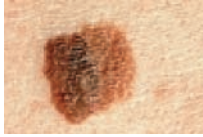
Asymmetry

If you draw a line through this mole, the 2 halves will not match.



Border

The borders of an early melanoma tend to be uneven. The edges may be scalloped or notched.



Color

Having a variety of colors is another warning signal. A number of different shades of brown, tan, or black could appear. A melanoma may also become red, blue, or some other color.



Diameter

Melanomas usually are larger in diameter than the size of the eraser on your pencil (1/4 inch or 6 mm), but they may sometimes be smaller when first detected.

Evolving

Any change—in size, shape, color, elevation, or another trait, or any new symptom such as bleeding, itching, or crusting—points to danger.

Prompt action is your best protection. The pictures below show atypical normal moles and melanomas.

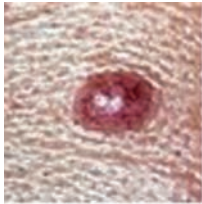


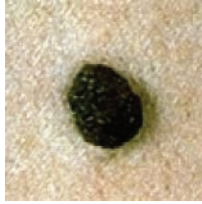
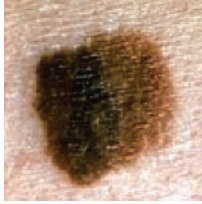

	Benign	Malignant	
Symmetrical			Asymmetric
Borders are even			Borders are uneven
One shade			Two or more shades
Smaller than 1/4 inch (6 mm)			Larger than 1/4 inch (6 mm)

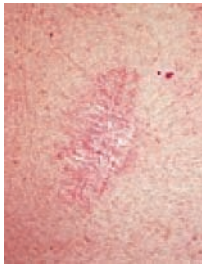
Figure 1 Melanoma.

Reprinted from Skin Cancer Foundation Web site (www.skincancer.org), with permission.

The 5 most typical characteristics of basal cell carcinoma are shown in the pictures below. Frequently, 2 or more features are present in 1 lesion.



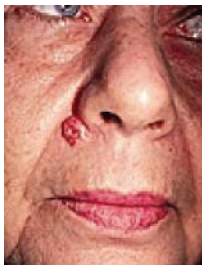
An open sore that bleeds, oozes, or crusts and remains open for a few weeks. A persistent, nonhealing sore is a common sign of an early basal cell carcinoma.



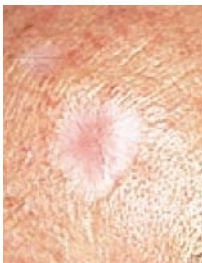
A reddish patch or irritated area, frequently occurring on the chest, shoulders, arms, or legs. Sometimes the patch crusts. It may also itch or hurt. At other times, it persists with no noticeable discomfort.



A shiny bump 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 scarlike area that is white, yellow, or waxy and often has poorly defined borders. The skin itself appears shiny and taut. This warning sign can indicate the presence of small roots, which make the tumor larger than it appears on the surface.

Figure 2 Basal cell cancer.

Reprinted from Skin Cancer Foundation Web site (www.skincancer.org), with permission.



A wartlike 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.



Figure 3 Squamous cell cancer.

Reprinted from Skin Cancer Foundation Web site (www.skincancer.org), with permission.

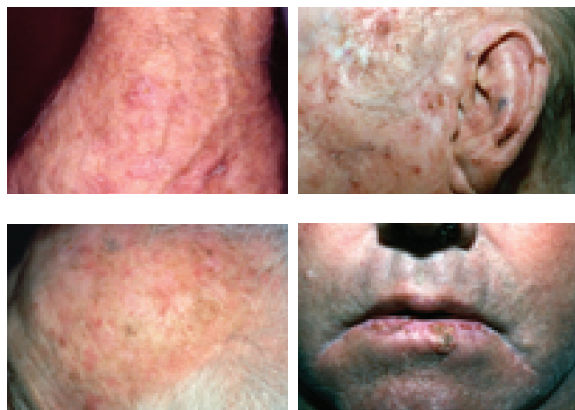


Figure 4 Actinic keratoses.

Reprinted from Skin Cancer Foundation Web site (www.skincancer.org), with permission.

In geographic areas such as Australia, where intense sun exposure is common, researchers in one study⁴¹ showed that almost 80% of transplant recipients had at least 1 skin cancer develop within 20 years of transplantation, and many of these had at least 2 skin cancers within 5 years of transplantation. In addition, SCC in transplant recipients is more aggressive and more likely to recur and metastasize than in the general population.^{5,42}

In particular, SCC of the scalp and external ear is especially important in transplant recipients, and more likely to be fatal, so the scalp must be added to a thorough skin examination.⁹ Although many people may consider skin self-examination as focusing on the face and hands, self-examination of all the skin on the body is critical.

A summary of the different types of skin cancer, their characteristics, risk factors, and the frequency with which they are diagnosed in transplant recipients compared with the general population are shown in Table 1.

The immunosuppressive medications that are part of the routine care of transplant recipients are thought to be the most significant factor in increasing the risk of skin cancer in transplant recipients beyond the risk in the general population.⁴³ A number of additional factors are involved as well: genetic (HLA), enzyme polymorphisms, infection by oncogenic viruses such as human papillomavirus, age, sex, fair skin type, and cumulative ultraviolet radiation. In fact, in one study,^{44,45} researchers found that the occurrence of skin neoplasm was proportional to the level of immunosuppression. The count of CD4 cells, the cells that normally orchestrate the immune response and play fundamental roles in oncogenesis and tumor defense, are lower in transplant recipients,⁴⁶ particularly in recipients with more immune deficiency.^{47,48} In fact, some studies have explored the possibility of reducing immunosuppression in solid-organ transplant recipients to reduce the incidence of skin cancer.^{49,50}

Coupled with a yearly skin examination by a doctor, self-examination of your skin once a month is the best way to detect the early warning signs of basal cell carcinoma, squamous cell carcinoma, and melanoma, the 3 main types of skin cancer. Look for a new growth or any skin change.

What you'll need: a bright light, a full-length mirror, a hand mirror, 2 chairs or stools, and a blow-dryer.



Examine head and face, using one or both mirrors. Use blow-dryer to inspect scalp.



Check hands, including nails. In full-length mirror, examine elbows, arms, underarms.



Focus on neck, chest, torso. Women: Check under breasts.



With back to the mirror, use hand mirror to inspect back of neck, shoulders, upper arms, back, buttocks, legs.



Sitting down, check legs and feet, including soles, heels, and nails. Use hand mirror to examine genitals.

Figure 5 Skin self-examination for cancer.

Reprinted from Skin Cancer Foundation Web site (www.skincancer.org/content/view/14/56/), with permission.

Recommendations for Skin Cancer Prevention and Early Detection

Organizations such as the Skin Cancer Foundation⁵¹ and the American Cancer Society⁵² have general

Table 1 Types of skin cancer

Type	Frequency in transplant population as compared with general population	Characteristic appearance	Risk factors
Melanoma	2-8 times greater	Change of shape, color, surface of an existing mole. Use ABCDEs: Asymmetry, Border irregularity, Color variation, Diameter > 6 mm, and Evolution over time.	Sun exposure, number of moles on the skin, skin type, genetics, personal history of previous cancer, and immunosuppression
Squamous cell carcinoma	65-250 times greater	Discrete scaly erythematous papule on an indurated base, either on normal-appearing skin or on an actinic keratosis. Sometimes like an open sore that does not heal. Usually tender.	Chronic sun exposure, industrial exposure, immunosuppressive medications
Basal cell carcinoma	10 times greater	Slowly growing, shiny, skin-colored to pink translucent papules with telangiectasia and a "pearly" rolled border. Can erupt, bleed, or crust.	Acute or chronic sun exposure, immunosuppressive medications
Actinic keratoses	Not applicable	Red areas (0.1-1.0 cm) on the skin that are rough and scaly. Occasionally may have the sensation of pinprick or burn if touched or exposed to sun.	Sun exposure

population recommendations; however, guidelines specifically for transplant recipients have been developed by the International Transplant Skin Cancer Collaborative (Table 2).²³

Benefits of Skin Cancer Screening in the General Population

Screening and early detection programs could reduce morbidity and mortality due to skin cancer, especially since skin cancer is external and visible, risk factors are well documented, and screening tests are safe and acceptable to the public. Results of one study⁵³ showed that self-examination of the skin can potentially reduce mortality from melanoma by 63%. In another study,⁵⁴ self-examination of the skin was a key predictor for melanoma less than 1 mm in thickness, a crucial cutoff for curable melanoma.

Studies confirm low adherence to the practice of thorough skin self-examinations, which is defined as careful examination of each of the 8 areas of the body (the front of you from the waist up, the front of your thighs and legs, the bottom of your feet, your calves, the backs of your thighs, your buttocks and lower parts of your back, your upper back, and your scalp).⁵⁵

Interventions targeting increased skin self-examination are effective, particularly among populations with increased risk for skin cancer, such as siblings of patients with melanoma.⁵⁶ Interventions in the clinic setting include photo books and take-home educational literature.^{57,58}

Skin Cancer Risk Reduction for Transplant Recipients

Given that transplant recipients make frequent visits to the transplant clinic, clinicians routinely have ample opportunity to teach patients about the importance of

prevention and detection of skin cancer. Transplant recipients also receive literature and education on a number of relevant health issues, among which education about skin cancer should be integrated.

Early detection and sun protection recommendations are needed to prevent skin cancers in transplant recipients, but few transplant centers in the United States provide counseling on reducing the risk of skin cancer (personal communication with dermatologists from International Transplant Skin Cancer Collaborative). Generally, surveys from many sites indicate that only about 50% of transplant recipients use adequate sun protection. Only a minority of transplant patients receive regular follow-up by a dermatologist. Few transplant sites seem to have integrated education about prevention of skin cancer on a routine basis.^{27,28} Only 26% to 41% of transplant recipients are aware of their increased risk for skin cancer.^{28,59}

The AT-RISC Alliance, a joint effort of the International Transplant Nurses Society and the International Transplant Skin Cancer Collaborative, recently developed recommendations for inclusion of skin cancer prevention as part of posttransplantation care. These recommendations are (1) early recognition of lesions through skin self-examination, (2) follow-up with a dermatologist regarding suspicious lesions, and (3) sun protection.²³ The European Best Practice Guidelines for Renal Transplantation's primary prevention recommendations²⁴ also include avoiding sun exposure, using protective clothing and an effective sunscreen, and urging patients with premalignant lesions to be referred early to a dermatologist for active treatment and follow-up.

Previous Studies in Transplant Clinics

In one study,²⁸ researchers found that 40% of Mayo Clinic patients attending a transplant dermatology

Table 2 Patient handout adapted from the International Transplant Skin Cancer Collaborative^a

Three simple steps to follow

Step 1: Daily Sun Protection

1. Use broad spectrum sunscreen daily with SPF of 30 or greater.
2. Use protective clothing. This is defined as long sleeve shirts with conservative neckline and long pants with a tight fabric weave. Clothing such as this is usually considered by many as very hot, and thus not worn. However, this doesn't have to be the case. Loose, light-weight fabrics can be worn that are protective and stylish. Most clothing provides adequate protection as long as it is worn. The one exception to this may be a white cotton T-shirt, worn by many during the warm seasons, which provides a SPF of only ~5.
3. Wear a broad-brimmed hat. Baseball style caps provide no protection for the ears, which is a common area for skin cancer to occur.
4. Avoid sun exposure as much as possible between the hours of 10 AM and 4 PM. Attempt to concentrate outdoor activities into early morning, late afternoon, and evening. If your shadow is shorter than you are, you're likely to sunburn.
5. Avoid tanning beds. A tan obtained in a tanning bed does NOT provide protection from harmful sunrays.
6. Wear sunglasses.
7. Seek shade.
8. Don't stay in the sun for prolonged periods of time, even if you are wearing sunscreen.

Step 2: Monthly Self Skin Examination

In a brightly lit room, with two mirrors, look over your entire skin surface. Do this once a month. A family member may assist with examination of the back, but if they are not consistently available, you can use two mirrors for this exam (Figure 5).

Step 3: Timely Skin Examination by a Dermatologist

- You should receive at least one complete skin examination by a dermatologist closely after the time of your transplant (within 4 months if possible).

Your physician will then recommend how often you should receive subsequent skin examination. This depends on the number of risk factors for skin cancer, and the amount of skin disease and sun damage that you have. It may range from every month to only as needed (provided that your primary care or transplant physicians were examining your skin on routine yearly exams).

^a Adapted from the International Transplant Skin Cancer Collaborative Web site,²³ <http://www.itscc.org/PatientEdu/prevention.cfm>. Accessed September 9, 2008.

clinic (ie, patients already identified as having suspicious skin lesions) performed skin self-examinations, although patients were not asked about details such as the frequency of examinations or the locations on the body examined. Rates of skin self-examination increased among patients receiving routine verbal and written education from the dermatology clinic and patients receiving routine care plus intensive repetitive written education. Results of this pilot study²⁸ suggest that brief interventions have a significant potential to affect skin cancer prevention among transplant recipients. In a report⁶⁰ from a kidney transplant clinic in the United Kingdom, nurses were trained by a dermatologist in the technique of appropriate skin examination and identification of suspicious lesions. Patients also received skin cancer education at each visit. The authors suggested that this practical model could be applied to nurses in other transplant clinics, and although precise data on detection rates were not given, the authors posited that an intense focus on dermatologic care could translate to improvement in early detection of suspicious skin lesions.⁶⁰

In a study⁶¹ of 270 patients in a kidney transplant clinic in Ireland, before transplantation, patients were stratified into low-, intermediate-, and high-risk skin

cancer groups based on skin type, hair and eye color, cumulative sun exposure, and history of skin cancer or precancerous lesion. Low-risk patients, with no risk factors, had professional skin examinations annually, whereas intermediate-risk patients were examined every 6 months. High-risk patients were examined by a dermatologist every 3 months, and the authors suggested that patients at very high risk may be seen monthly. All patients were given detailed written materials about skin care after transplantation, including proper use of broad-spectrum sunscreen and financial aid for those who could not afford sunscreen. In addition, the information on skin cancer protection is reviewed at each follow-up visit.⁶¹

Counseling Principles

The label "teachable moment" has been used to describe naturally occurring health events thought to motivate individuals to spontaneously adopt risk-reducing health behaviors.⁶² Transplant recipients make multiple visits to transplant clinics, each of which can be viewed as an opportunity to instruct patients on the value of sun protection and early detection. As health and functional capacity improve after transplant, recipients are more likely to feel increased motivation and

openness to opportunities to increase self-efficacy, which in turn facilitates skill acquisition. In particular, placing skin cancer prevention in the context of the patient's relationship with the transplantation team increases the salience of the intervention as a post-transplantation health issue.

That being said, depression⁶³ and the need to develop a strong medication regimen in transplant recipients provide challenges to the adoption of new practices. Consideration of these and other quality-of-life issues in transplant recipients also make counseling about the adoption of new practices even more challenging.^{64,65} Interventions for other behaviors such as tobacco cessation counseling in transplant recipients can serve as models for strategies of risk reduction in transplant recipients.⁶⁶ In the Irish study⁶¹ of 270 kidney transplant recipients described earlier, transplant recipients were poorly compliant with the use of sunscreens both before and after transplantation, although they noted improved rates of sunscreen use with intensive education and sunscreen distribution.⁶⁷

It is clear that providing information to increase use of sun protection is only one piece of what is necessary. Clinicians need to be trained on ways to help frame positive messages that lead to more long-lasting behavioral changes. Understanding that adopting a new behavioral change is a gradual process is guided by the Transtheoretical Model.⁶⁸ Five stages of change have been conceptualized to show that for most people, behavior change occurs gradually. These stages are precontemplation, contemplation, preparation, action, and maintenance. The patient moves from being unaware or uninterested in making a change (precontemplation) to a point of considering making a change, with awareness that a problem exists (contemplation). Patients then commit to take action (preparation), typically intending to take action in the next month. Determined action is the stage in which individuals modify their behavior, experiences, or environment in order to overcome their problems. This stage clearly requires considerable time and energy commitment. Maintenance is the stage in which people work to prevent relapse and to maintain the gains attained. Relapse is inevitable and becomes part of the process of working toward life-long change.^{69,70} Decisional balance, often a protracted process whereby patients weigh the pros and cons of a certain behavior, is a key component of the Transtheoretical Model.

Motivational interviewing is a process that was developed to help individuals move toward change and guides the person facilitating the change. The therapist or clinician schooled in motivational interviewing techniques can support self-efficacy and encourage and support the client's sense of the possibility of change.⁷⁰ Especially in the context of a transplant clinic, where patients return for regular visits and are closely

followed up for many health issues, there is opportunity, over time, to address behavior change with respect to practices to reduce the occurrence of skin cancer. Basic education, skin examinations, and reviews and reminders could occur over the many months and years in which the patient will visit the clinic.

The first series of transplant recipients' visits to the clinic tend to occur frequently and often involve discussion relating to the surgery or medications. As time passes, patients come to the clinic less often, assuming no major complications or issues arise. Depending on the clinic site, a recipient will see a number of providers at each visit, ranging from the surgeon, a medical specialist such as nephrologist, a hepatologist, a clinical nurse coordinator, and members of the behavioral health team, such as a psychologist, a social worker, and so on. Although tobacco use and alcohol use are traditionally addressed, practices for reducing the risk of skin cancer can be addressed and prompted by questions on the medical intake form.

Practical Suggestions for Transplant Clinics

Various educational materials are routinely distributed to patients, and materials on skin cancer can easily be integrated into these materials. Materials using different media such as videocassettes, DVDs, pamphlets, flyers, or even computer workstations with information for patients on risks for skin cancer and sun protection education can be added to the "portfolio." Written materials may be on the reception desk, with the waiting room periodicals, or mounted on the wall. In one study,⁶¹ sunscreen was distributed to study participants for whom the cost of purchase was prohibitive.

At a routine visit, the clinician should routinely inquire about sun protection practices, especially for tanned, light-skinned, or freckled patients or for patients who are planning a warm-weather vacation or time in the sun during the summer. Each routine visit could constitute a teachable moment for skin cancer education, especially when the patient has an evolving mole or freckle or a recent sunburn. The clinician could be reminded to discuss practices for protecting against skin cancer in a written checklist or an electronic medical record. Computer reminders are effective in increasing preventative care for patients who are hospitalized,^{71,72} and such prototypes could be applied to the outpatient setting as well. Providers from all disciplines should be vigilant about encouraging all patients to examine their skin regularly and to seek medical evaluation if they detect anything that concerns them. In addition, the providers should work closely with dermatologists to ensure that the transplant recipient is evaluated quickly. Finally, the patient should be reminded that documentation from visits to their primary physicians or outside dermatologists always need to be brought to the attention of the transplant care team.

Smoking cessation initiatives often have a mechanism such as counseling sessions conducted in person, by telephone, or online and routine reminders by virtually all clinical staff with whom the patient interacts. Such a set clinical pathway is rarely in place for the integration of information for skin cancer prevention and education.⁶⁶ Skin cancer education and prevention efforts should exist alongside successful efforts in improving diet and nutrition while reducing tobacco and alcohol use, which anecdotally, have been successful.

Comprehensive education of the staff must take place if skin cancer prevention is to be integrated into the care of transplant recipients. Staff can be trained in center-wide educational efforts (eg, grand rounds), in seminars, and alongside any other continuing medical education.

Summary

Education on preventing skin cancer is particularly important in solid-organ transplant recipients, who are at a significantly increased risk of skin cancer. Transplant patients are at greater risk of more frequent and more aggressive skin cancers than the general population. These cancers may include melanoma, the most serious skin neoplasms, and nonmelanomatous skin cancers, namely basal cell carcinoma and SCC. The most common risk factor for all of these lesions is cumulative sun exposure, although immunosuppression is thought to play an integral role in their increased risk of malignancy. Typical photos and descriptions have been included here to help readers identify these lesions.

Skin cancer education should be integrated into the care of transplant recipients as part of their numerous visits to the transplant clinic. Although some transplant recipients may be resistant at first to adopting new behaviors, ample clinic opportunities for education of transplant recipients can dramatically reduce their risk of skin cancer.

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CE Test Test ID 4000-J55: Skin Cancer Education in Transplant Recipients

Learning objectives: 1. Identify the risk factors for development of skin cancer in solid-organ transplant recipients 2. Describe the components of a successful skin cancer prevention program for transplant recipients 3. Discuss ideas for transplant recipient education regarding skin cancer prevention

1. What form of skin cancer is most common in transplant recipients?
 - a. Lentigo maligna melanoma
 - b. Basal cell carcinoma
 - c. Actinic keratoses
 - d. Squamous cell carcinoma
2. Which of the following statements accurately describes the contrast between skin cancer and other cancers?
 - a. Melanoma skin cancer has a higher mortality, but lower morbidity, than other forms of cancer.
 - b. Mortality rates for melanoma in the United States have increased, while mortality rates for other cancers are decreasing.
 - c. Skin cancer is more likely to metastasize than other forms of cancer.
 - d. Self-examinations for skin cancer have been proven to be the most effective way of detecting early melanoma.
3. Which form of melanoma is the only one in which sunlight is not thought to play a causative role?
 - a. Actinic keratoses
 - b. Acral lentiginous melanoma
 - c. Basal cell carcinoma
 - d. Squamous cell carcinoma
4. The incidence of skin cancer in transplant recipients is most related to which of the following factors?
 - a. The recipient's ethnicity
 - b. The recipient's body surface area
 - c. The particular solid organ transplanted
 - d. The recipient's level of immunosuppression
5. Which of the following is a characteristic of transplant-associated melanoma?
 - a. More than one primary lesion
 - b. Occurrence in older individuals
 - c. Lack of metastasis
 - d. Nonaggressive tumor growth
6. Cancers of what body areas account for 40% to 50% of all post-transplant cancers?
 - a. Bone and cartilage
 - b. Face and ears
 - c. Skin and lips
 - d. Breast and hands
7. Skin self-examinations by transplant recipients should focus on which body areas?
 - a. Face and hands
 - b. Back and legs
 - c. Scalp and torso
 - d. All skin on the body
8. Squamous cell carcinoma in which particular body area is most likely to be fatal?
 - a. External ear
 - b. Tip of the nose
 - c. Sole of the foot
 - d. Dorsum of the hand
9. At what rate does squamous cell carcinoma occur in transplant recipients in comparison to the general population?
 - a. Less than 5 times more often
 - b. 5 to 10 times more often
 - c. 20 to 40 times more often
 - d. 65 times more often or more
10. Successful integration of skin cancer prevention into the care of transplant recipients requires which of the following?
 - a. Distribution of sunscreen to those for whom the purchase is cost prohibitive
 - b. Comprehensive education of transplant clinic staff
 - c. Addition of questions to aid in assessment of skin cancer risk to clinic medical intake forms
 - d. Routine distribution of written skin cancer prevention educational materials to all transplant recipients
11. Which of the following is not a factor for clinicians when inquiring about the sun protection practices of transplant recipients?
 - a. Patients with allergic dermatitis
 - b. Patients with many freckles
 - c. Patients with red hair or who burn easily
 - d. Patients planning a week vacation to a Southern climate
12. Efforts to reduce skin cancer risk in transplant recipients should focus on which of the following?
 - a. Monthly examinations by a dermatologist
 - b. Patient education
 - c. Routine CD4 counts
 - d. Behavior modification training for recipients and caregivers

Test answers: Mark only one box for your answer to each question. You may photocopy this form.

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