Chapter 19: Recognition and Treatment of Skin Lesions

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Cutaneous lesions are often the first entity the otolaryngologist - head and neck physician encounters. They may be visible in even the most cursory examination, or the patient may bring them to the attention of the physician. To the untrained eye, they can often provide a challenging diagnosis. Even to the experienced eye, the diagnosis must often be confirmed histologically. Treatment of cutaneous lesions can be performed with confidence, skill, and success. Several "tricks" to the treatment of these lesions can help ensure a satisfactory outcome.

This chapter is structured to provide the head and neck surgeon with practical knowledge concerning the differential diagnosis of cutaneous tumors of the face, including epidermal tumors, melanocytic tumors, cystic lesions, vascular tumors, and fibroadnexal tumors. Within the discussions of the various tumor categories are reviews of the preferred therapeutic options for each specific tumor. At the end of the chapter is a discussion of treatment methods and biopsy techniques commonly used by the dermatologist and cutaneous surgeon that can easily be applied by the otolaryngologist. The details of various biopsy techniques used to establish a histologic diagnosis are stressed, as the pathologist's ability to establish a definitive diagnosis depends directly on the clinical specimen obtained for histopathologic review.

An in-depth discussion of all cutaneous tumors (benign and malignant) is beyond the scope of this chapter. The recognition of the three most common cutaneous malignancies will be discussed, with detailed chapters concerning these tumors to follow. The treatment of basal cell carcinoma and squamous cell carcinoma is discussed in Chapter 24. Chapter 25 details the current status of the treatment of malignant melanoma. The present chapter, then, will serve only to introduce these three tumors.

Epidermal Neoplasms

The epidermis is a highly differentiated tissue, which is limited in its possible response to stimuli. Epithelial neoplasms of the skin can range from entirely benign to highly malignant tumors. Epidermal tumors are so common that one can safely say that few people go through life without acquiring at least one. A great assortment of epidermal tumors have been described, under a wide variety of names. The more common and important ones will be discussed in this chapter.

Three important factors relevant to epidermal tumors should be noted. First, the epidermis in the normal person is a relatively thin structure and is the outermost layer of the skin. Hyperproliferation of the epidermis or its layers results in tumors that usually are superficial appearing and often are associated with scale. Dermal tumors and tumors of the cutaneous appendages (adnexal tumors) are usually deeper and, therefore, more nodular in appearance. Recognizing these differences is one general way of differentiating between the two tumor groups. Second, three types of lesions occur within epidermal tumors: benign, cancerous, and precancerous. The precise nature of precancerous lesions has been debated widely, but the term persists in the literature; it refers to a group of epidermal lesions of

which a small percentage can go on to become malignant neoplasms. Finally, because the epidermis is limited in the number of ways it can respond to stimuli, the clinical presentations of many tumors will be similar. Even the most experienced dermatologist often has to resort to a biopsy for the definitive diagnosis of an epidermal tumor.

Seborrheic keratoses

Seborrheic keratoses, which are very common lesions, usually begin around the fourth decade of life. They can be single or multiple and can occur anywhere on the body with the exception of palms and soles. Clinically they are sharply demarcated and slightly raised, appearing as if they were stuck on the skin surface (Fig. 19-1). Many have a verrucous surface with a soft, friable consistency. However, others may have a smooth surface. Characteristically, all seborrheic keratoses show keratotic plugs on careful surface inspection. Their color is usually brownish to brown-black, although it can vary from flesh color to deep black. The color within an individual lesion is usually uniform. Lesions can measure from a few millimeters to several centimeters. When subjected to trauma they can become irritated, causing an inflammatory base and occasional bleeding. Occasionally, seborrheic keratoses are pedunculate, especially on the neck.

The etiology of seborrheic keratoses is unknown, although they may be dominantly inherited. They are benign with no malignant potential, although the appearance of hundreds in rapid "showers" may be a sign of internal malignancy. This is the much-debated Leser-Trélat sign. The most common tumor seen in this association is colonic adenocarcinoma.

As one would expect from their hyperkeratotic, stuck-on appearance, all seborrheic keratoses share histologic evidence of hyperkeratosis, acanthosis, and papillomatosis. The acanthosis in most instances is due entirely to upward extension of the tumor. Therefore, the lower border of the tumor often lies at the same level as the normal, well-demarcated epithelium on either side of the tumor.

In the head and neck, the most common mistaken diagnosis is melanoma; therefore, the pathologist not infrequently receives a widely excised seborrheic keratosis that had been mistaken clinically for melanoma. If the diagnosis is in doubt, one should perform a biopsy before definitive treatment.

Treatment of these lesions varies. Because these lesions are so superficial, they often can be shave excised flush with the skin, with any of the shaving techniques described at the end of this chapter. These lesions also are amenable to a light liquid nitrogen freezing, creating an intraepidermal blister and allowing removal of the keratosis with the blister. A nice trick with these tumors is to freeze them with one of the prepared refrigerants commonly used for dermabrasion (Frigiderm, Floro Ethyl, Cryosthesia). The lesion can be literally "flicked" off with a curette in a cosmetically elegant manner. Because these are truly benign lesions, the best treatment is often no treatment, unless they are cosmetically disfiguring.

Dermatosis papulosa nigra (DPN) is a condition found in approximately 35% of adult blacks, often with its onset during adolescence. The lesions are located predominantly on the face, especially in the malar region. They may also occur, though infrequently, on the neck and upper trunk. They consist of small (1- to 3-mm), smooth, pigmented, stuck-on

hyperkeratotic papules. They have the histologic appearance of seborrheic keratoses but are smaller. Most clinicians consider them a true variant of seborrheic keratoses.

The treatment of DPN is difficult because of pigmentary problems in treating black skin. Options that have been tried include fine-needle electrosurgery followed by use of a small curette, light freezing with liquid nitrogen, and dermabrasion. If the lesions are few, we prefer the first method. Cryosurgery can produce spotted hypopigmentation in blacks and should be avoided unless other treatment modalities are not available. Dermabrasion can be of two types. By means of either a small (2-mm) wheel or a small cone or pear diamond fraise, the lesions can be removed singly, very quickly and easily. Dermabrasion also can result in mottled pigmentation on healing, which usually will fade with time. If the lesions are multiple and confluent, total regional dermabrasion may be the treatment of choice to offer the best cosmetic blend.

Warts

Warts, very common lesions, are the only tumors definitively known to be caused by a virus - the human papilloma virus (HPV), which is a DNA virus. Warts can be classified in three ways. The traditional classification, based on the clinical appearance and location, is as follows: (1) verruca vulgaris, or common wart, including the filiform wart; (2) deep hyperkeratotic palmar-plantar wart; (3) superficial mosaic-type palmar-plantar wart; (4) verruca plana; (5) epidermodysplasia verruciform; and (6) condyloma acuminatum. The second classification is based on histology. The third, the most recent classification, is based on the presence of several antigenic types of papilloma viruses, each with a distinct DNA genome and type-specific antigen. Serotypes have been added.

The most definitively characterized types include the following. Papilloma virus type 1, or HPV-1, is specifically associated with deep, hyperkeratotic palmar-plantar warts. HPV-2 is associated with superficial mosaic palmar-plantar warts as well as with common and filiform warts. HPV-3 is associated with verruca plana and the benign variant of epidermodysplasia verruciformis. HPV-5, initially called HPV-4, is associated with the dysplastic type of epidermodysplasia verruciformis. These four are the most highly specific serotypes. Less specific serotypes include HPV-4, largely associated with superficial mosaic palmar-plantar warts and some common warts; HPV-6, largely associated with condyloma acuminatum; and HPV-7, warts detected on the hands of nine butchers.

The most common facial warts include common warts, flat warts (verruca plana), and filiform warts. These warts would be most commonly associated with the antigenic serotypes HPV-2 and HPV-3. Clinically these lesions are hyperkeratotic. The filiform wart is often a pedunculate lesion occurring in isolation on the cheek, nasal tip or columella, or eyelid (Fig. 19-2). Common warts can occur anywhere on the face. Flat warts usually occur in younger patients; they are small (1- to 2-mm), flat-topped, hyperkeratotic lesions, which can coalesce (Fig. 19-3).

Treatment of these warts is at times difficult. The filiform wart can be anesthetized at its base and scissors excised, with the base being lightly curetted and fulgurated under low current. This approach affords the best chance for cure. Filiform warts often are too verrucous and hyperkeratotic to be effectively treated with cryosurgery. Common warts, when not too

verrucous, can be treated effectively with liquid nitrogen cryotherapy. Flat warts present a difficult problem. At times, they can be effectively treated with liquid nitrogen. Perhaps the best method is to individually scrape each small wart off the skin with a small curette, treating, when possible, all the flat warts in an area at one time. In young children who do not tolerate surgical therapy well, one may use topical retinoic acid (Retin-A) at a concentration sufficient to produce erythema and irritation in an attempt to stimulate the body's own immunity against the wart virus. At times, avoiding treatment is best, as the vast majority of warts will spontaneously involute once the patient's immune system recognizes the virus.

Related to the poxvirus family is a group of viruses known as the molluscum contagiousm virus family (EM-2). An infection with one of these viruses appears clinically as a variable number of small, discrete, waxy, skin-colored, dome-shaped papillomas, 2 to 4 mm in diameter, with umbilicated centers (Fig. 19-4). Like all viral lesions, they ultimately will involute spontaneously. Histologically, they have a classic appearance of cytoplasmic inclusion bodies, the so-called molluscum bodies. The best treatment is usually superficial cryotherapy or curettage, as with common warts.

Actinic keratoses

Actinic keratoses, sometimes called solar keratoses, are precancerous lesions. Studies indicate that from 5% to 20% of persons with solar keratoses will develop squamous cell carcinoma or basal cell carcinoma in one or more of the lesions. As the name implies, actinic keratoses result solely from solar damage. They are seen on sun-exposed areas of the skin, usually in persons after the fourth decade of life. They are seen most commonly in fair individuals who frequently burn (Celts with type I skin). Clinically, these lesions are usually erythematous with covering adherent scale and show little or no infiltration (being very superficial) (Plate 3, A). A patient often can feel the rough, adherent scale before the lesion is clinically visible. Solar keratoses can be flesh colored or pigmented. They often do not have a sharp demarcation from surrounding skin and can spread peripherally. Occasionally these lesions develop marked hyperkeratosis, giving a clinical appearance of a cutaneous horn. On the vermilion border of the lip, actinic keratosis is known as solar or actinic cheilitis.

Actinic keratoses lesions are best removed and not watched. The most commonly used method for removing discrete lesions is cryosurgery. Shave excision can also be performed. However, in the milieu of sun-damaged skin, new lesions may frequently appear. In persons with severe sun damage to the face or with diffuse actinic keratoses, topical 5-fluorouracil (Efudex) is effective for treatment of a region, or the entire face. Because proper use results in severe irritation, sound patient understanding and education and physician reassurance are necessary to ensure adequate compliance. A full-face dermabrasion is also a good method of treatment for severe, diffuse cases.

Keratoacanthoma

A keratoacanthoma is a rapidly growing tumor usually seen on sun-damaged skin (Plate 3, B). Two types of keratoacanthomas exist - solitary and multiple. The solitary keratoacanthoma was first recognized as a distinct entity in 1950. Before then, this lesion was thought to be a form of squamous cell carcinoma. This common lesion is now recognized as

an entity that is clinically and histologically different from squamous cell carcinoma. The solitary keratoacanthoma occurs in elderly persons, usually as a single rapidly growing tumor with three classic phases: growth, plateau, and involution. During the growth phase, the tumor begins as a firm, dome-shaped papule, which grows to become a nodule, usually peaking at 1 to 2.5 cm in diameter, with a central horn-filled crater (Plate 3, C). Sites of predilection are the sun-exposed areas, where up to 95% of solitary keratoacanthomas have been reported. They have not been reported on palms, soles, or mucosal surfaces. A keratoacanthoma will classically reach full size within 6 to 8 weeks and then enter the plateau stage. It then will generally involute spontaneously within 6 months, often healing with a slightly depressed scar. However, keratoacanthomas may grow for more than 2 months and take up to 1 year to involute.

Of the three rare clinical forms of solitary keratoacanthoma, two are pertinent to the physician. The first, the giant keratoacanthoma, presents with a rapid growth, reaching a size of 5 cm or more, and may cause destruction of underlying tissues. Nevertheless, spontaneous involution will usually occur. The most common site for this lesion is the nose. The second, the keratoacanthoma centrificum marginata, may reach 20 cm in diameter, with little tendency toward spontaneous involution and with peripheral extension. This lesion is most commonly located over the dorsum of the hand.

Claims have been made that keratoacanthoma may undergo transformation to squamous cell carcinoma in the setting of immunosuppression. Debate continues as to whether this transformation actually occurs or whether a "transformed" lesion has been a squamous cell carcinoma from the beginning. The most common site, in our experience, for this malignant transformation to occur is the nose. We have seen three lesions with the histologic diagnosis of keratoacanthoma destroy the entire nose as well as upper palate. We have also seen two "keratoacanthomas" metastasize. Therefore, especially in dealing with central facial keratoacanthomas, care must be taken in interpreting the histologic report and correlating it with the clinical behavior of the tumor.

The second type of keratoacanthoma is the multiple variety, of which there are two forms. The first is the multiple, self-healing epithelioma of the skin. Such lesions usually begin to occur in childhood or adolescence and can be located anywhere, including palms, soles, and head and neck. Generally, no more than a dozen lesions exist at any one time, and they behave clinically the same as solitary keratoacanthomas, regressing after a few months with a depressed scar. The second form of multiple keratoacanthoma is the eruptive keratoacanthoma. Eruptive keratoacanthomas do not usually appear until adult life, often presenting as many hundreds of characteristic papules measuring 2 to 3 mm in diameter. The oral mucosa and larynx may be involved.

Treatment of keratoacanthomas can be difficult. Surgical excision is probably the treatment of choice for most lesions when they cannot be left to spontaneously involute. Intralesional injection of cytotoxic agents, the most common being 5-fluorouracil and methotrexate, has induced involution, after which healing occurs similarly to spontaneous involution. We favor methotrexate, at a dose of 12.5 to 25 mg/mL, with approximately 1 mL being injected into the lesion at 3- to 4-week intervals. Large keratoacanthomas - those in which distinction from squamous cell carcinoma is difficult clinically and histologically - especially when they occur in the central facial area, are best treated using Mohs surgery.

This technique is detailed in Chapter 24.

Basal cell carcinoma

Basal cell carcinoma is the most common malignancy in humans. It comprises approximately 65% of all epithelioid tumors, and accounts for 20% of all cancers in men and 10% to 15% of all cancers in women. Depending on the study cited, approximately 86% of lesions occur initially in the head and neck, with 25% of all primary lesions occurring on the nose. Approximately 96% of recurrences are in the head and neck, with 38% being on the nose. Emmet reported that 75.5% of previously untreated basal cell carcinomas found in Australia occurred in the head and neck, 8.4% on the chest and back, and 16% on the arms and legs. When looking at recurrent tumors, Emmet found that 91% occurred on the head and neck, 7.5% on the chest and back, and 1.5% on the arms and legs. In this discussion, we will outline the epidemiology and clinical and histologic variations of basal cell carcinoma. Treatment of basal cell carcinoma and squamous cell carcinoma is dealt with in detail in Chapter 24.

Basal cell carcinoma, more common in men than in women, is seen most frequently between the ages of 40 and 60. With the aging of the sunbathing generation, however, basal cell carcinomas are occurring with increasing frequency in younger people. Scandinavians and people of Celtic extraction (in particular, Irish), who frequently have type I or type II skin, appear to be more prone to basal cell carcinoma than persons with more darkly pigmented skin. Exposure to sunlight, primarily in the ultraviolet B (UVB) spectrum, is the primary factor causing basal cell carcinoma. This has been shown experimentally and reproduced clinically. The tumor is more common as one proceeds toward the equator and is also more common at high altitudes. The head and neck area is the most common site for basal cell carcinoma. On the head and neck, the nose is the most common site, with the nasal tip and the nasal ala being the most common locations on the nose itself. The cheeks and the forehead are the next most common sites. Basal cell carcinoma is more common on the left side of the body than on the right, perhaps because of selective sun exposure in individuals whose occupation preferentially exposes the left side.

Although sun exposure is the primary etiologic agent in producing basal cell carcinoma, other risk factors include occupation, genetic conditions, immunosuppression, and former injury. Farmers, sailors, and fishermen, because of their heavy occupational actinic exposure, have a higher than average incidence of skin cancer. Genetic syndromes include the autosomal-dominant nevoid basal cell carcinoma syndrome and xeroderma pigmentosum. In the former, basal cell carcinomas can arise on any area of the body, with the predilection being toward sun-exposed sites, beginning at an early age and continuing throughout life. These patients also have skeletal abnormalities, including bifid ribs, jaw cysts, and frontal bossing, as well as calcified cerebra as shown on skull x-ray film. Xeroderma pigmentosum, autosomal recessive in inheritance, is a defect in DNA repair, which can result in the formation of basal cell carcinoma and other cutaneous neoplasms at a very early age, usually in response to sun exposure. Immunosuppression, either iatrogenic or in patients with leukemias or lymphomas, has been shown to increase the incidence and aggressiveness of basal cell carcinomas. Chemical carcinogens, notably arsenic, play a tumorigenic role. The arsenic usually comes from well water contaminated with arsenic; or patients with asthma, hay fever or psoriasis may have taken arsenic as Fowler's solution. Arsenic-induced basal cell

carcinomas tend to be primarily on the trunk and are accompanied by keratoses of the palms and soles, pigmentary changes, and nail changes (Mees's lines) associated with arsenic ingestion. Exposure to ionizing radiation is also an important etiologic factor; tumors can arise in areas of radiation damage, often many years after superficial x-ray therapy for acne or tinea, or as a depilatory, at an early age. Basal cell carcinoma can arise at the edge of a scar or area of trauma. The injury may possibly have acted as a cofactor, adding to the effect of already existing factors such as sunlight and racial susceptibility. Smallpox vaccinations and burn scars have been associated with basal cell carcinoma.

To the trained and curious eye, the clinical recognition of basal cell carcinoma is not difficult. Typically, there is a raised, nodular lesion with a smooth, clear (pearly) border, and telangiectasia (Plate 3, D). The lesion can ulcerate and form a crust (Plate 3, C). A typical history involves a pimplelike lesion that bleeds and does not heal. Pruritus is a common early symptom.

There are, however, several different clinical presentations and distinctive histologic pictures. The *nodular* or *noduloulcerative* basal cell carcinoma is the most common of clinical presentations (Plate 3, C and D). This lesion has a well-formed clinical border, with the histologic features of basal cell carcinoma usually being confined within the clinical border. It is, therefore, one of the easiest variants of basal cell carcinoma to treat. Basal cell carcinoma can be *pigmented* (Plate 3, E). Even when it is pigmented, the lesion maintains the clinical features of a pearly, translucent border and telangiectasia. The *superficial multicentric* basal cell carcinoma is often present in the setting of actinic damage, with differing, intercommunicating extensions of tumor in a superficial histologic field. The lesion may contain cystic spaces appearing as very ill-defined clinical margins, which make treatment difficult. Some sources separate a cystic basal cell carcinoma from the nodular and multicentric types. This is mostly a histologic separation.

Three forms of basal cell carcinoma are often more subtle clinically, more aggressive histologically, and more difficult to treat. Clinically, the *morpheaform* basal cell carcinoma (Plate 3, F) presents as a yellowish plaque, which develops telangiectasia, may ulcerate, and may form a sclerotic or scarlike appearance. The margins are often indistinct; histologically, this tumor extends subclinical, fingerlike projections intradermally, making complete excision difficult. This tumor has a scarlike, stromal matrix, which gives it a very fibrous, sclerotic appearance and nature. Another aggressive tumor is the *keratotic* basal cell carcinoma (*basosquamous carcinoma* or *metatypical carcinoma*). The term "keratotic" is gaining rapid acceptance, replacing the terms in parenthesis. With the advent of monoclonal antibody staining, it has become evident that basal cell carcinoma and squamous cell carcinoma are individual neoplasms; a true intermediate tumor probably does not exist. Therefore, the keratotic tumor represents a basal cell carcinoma that keratinizes and is aggressive clinically. Histologically, within the same field typical basal cell carcinoma exists in association with cells that appear squamous and keratinize. *Recurrent* basal cell carcinoma (Plate 4, A) presents a varying clinical appearance, depending on the type of initial treatment. It may appear at the edge of a skin graft, within a scar created by electrosurgery, under a scar created by cryosurgery, or as a nodule developing within a suture line. Recurrent basal cell carcinoma is often nodular and accompanied by a morpheaform or sclerotic histologic picture in the deeper portions of the tumor. This picture may represent an aggressive histologic dedifferentiation of the tumor, a factor that may partially account for its clinically aggressive

behavior and resistance to treatment.

The typical basal cell carcinoma occurring in the middle-aged or elderly, fair-skinned person in the head and neck is not difficult to diagnose. One must be aware, however, that this tumor has a variety of clinical appearances, can appear in young people, and can occur in areas other than the head and neck. Any suspicious, nonhealing, pruritic, scaly lesion, especially one occurring in a sun-exposed area on a fair-skinned individual, should be investigated by biopsy.

Biopsy techniques for basal cell carcinoma are simple. It has been well documented that implantation metastases from basal cell carcinoma do not occur, as the tumor needs a stroma to provide an environment in which to grow. The most appropriate technique is a medium-depth shave biopsy. The depth of the biopsy ideally should be mid-dermis. This depth gives a dermal collagen network that is amenable to any form of therapy. If a morpheaform basal cell carcinoma is suspected, the biopsy specimen often must extend deeper, perhaps through a punch or incisional biopsy. In cases of recurrent or superficial multicentric lesions or large clinical lesions, biopsy specimens should be obtained in multiple sites to assess the true nature and size of the tumor. Biopsies of recurrent deep nodular lesions should be performed in an appropriate fashion to ensure an adequately deep specimen from the dermal nodule. This maneuver can be accomplished by means of an incisional biopsy or a deep-punch biopsy. As a rule of thumb, if the biopsy does not confirm the clinical opinion of basal cell carcinoma and the lesion remains suspicious, an additional biopsy of the lesion is indicated.

Chondrodermatitis nodularis helicis (Plate 4, B) is an inflammatory disease of underlying helical cartilage that can mimic and be mistaken for basal cell carcinoma. The condition usually results from chronic trauma. The entire diseased cartilage (which will appear yellow) must be excised for a surgical cure.

Squamous cell carcinoma

Squamous cell carcinoma, though less common than basal cell carcinoma, is still a common neoplasm. Many of the etiologic factors are the same as for basal cell carcinoma, the most important of which is long-standing, chronic sun exposure - specially if a person has lived close to the equator or at high altitudes. For example, in Michigan the ratio of basal cell carcinoma to squamous cell carcinoma is approximately 8 to 1, whereas in Texas the ratio approaches 2 to 1. Squamous cell carcinoma is more common in men than women and is more likely to present with multiple cutaneous carcinomas. It often is found in skin adjacent to basal cell carcinomas, a fact that is indicative of similar etiologic factors for both tumors. These include actinic (solar) damage, irradiation, trauma (scars), genetic susceptibility (nevoid basal cell carcinoma syndrome and xeroderma pigmentosum), occupation, and exposure to chemicals (especially arsenic).

Clinically, squamous cell carcinomas can often be separated into actinically induced squamous cell carcinomas and de novo squamous cell carcinomas. The former are the more common, arise on sun exposed areas, and are associated with a low incidence of metastasis (less than 1% in most series). The de novo lesions can be associated with some of the nonsolar etiologies for squamous cell carcinomas. Some studies suggest that de novo lesions

have a higher metastatic potential (around 2% to 3%) than the actinically induced squamous cell carcinomas. The mucosal variant of squamous cell carcinoma, seen clinically as carcinoma of the lip, has the highest metastatic potential, approaching 11% to 12% in some series. Therefore, these distinctions are important in prognosis. Carcinoma of the lip is discussed in detail in Chapter 24.

Squamous cell carcinoma may present clinically in any of several ways. It can present as a thick and scaly hyperkeratotic patch on the exposed surface of the body, in particularly the ear, lip, or nose (Plate 4, C). The lesion may change slowly over a period of time. If the crust is removed, the base is often ulcerated and has a rolled margin. The lesion may also present as a persistent ulcer, particularly as an old scar, or as a superficial multifocal change in generally sun-damaged skin. The latter is often the most difficult lesion to diagnose, requiring several biopsies at different points. Occasionally, a squamous cell carcinoma will become a vegetative nodular lesion. This lesion often has a cystic feel and can ulcerate and progressively enlarge. Often these exophytic lesions have not invaded deeply. They all have a tendency to ulcerate and become more erosive in appearance than a basal cell carcinoma. As with basal cell carcinoma, they can become pigmented (Plate 4, D) and often appear very similar clinically to keratoacanthomas, especially when the latter are in the growth phase. However, these lesions usually grow more slowly than keratoacanthomas, thus allowing distinction on clinical as well as histologic grounds. When this occurs, biopsy is always indicated.

Squamous cell carcinoma of the skin can be divided histologically into five groups. *Adenoid* squamous cell carcinoma is the most common. It is the classic nodular, ulcerative lesion, often appearing periauricularly. A second group is the *bowenoid* squamous cell carcinoma. This variant has the histologic appearance of Bowen's disease but can invade through the basement membrane and can become invasive carcinoma. A third group, *generic* squamous cell carcinoma, is the most common histologic group and carries the highest (still less than 1%) risk of metastasis. As the name implies, *verrucous* squamous cell carcinoma is a verruciform lesion that invades by blunt, pseudopod-type growth. The last group, *spindle* squamous cell carcinoma, is the least common and most indistinct clinically. The treatment of cutaneous squamous cell carcinoma, very similar to that of basal cell carcinoma, is discussed in depth in Chapter 24.

Bowen's disease is a variant of a squamous cell carcinoma. By definition it is a full-thickness dysplasia of the epidermis, thereby being noninvasive; however invasion can occur. Clinically Bowen's disease presents as a well-demarcated, erythematous, scaly patch or plaque in sun-exposed areas. It may be very psoriasiform in nature, psoriasis being one of the most common mistaken diagnoses. Bowen's disease carries the same etiologic implications as basal cell carcinoma and squamous cell carcinoma; it is probably the most common tumor found in patients with histories of long-term arsenic ingestion. Some studies have suggested an increased incidence of internal malignancy when Bowen's disease occurs in non-sun exposed areas. However, reports are conflicting, and the definitive word is not in at this time.

Melanocytic Neoplasms

The melanocyte is the pigment-producing cell of the epidermis. However, many tumors of this cell line, the neural crest cells embryologically, occur in the dermis either by

migration or because crest cells fail to reach the epidermis during embryogenesis. The most common of these tumors are nevocellular nevi and melanoma. This section discusses the clinical manifestations of melanoma and nevocellular nevi and other tumors of melanocytes included in the differential diagnosis of melanoma. Chapter 25 discusses in detail the behavior and treatment of melanoma.

Malignant melanoma

Malignant melanoma, the third most common skin cancer, is increasing in incidence throughout the world. This disease is important because it is a lethal cutaneous neoplasm. With sophistication of the physician and patient, however, this disease can be recognized early and cured. Every effort, therefore, should be made to diagnose melanoma at its earliest stage (stage I - less than 0.85 mm thick or level I or II of Clark). The clinical recognition of melanoma depends on four major criteria: color, border, topography, and surrounding tissue. To a lesser degree, symptoms including pruritus, tingling, and bleeding are important. Changes in any of the four major criteria in connection with a preexisting mole or the continued growth of a new lesion should signal the clinician to suspect melanoma. The most significant change is one that occurs over time (weeks or months) rather than over a few days. A fairly rapid change is rarely due to malignancy but more commonly to infection or trauma.

1. *Color.* Melanoma is said to be a patriotic tumor, exhibiting shades and hues of red, white, and blue. Melanoma is rarely uniform in color but often has differing hues within the same lesion (Plate 4, E). Blue in a lesion signifies dermal melanin. The more blue the lesion, the deeper the dermal melanin because of the refractile properties of the skin. One can often see shades of blue, blue-black, or blue-green within a melanoma. Red in a melanoma often indicates inflammation. White areas indicate sites of regression within a melanoma.

2. *Border.* The border of a melanoma is classically irregular and scalloped, often bending diffusely into the normal skin (Plate 4, F). Changes in the border of a preexisting mole are sometimes the earliest signs of transformation to melanoma, reflecting an early radial growth phase of the melanoma.

3. *Topography.* Topography is critical to the diagnosis of melanoma (Plate 4, F). Rarely are melanomas macular (flat) lesions. Surface characteristics include nodularity, ulceration, verrucousness, and irregular undulations. Development of nodularity within a melanoma usually suggests invasion and vertical growth. Ulceration within a melanoma is one of the clinically poor prognostic signs.

4. *Surrounding tissue.* Changes in surrounding tissue suggest development of satellite pigmented lesions, which are often melanoma or at least atypical melanocytic hyperplasia.

Changes in one or more of these important clinical criteria, as well as the other symptoms and signs, should alert one to suspect melanoma and to perform a biopsy for diagnosis.

The biopsy of a melanoma is important. As will be suggested in Chapter 25, the most critical determination in judging the treatment and prognosis of stage I melanoma is the depth of invasion as defined in millimeters by Breslow or in levels by Clark. The most elevated

portion of a melanoma clinically is not always the deepest portion of the melanoma histologically. To give the pathologist (and therefore the patient) the best chance for an accurate diagnosis and treatment recommendation, an excisional biopsy of the entire suspicious lesion should, therefore, be performed. This approach allows the pathologist to step or serial section the entire specimen to determine the maximum vertical depth of the lesion. When excisional biopsy is impossible, multiple biopsies, including the most nodular area of the melanoma, are the next best choice.

As previously mentioned, there are two phases of growth noted in a melanoma, a radial growth phase (centripetal growth) and a vertical growth phase. The radial growth phase involves the circumferential growth of the tumor; this type of growth is confined to the dermoepidermal junction before actual invasion. The vertical growth phase involves the invasive growth of the tumor.

The four common types of melanoma fall within a spectrum. *Lentigo maligna melanoma* occurs in the head and neck (sun-exposed areas) of elderly patients and exhibits the longest radial growth phase. It makes up approximately 7% of the melanomas and often carries the best prognosis. It classically begins as an irregularly pigmented, flat macule, which grows very slowly over a period of several years (often a decade or more) (Plate 5, A). Malignant changes are evidenced by thickening and the development of discrete tumor nodules. The lesion may ultimately grow to a diameter of several centimeters because of its extensive radial growth. The precursor lesion is called lentigo maligna or (in older terminology) Hutchinson's freckle. It becomes melanoma once invasion or a vertical growth phase has developed.

The second type in the continuum is *superficial spreading melanoma,* the most common form of melanoma, representing approximately 65% of cases. This tumor has variable radial and vertical growth phases, with the radial phase often existing for a period of time before nodularity and vertical growth develop. This type of melanoma occurs most commonly in the fourth and fifth decades of life, although the age is declining as with other cutaneous neoplasms, possibly because of increased sun exposure. This is the classic melanoma of multiple colors, irregular border, and nodularity (see Plate 4, E and F).

Next along the continuum of growth is the *acral lentiginous melanoma.* The most recently described melanoma, also has variable radial and vertical growth phases. It is the most common type of melanoma seen in blacks. As implied by the name, these tumors are seen in acral areas, including hands, feet, and oral and anogenital mucosa. They carry a poorer prognosis than other forms of melanoma, perhaps because of the rich vascular supply and early angiolymphatic spread or because they are not easily or often visualized early in their development. These lesions make up approximately 5% to 7% of melanomas.

The last form of melanoma is the *nodular melanoma,* which develops a very early vertical growth phase. It constitutes approximately 7% to 8% of melanomas and is the most invasive form. It often presents as a blue-black, polypoid, smooth surface nodule that may bleed and has a tendency toward early ulceration. By definition, it is deeply invasive and has a vertical growth phase from its inception, leading to a poor prognosis.

Other melanocytic tumors fall into the differential diagnosis of melanoma and will be

discussed in that light. They are for the most part nevocellular nevi, very common tumors that can appear shortly after birth to late in life.

Junctional nevus

Junctional nevi are tan to brownish macules (flat lesions) of uniform color and smooth border (Plate 5, B). Dots of black pigment may be present, but unlike melanoma, the normal skin markings are preserved. The lesion varies from a few millimeters to a centimeter or more in diameter. The melanocytes or nevus cells are located at the junction of the epidermis and the dermis (dermoepidermal junction). The lesion can occur anywhere on the body and is the nevus most commonly mistaken for melanoma. When in doubt, one should perform a biopsy of the lesion. Junctional nevi occur anytime after birth and are the common moles in children before puberty. Their importance lies in their ability to develop into malignant melanoma, although this rarely occurs before puberty. The vast majority of junctional nevi remain benign throughout life and can evolve over time into either compound or intradermal nevi. Their treatment is often dictated by suspicion or melanoma or cosmetic reasons and usually includes a roll shave in noncosmetic area or a fusiform excision with closure in cosmetically important areas. Melanocytes are very cold sensitive, and a strictly junctional nevus can be removed with deep cryotherapy.

Intradermal nevus

The intradermal nevus is the common mature mole of adults, occurring anywhere on the body but rarely on the palms and soles. It is most common on the scalp or face in adults, varying in size from a few millimeters to several centimeters. It may be flat and smooth or raised and warty, pigmented or nonpigmented, sessile or pedunculate (Plate 5, C). It often contains coarse hairs, reflecting the depth within the dermis of the nevus cells. It is quite benign and rarely becomes malignant. By definition, all of the nevus cells occur within the dermis. This mole is best treated by shave excision when it is pedunculate and hairless. When it is on the head or neck and contains hair, it is necessary to excise this mole using either the punch excision technique (described later) or routine excision to remove the complete depth of the hair follicles within the nevus.

Compound nevus

The compound nevus, a combination of junctional and intradermal elements is found most commonly in adults. It is a brown to black mole, usually less than 1 cm in diameter. A brown, macular ring is frequently around the periphery of the lesion. It can contain hair and is often clinically indistinguishable from an intradermal nevus. Although the compound nevus, like any mole, can develop into a malignant melanoma, it usually remains benign and matures into an intradermal nevus. Treatment usually consists of shave or excision and closure. As with intradermal nevi, the choice of treatment depends on location and on the presence or absence of hair.

Blue nevus

Blue nevi may be flat or raised. These uncommon nevi present as dark blue or black hairless lesions that are less than 0.5 cm in diameter. They are usually indurated and palpable.

The overlying epidermis is remarkably smooth and the outline regular (Plate 5, D). Blue nevi most commonly occur on the head and neck, the dorsa of the hands and feet, or the buttocks. They are more common in women than men and usually undergo very little change after their initial presentation. The treatment of these lesions is excision or observation. The excision must be deep because the pigment often extends deep into the subcutaneous fat, resulting in the deep color of the lesion.

Halo nevus

The halo nevus is a phenomenon usually associated with a junctional nevus in children or adolescents. Most commonly found on the back, it is often a benign-looking, brown papular lesion in the center of a well-circumscribed, pale white circle of depigmented skin (Plate 5, E). This appearance reflects the body's rejection of the nevus cells, as an inflammatory response ensues in which the melanocytes of the nevus and those of the immediately surrounding epidermis are destroyed. If left alone, these nevi will often disappear, which is rarely a sign of malignant change.

Spitz nevus

The spitz nevus is also known as a juvenile melanoma or a compound melanocytoma. This rapidly growing pigmented lesion occurs principally in children, although it can occur in adults. It is usually less than 1 cm in size and is pink or red; occasionally it can be brown or black. A Spitz nevus may be soft or hard but is usually dome-shaped and can be either sessile or pedunculated. It can occur anywhere on the body and is often difficult to diagnosed clinically. Its main importance is its histologic resemblance to melanoma, with even experienced pathologists having difficulty distinguishing between the two. Very few, however, progress to malignancy. Treatment of a Spitz nevus is the same as that for an intradermal or compound nevus.

Congenital nevus

Congenital nevi are present at birth. They are not easily distinguished histologically from compound or intradermal nevi, although an expert can diagnose them. They often are dark brown to black and contain hair. They appear to be associated with an increased risk of developing a malignant melanoma, especially when they are large. Most studies define "large" as lesions greater than 1.5 cm, in which case the risk of melanoma ranges from 8% to 20%. The most quoted figure is about 10%, and the highest chance of melanoma developing exists in the first two decades of life. Whether this malignant potential is due to the increased number of melanocytes or to some inherited premalignant tendency in the cells themselves is not clear. Most clinicians recommend removal during early childhood, often a difficult task when a lesion is very large. The treatment of choice is surgical excision, which often must be performed in stages to remove a large lesion. Dermabrasion of the lesion within the first 6 weeks of life has been proposed by some, but recent evidence suggests that such early removal is of cosmetic importance only, as a repeat biopsy of the area will show residual neural crest nevus cells.

Nevus sebaceus

Not a true nevocellular nevus, the nevus sebaceus presents clinically as a warty, pebbly, flesh-colored, hairless, well-demarcated lesion in the scalp (Plate 5, F). It can also present in other areas of the head and neck. Off the scalp, the lesion can be linear, closely resembling a linear epidermal nevus. The full name is nevus sebaceus of Jodassohn. Its size varies from 0.5 cm to several centimeters. Histologically these tumors appear in three stages. In the first few months of life, the sebaceous glands in the lesion are well developed. Thereafter, through childhood, the sebaceous glands in a nevus sebaceus are underdeveloped and, therefore, greatly reduced in size and number. In this phase, the diagnosis may be missed. At puberty the lesions assume a diagnostic appearance, histologically characterized by the presence of large numbers of mature or nearly mature sebaceous glands and by papillomatous hyperplasia of the epidermis. During this stage various types of appendical tumors develop secondarily within the lesion. A syringo-cystadenoma papilliferum has been found in 8% to 19% of lesions. Less commonly found tumors include nodular hidradenoma, syringoma, and sebaceous epithelioma. Of primary importance is the occurrence of basal cell carcinoma in 5% to 7% of cases of nevus sebaceus. A nevus sebaceus is often small and clinically not apparent, showing no aggressive growth pattern. Therefore, full-thickness excision of a nevus sebaceus is warranted before puberty as a preventive measure.

Nevoid pseudomelanoma

Pseudomelanomatic changes in melanocytic nevi occur after trauma and in nevi recurring after incomplete removal. The resulting lesions can look clinically and histologically like melanomas. Such a lesion often must be diagnosed histologically and on the basis of the clinical history of a previously removed nevus. Usually these lesions are reexcised full thickness for the purpose of diagnosis and treatment.

Lentigo senilis

Lentigo senilis is not a nevocellular lesion but is an important entity in the diagnosis of pigmented lesions of the head and neck. Lentigo senilis commonly occurs as multiple lesions in areas exposed to sun, often being referred to as a solar or actinic lentigo. The lesions rarely occur before the fifth decade of life, slowly increase in size and number, and form in more than 90% of whites over 70 years old, most commonly on the dorsa of the hands and on the face. They are not infiltrative, and they possess a uniform dark brown color and an irregular outline. Varying in size from minute to greater than 2 cm, they may coalesce to form larger lesions. Malignant degeneration does not occur. These lesions may resemble seborrheic keratoses in clinical appearance, and both conditions are referred to in lay terms as "liver spots". Lentigo senilis lesions, however, are much less hyperkeratotic than seborrheic keratoses and have no areas of follicular prominence. They are best treated using a chemical peelant such as trichloroacetic acid or phenol or by cryosurgery using liquid nitrogen.

Dysplastic nevus syndrome

Dysplastic nevus syndrome, recently described by Clark, is also known as the B-K mole syndrome. It consists of the association of familial malignant melanoma, often occurring in multiple lesions, with "dysplastic nevi" in both the melanoma patients and many of their

relatives. Dysplastic nevi are usually larger than ordinary melanocytic nevi, measuring from 5 to 15 mm; they present with an irregular border and a haphazard mixture of tan, brown, black, and pink. Centrally there is often a small, palpable component (Plate 6, A). Dysplastic nevi are located on either exposed or nonexposed skin and form throughout adult life.

Because a dysplastic nevus may transform itself into a malignant melanoma, its recognition is critical. Dysplastic nevi occur in two forms - familial and sporadic. It is important to note that melanomas arising in patients with dysplastic nevi have more of a tendency to arise de novo than within a preexisting dysplastic nevus, although the latter can occur. The treatment consists of careful observation after histologic confirmation of the diagnosis in the most suspicious lesions. Patients are then followed with careful photography at 4- to 6-month intervals, with biopsy and removal of any nevi that undergo change or any new, clinically bothersome nevi. Patients with the dysplastic nevus syndrome, especially those with familial variant, have a significantly higher change than the general population of developing malignant melanoma.

Cysts

Cutaneous cysts may be located either intradermally or within subcutaneous tissue. These generally spherical growth contain a cavity that may be fluid filled or contain cellular products or debris. A true cyst has an epithelial lining, whereas a pseudocyst lacks such an organized epithelium. Cysts are generally classified according to the pattern of differentiation they exhibit on histologic examination. Many are difficult to differentiate clinically. As a rule, malignant degeneration is rare for all of the cysts described here.

Epidermoid cysts

Epidermoid cysts are true cysts. The lining of these common tumors consists of a stratified squamous epithelium that resembles that of normal epidermis. This lining produces fully matured, keratinized cellular debris, which fills the cavity of the cyst. In a series of 125 consecutively excised epidermoid cysts at the University of Michigan, 60% occurred in the head and neck, and men were affected twice as often as women. Epidermoid cysts thought to originate from the follicular infundibulum of hair shafts and may arise either spontaneously or as a result of inflammation or trauma to the area. Injection of surface epidermal material to deeper dermal or subcutaneous layers as a result of penetrating trauma or the use of needles has also been postulated. These cysts are rarely found before puberty, but have been found in all age groups after this period. Should these cysts appear before puberty or in large numbers, they may be an indication of Gardner's syndrome, an autosomal dominant condition that predisposes the patient to intestinal cancer.

Although malignant degeneration is uncommon, epidermoid cysts can present a cosmetic problem, and should they rupture or become infected, they may cause severe pain and scarring. Whereas some of these lesions will occasionally respond to intracystic injections of triamcinolone, surgical excision is the most effective treatment. It is necessary to carefully dissect and remove the entire cyst wall, as retained segments may lead to recurrent growth of the cyst.

Pilar cysts

Pilar cysts, also known as trichilemmal cysts or wens, are also true cysts. They are clinically indistinguishable from epidermal cysts. The tendency to form such cysts appears to be inherited as an autosomal dominant trait. The lining of the cyst differentiates in a manner analogous to that of the outer root sheath of the hair follicle. This fact allows for its differentiation from epidermal cysts. In a series of 100 consecutive cases of pilar cysts studied at the University of Michigan, 80% were on the scalp. They are uncommon before puberty. Multiple cysts are often present. If a pilar cyst ruptures or becomes infected, considerable pain and scarring may result. On the scalp, rupture may lead to areas of alopecia. As with epidermal cysts, the best treatment is complete surgical excision.

Dermoid cysts

Dermoid cysts are rare tumors that are frequently present at birth. They may measure up to 4 cm in diameter, although they are generally less than 2 cm. They may occur anywhere but are most common on the face, particularly in the area of the lateral eyebrow, the orbit, and the nose. Dermoid cysts appear to result from the inclusion of embryonic epidermis within embryonal fusion planes. Histologically these cysts are lined by an epithelium that resembles normal epidermis. They can be differentiated from epidermal cysts by their attachment to adnexal structures, which include hair, sebaceous glands, eccrine glands, and apocrine glands. Treatment is by surgical excision. If a dermoid cyst is located over the nasal root, however, care must be taken because this tumor may be confused with a nasal glioma.

Steatocystoma multiplex

Steatocystoma multiplex, an uncommon condition, is often familial, representing an autosomal dominant mode of inheritance. Although lesions can be discovered at any age, they most commonly occur shortly after puberty. The condition represents as multiple 1- to 2-cm cysts, generally located intradermally. They are most commonly found on the anterior chest but are also found on the face, forehead, ears, eyelids, and scalp. When punctured, these lesions exude a yellowish, oily fluid and occasionally hairs. On histologic examination these cysts contain a highly corrugated wall of epithelial cells. Embedded within the wall are multiple sebaceous gland lobules, which may be partially responsible for the contents of the cyst. The mode of keratinization of the epithelial lining appear similar to hair follicles. Infection with pain and subsequent scarring is a major problem associated with this condition. Treatment is disappointing because of the large number of lesions present, although individual lesions can easily be excised. On the face, cosmetically acceptable improvement has been reported with dermabrasion.

Milia

Milia are small, usually 1- to 2-mm, cysts that differ histologically from epidermal cysts only in their small size. Clinically they are whitish, smooth globules, most commonly seen on the face. They may arise spontaneously, but are also frequently present as a result of trauma such as dermabrasion or burns or as a result of bullous diseases. When they arise after trauma or disease as a result of the occlusion of the pilosebaceous unit, they represent a retention cyst. Treatment is the same, whether milia arise spontaneously or secondarily, and

is necessary only for cosmetic reasons. The lesion can easily be shelled out with a hypodermic needle or a comedo extractor. Because they may occasionally number in the hundreds, this treatment can be a considerably tedious chore.

Mucous cysts

Mucous cysts are pseudocysts, as no true lining is present. They are also called mucous retention cysts or mucoceles. These lesions are usually located on the mucous surface of the lower lip and are asymptomatic. They are generally less than 1 cm in diameter and, if superficial, may appear slightly bluish and translucent. They appear to be the result of traumatic rupture of the ducts of minor salivary glands. With leakage of the contents into the tissue, an inflammatory process ensues, with the resultant formation of granulation tissue surrounding the cystic space. Mucous cysts may resolve spontaneously or can otherwise be treated by intralesional injection of low-dose triamcinolone (2.5 mg/mL), excision, or marsupialization.

Vascular Tumors

Cutaneous tumors of vascular origin may be true neoplasms or may be ectatic vascular systems present in either the dermis or the subcutaneous tissue. Differentiation may be toward blood vessels, lymph vessels, or both. They may be congenital or arise later in life. Most are benign. They may cause serious psychological or physical problems (because of impingement on important anatomic structures), or they may be markers for more serious underlying diseases or syndromes. In general these can be classified histologically according to the size and nature of the vessels present. This discussion classifies the lesion as capillary angiomas, cavernous angiomas, or lesions of vascular dilation.

Capillary angiomas

Capillary hemangioma

The capillary hemangioma, commonly known as a strawberry hemangioma, is present in as many as 2.6% of all newborns. Histologically such lesions represent capillary hamartomas, although occasionally they may have cavernous spaces. Capillary hemangiomas most often occur on the head and neck, although any portion of the skin may be affected. When first noted at or shortly after birth, they are generally macular, pink to red lesions. During the first year of life, they exhibit a rapid growth phase, and the lesions become raised, dome-shaped to polypoid, and bright red to deep purple. After the first year of life, they enter a quiescent phase, followed by a period of spontaneous involution. By the age of 5, about 50% of these lesions have spontaneously resolved; 70% resolve by the age of 7. If they have not involuted by 7 years of age, they are unlikely to do so. Lesions located on the mucous membranes of the lip appear to exhibit the poorest chance of spontaneous resolution.

Although these tumors are benign, they may present significant problems to the patient if they impinge upon important anatomic structures, especially the eye or the respiratory tract. Other complications include ulceration and infection, which occur most commonly during the rapid growth phase. An uncommon complication, occurring in particularly large capillary hemangiomas with cavernous components, is called the Kasabach-Merritt syndrome. This

syndrome involves entrapment of platelets with partial thrombosis of the capillaries, leading to rapid consumption of the body's clotting factors. With very large lesions, this development may actually lead to production of disseminated intravascular coagulation.

Because approximately 70% of capillary hemangiomas involute spontaneously, treatment is often not necessary. Unless the lesion is growing extremely rapidly and threatens an important anatomic structure or is ulcerating, treatment is not indicated until at least the age of 7 years. Rapidly growing lesions can be treated with systemic steroids. A dose of 0.5 to 1 mg/kg of prednisone daily often results in marked regression. Treatment of the Kasabach-Merritt syndrome includes heparin, blood products, and systemic steroids. If a lesion fails to involute spontaneously, surgery is indicated. Cryotherapy and sclerosing agents are generally not successful, and x-ray therapy is contraindicated because of long-term sequelae related to the radiation. Laser therapy, although helpful in port-wine stains, is generally not beneficial because of the depth of these lesions.

Cherry hemangioma

Cherry hemangioma are also called senile hemangiomas or De Morgan's spots. They may occur anywhere on the body but most commonly are on the trunk. They usually appear during young adulthood. They are generally 1- to 3-mm, bright red, slightly raised, dome-shaped lesions. The lesions consist of multiple dilated capillaries found in the upper dermis. Cherry hemangiomas are benign and unrelated to systemic or congenital disease. Treatment is not necessary but may be desired for cosmetic reasons. They respond to both superficial electrodesiccation and laser surgery.

Pyogenic granuloma

Pyogenic granuloma, a common tumor, has several synonyms, including granuloma pyogenicum, bloody wart, and pregnancy tumor. It can occur at all ages, but is most common in young children and young adults and also in pregnant women. The etiology of pyogenic granuloma is unclear, although it tends to occur at sites of trauma or infection. There may also be a hormonal factor involved, which would explain the increased incidence during pregnancy. Histologically, the lesion presents as a polypoid, lobulated mass of newly formed capillary blood vessels surrounded by an edematous stroma. An inflammatory infiltrate is generally present. Clinically, pyogenic granuloma appears as a dark red, pedunculated or dome-shaped lesion that ranges from several millimeters to centimeters in diameter. It commonly ulcerates and becomes crusted. It most commonly occurs on the distal extremities and the face but can present on any part of the body. Oral cavity lesions are common; the gingiva is the site most often involved. There is frequently a collarette of epidermis around the base of the lesion. Because of their rapid and exuberant growth, they are sometimes thought to be malignant lesions. The differential diagnosis often includes malignant melanoma, Kaposi's sarcoma, metastatic carcinoma, and angiolymphoid hyperplasia with eosinophilia.

Occasionally the lesion spontaneously resolves. Lesions associated with pregnancy frequently involute after delivery. Most often, however, the lesion must be treated surgically. This treatment is easily accomplished by surgical excision or curettage with electrodesiccation.

Angiolymphoid hyperplasia with eosinophilia

Angiolymphoid hyperplasia with eosinophilia presents in adults as single or multiple nodules commonly on the face, ears, or scalp. Intradermal lesions are generally 0.5 to 1 cm in diameter, although subcutaneous lesions may measure several centimeters. This condition appears to represent a reactive vascular hyperproliferative response, although the exact etiology and pathogenesis are unclear. Histologically the lesions consist of two components. The first is vascular: thick-walled, well-differentiated capillaries lined by very plump and prominent endothelial cells. The second component is a cellular infiltrate, which includes lymphocytes, histiocytes, and many eosinophils. The lesions appear as erythematous to purple nodules, which may ulcerate and become crusted. The condition is frequently called pseudopyogenic granuloma. Despite the fact that the lesions histologically may resemble Kaposi's sarcoma or malignant angiosarcoma, they are benign lesions. Surgical excision may be performed, but if multiple tumors are present, no therapy is warranted.

Cavernous hemangiomas

Cavernous hemangiomas consist of large venous channels or sinusoidal blood spaces situated in the deep dermis or underlying subcutaneous tissues. They are about one-tenth as common as capillary hemangiomas but may often occur in conjunction with them. Although congenital, cavernous hemangiomas are often not apparent at birth. Like capillary hemangiomas, they may undergo a rapid growth phase during the first 6 months of life; but unlike capillary hemangiomas, they are much less likely to undergo spontaneous involution and rarely completely resolve. Because of the depth of these lesions, they are poorly defined and often present with a bluish or reddish-blue color. Although they are generally smooth, more superficial lesions may be nodular and occasionally exhibit a hyperkeratotic epidermis. The lesions may feel cystic and are quite easily compressed. They are most commonly seen on extremities, where they may involve underlying muscle. Histologically these lesions are composed of dilated, thin-walled vascular spaces lined by a flattened endothelium. Multiple thrombi may be present, with some being calcified. There is a fine, loose-surrounding stroma.

Cavernous hemangiomas may be associated with several congenital conditions. The Klippel-Trenaunay-Weber syndrome is characterized by large vascular malformations of the extremities, which may result in massive hypertrophy of an affected limb. Maffucci's syndrome is characterized by the combination of dyschondroplasia and cavernous hemangiomas, also usually appearing on the extremities. The patient may have marked bony deformities as well as pathologic fractures. In the blue rubber bleb nevus syndrome, multiple, soft, compressible cavernous hemangiomas are present, not only on the skin but also within the gastrointestinal tract, which may result in severe gastrointestinal bleeding.

Cavernous hemangiomas may result in complications related to their location. Involvement of articular spaces, oral and respiratory structures, or periocular tissues may result in impairment of function of these important systems. As with capillary hemangiomas, the Kasabach-Merritt syndrome may complicate these tumors.

Treatment of cavernous hemangiomas is very disappointing. Because of their size, depth, and the size of the individual vessels, surgery is often difficult and may result in severe hemorrhage. Treatment with radiation therapy or cryotherapy is usually not successful. In

cases of Kasabach-Merritt syndrome, anticoagulation therapy with heparin is the treatment of choice. During periods of rapid enlargement, particularly when vital structures of the head and neck are in danger of being compromised, systemic steroids may be of some value in slowing the growth or shrinking the lesions. Pressure and surgery can be used where indicated.

Vascular ectasias

As the title implies, vascular ectasias are actually telangiectasias or areas of vascular dilatation rather than true tumors. They may involve a significant portion of the skin and swell with time to become quite nodular. They may also cause significant problems for the patient because of secondary bleeding. Finally, these lesions may be an indication of serious underlying disease.

Nevus flammeus

A nevus flammeus is generally present at birth. The lesion presents in two general forms. The first is extremely common and may be present in up to one third of newborn babies. Located on the nape of the neck, it is referred to as a salmon patch or stork bite. It may also be present on the eyelid or glabella. Eyelid lesions generally resolve within the first year of life, and the glabellar lesions also spontaneously involute but take somewhat longer. The nuchal lesions may persist into adult life, although most will spontaneously fade.

The second, less common presentation of nevus flammeus occurs on the face and is called the port-wine stain. This lesion is present in approximately 0.3% of newborns. Port-wine stains show no tendency to fade, and in fact will generally darken and enlarge with age, becoming deeply violaceous and nodular in adult life. These lesions are generally unilateral and may follow a trigeminal distribution on the face. They may involve extensive areas of the skin of the face as well as oral mucous membranes and conjunctival membranes. Less commonly, they may involve other parts of the body.

Although most of these lesions represent only cosmetic problems to the patient, a small percentage may be indicators of serious underlying disease. One such disease is the Sturge-Weber syndrome (leptomeningeal nevus flammeus), in which a port-wine stain is located along the distribution of the trigeminal nerve. Patients with this syndrome may have angiomas within the meninges, with progressive calcification in these areas. Abnormalities associated with this condition include seizures (reported as early as 3 weeks of age but generally occurring later in infancy), mental retardation, hemiplegia, and ocular abnormalities such as glaucoma (in up to 40% of patients). Another syndrome associated with port-wine stain is the Klippel-Trenaunay-Weber syndrome (osteohypertrophic nevus flammeus), in which hypertrophy of the soft tissues and bones of extremities is accompanied by an overlying nevus flammeus.

Histologic examination of these lesions may reveal no changes early in life. With time, however, the ectatic or dilated vessels become more prominent. They will vary in degree of dilatation and in depth among patients. The capillaries are otherwise normal. There may be overlying acanthosis.

Although nevus flammeus is usually an isolated cosmetic defect, its significance may

be great. The natural history of these lesions is to present initially as pink or pale red patches, which, with time, progress through deepening shades of red to take on a deeply violaceous hue. Also with increasing age, the ectatic vessels become progressively more dilated and may become nodular and protuberant. Their prominent location on the face may cause significant psychologic trauma for the patient. These large nodular lesions may also tend to bleed and become crusted.

Treatment has always been difficult. Surgery, x-ray therapy, and cryosurgery are not successful and may result in serious complications. Tattooing, while without significant risk to the patient, gives unsatisfactory results because of difficulty in matching skin color. The recent use of laser therapy, especially the argon laser, has provided the best results to date. It has emission bands that are close to the absorption spectra of hemoglobin. It was initially felt that selective absorption by the hemoglobin of the argon laser beam led to selective destruction of the ectatic vessels. This selectivity has not actually been borne out.

Hereditary hemorrhagic telangiectasia (Rendu-Osler-Weber syndrome)

Hereditary hemorrhagic telangiectasia is a dominantly inherited condition that affects blood vessels throughout the body. It is characterized by ectatic vessels of the skin, mucous membranes, and viscera. Often the presenting symptom is spontaneous epistaxis, which may begin in early childhood but more likely appears at puberty or in adult life. Telangiectasia begins generally around and after puberty. The superficial telangiectasia assumes three morphologic forms; the most common lesions are punctate, but they may also be linear or spiderlike. The mucous membranes are almost always involved, with lesions occurring on the nasal septum, mouth, nasopharynx, and also throughout the gastrointestinal tract. The lesions may ulcerate and frequently bleed. The condition is associated with pulmonary arteriovenous fistulas. Other viscera may also be affected, as well as the retina. Bleeding may occur from any of the vascular lesions throughout the body and may be fatal. The diagnosis is generally made when the combination of frequent hemorrhagic episodes, vascular ectasias, and a family history is recognized. Treatment is aimed at control of specific hemorrhages and of anemia if it arises. Individual lesions may be treated by electrocauterization and photocoagulation. Complete replacement of the nasal mucous membrane with a split-thickness skin graft has also been reported, but this operation may be somewhat hazardous.

Generalized essential telangiectasia (benign familial telangiectasia)

Generalized essential telangiectasia may be misdiagnosed as hereditary hemorrhagic telangiectasia. However, the lesions are somewhat different from those seen in the latter condition in that they present as extensive sheets of telangiectasias and in particular are not associated with internal hemorrhage. There may be recurrent mucosal or skin hemorrhages, but these rarely produce clinical problems, and the condition is essentially only a cosmetic nuisance.

Ataxia-telangiectasia (Louis-Bar syndrome)

Ataxia-telangiectasia is an autosomal recessive disease that includes telangiectasia, cerebellar ataxia, and recurrent respiratory infections. Telangiectasias involve the eyeball, conjunctiva, ear, face, and neck, as well as flexural areas of the limbs. Ataxia is often the

initial symptom, occurring during early childhood and progressing to involve deficits in speech, ocular motility, and control of large muscle groups. There is an associated hypogammaglobulinemia, particularly of IgA, and more than one-half of patients die of recurrent pulmonary infection.

Spider telangiectasia

Spider telangiectasia may be present in up to 15% of normal persons. The lesions are more frequent during pregnancy, during which they occur early and increase until delivery. They generally resolve spontaneously during the postpartum period. They may also be associated with liver disease or estrogen therapy. They tend to persist when seen in nonpregnant healthy persons. Clinically the condition presents as a central, raised, small body that may be pulsatile. Fanning out from this central area are multiple fine telangiectasias. In otherwise healthy people the lesions are only a cosmetic problem. They may occur on mucous membranes, in which case the differentiation from hereditary hemorrhagic telangiectasia must be made. Treatment is by obliteration of the central feeding artery, which can be accomplished with electrocautery or photocoagulation.

Venous lakes (venous varices)

Venous lakes present as deep blue, cutaneous nodules, occurring most frequently on the face, lips, and ears of elderly patients (Plate 6, B0. Sometimes called senile angiomas, they are composed of dilated thick- and thin-walled otherwise normal-appearing vessels. The lesions may thrombose and involute but frequently persist. They are of no significance other than as a cosmetic nuisance.

Fibroadnexal tumors

Fibroadnexal tumors are derived from components of the deeper layers of the skin. They generally show differentiation toward the specific cell or tissue of origination and may be derived from any of the neurogenous, fibrillar, glandular, or pilar components of the dermis as well as the subcutaneous tissue.

Acrochordon (skin tag, fibroepithelial papilloma)

Acrochordons are extremely common lesions, occurring most often in middle to late life. They are flesh colored, pedunculate tumors, generally up to about 2 mm in diameter. They are soft and most commonly occur in flexural regions such as the axillae, sides of the neck, inframammary areas, and upper eyelids. The lesions are composed of mostly loose fibrous tissue, similar to that of the superficial dermis, and are covered by a thin epidermis. No adnexal structures are present. The lesions are easily removed by simple sharp-scissors excision or light electrodesiccation.

Keloids and hypertrophic scars

Keloids and hypertrophic scars are generally considered to be located at different points along the same spectrum and represent uncontrolled proliferative responses to trauma by the fibrous tissue of the dermis. The difference between the two is one of degree. One

definition currently in use is that a hypertrophic scar is a thickened scar that does not extend beyond the margins of the original injury, whereas a keloid is an exuberant growth extending beyond the borders of the initial scar. Keloids are most commonly seen in blacks. In certain African cultures, they are artistically induced and used as cutaneous decoration and status symbols. The epithelium overlying the tumor is frequently thinned and shiny, and the tumor may be tender and pruritic. The areas of predilection for keloids include the sternal area, the shoulders, and the upper back. They are also frequently seen on the earlobes after ear piercing and on the face. These tumors may be flat or extremely protuberant, dome shaped, or bosselated. They are most common in the second and third decades of life, becoming less common with age.

Hypertrophic scars and keloids are difficult to differentiate histologically, as both show a proliferation of fibroblasts in a whirling and nodular pattern. In hypertrophic scars, the pattern of fibroblast proliferation eventually flattens out and becomes more parallel to the epidermal surface, whereas the whirling nodular pattern tends to persist in keloids.

Until recently, treatment has been very unsatisfactory. Excision of these tumors generally has resulted in regrowth. Some success has resulted from the injection of very potent corticosteroids (triamcinolone, 40 mg/mL). Pressure also seems to stimulate involution, although the pressure must be maintained daily for up to 1 year. Special pressure earrings can be applied to the lobes, and Jobst body suits can be constructed. Preliminary experience with the use of the carbon dioxide laser to excise keloids, followed by high-dose intralesional steroid injections, has been promising.

Dermatofibroma

The common tumors known as dermatofibromas fall into the class of fibrous histiocytomas and can occur anywhere on the body (Plate 6, C). They range in size up to 1 cm, and frequently they are slightly hyperpigmented and hyperkeratotic. Dermatofibromas are benign and may persist for many years, although regression is not uncommon. On microscopic examination, these tumors are composed of spindle-shaped cells arranged in a whorled fashion with very ill-defined margins. No treatment is necessary, but if it is desired, excision is the best approach. Some dermatofibromas may respond to cryosurgery, which may at least flatten the lesion.

Dermatofibrosarcoma protuberans

Despite the similarity of its name to that of the preceding tumor, dermatofibrosarcoma protuberans is probably derived from fibroblasts. It is a rare, locally invasive, "malignant" tumor that most commonly occurs on the trunk but may occur on the scalp, face, or neck; it seldom metastasizes. It presents as a recurrent or persistently enlarging and protuberant mass, which may vary in color from flesh toned to bluish or reddish. Treatment is excision. Because incomplete removal invariably results in regrowth, microscopically controlled excision using the Mohs technique may offer a distinct advantage in the treatment of this tumor.

Atypical fibroxanthoma

Atypical fibroxanthoma most commonly occurs in sun-exposed areas of elderly people,

where it presents as a rapidly growing nodule. A less common presentation is in persons in the third or fourth decade of life, in which case growth is less rapid. The lesion is a pink to translucent asymptomatic nodule, generally 1 to 2 cm in diameter. Ulceration is not uncommon. The nodules may be mistaken for basal cell carcinomas because of their translucent appearance, the ulceration, and their location in sun-exposed areas of elderly people.

Histologically, these lesions have a very bizarre appearance, with large and atypical epithelioid and spindle cells. Multinucleate giant cells are also present. These tumors have been misdiagnosed as several different types of malignancies, including sarcomas, squamous cell carcinomas, and melanomas. Paradoxically, their course is quite benign and local excision is curative.

Neurofibroma

Neurofibromas are soft, dome-shaped, flesh-colored lesions that may be located anywhere on the body; they may vary greatly in size, from quite small to large pedunculate lesions. Neurofibromas are derived from the Schwann cells of cutaneous nerves. On histologic examination they present as nonencapsulated, loose, spindeloid tumors. Solitary lesions may be easily excised.

These tumors may be indicative of the genetic neurofibromatosis syndrome, which may be associated with severe neurologic problems as well as a risk of malignant degeneration of the tumor. When a neurofibroma is found, a careful search for other manifestations, which include cafe-au-lait spots and axillary freckling, as well as a family history, should be carried out to rule out the syndrome.

Angiofibroma (adenoma sebaceum)

Angiofibroma, formerly called adenoma sebaceum, is present as part of the genetic syndrome tuberous sclerosis. This autosomal dominant syndrome has variable expressivity; the finding of even one angiofibroma requires genetic counseling because the patient may pass on a much more severe form of the disease to offspring. Angiofibromas present as small dome-shaped papules, 2 to 3 mm in diameter, that are flesh colored or reddish brown. They are most commonly present on the sides of the nose and the medial cheeks. The original name is a misnomer, because on histologic examination no sebaceous components are noted. The tumors are composed mostly of fibrous tissue, with an angioid component. When the lesions are solitary or few in number, simple excision is curative.

Fibrous papulae

The fibrous papule is a common lesion, generally occurring on the nose, especially the alae, in older persons (Plate 6, D). However, it can be seen on the medial cheeks. These lesions present as small, 0.5-cm, dome-shaped, flesh-colored papules. Although they are rather common, some confusion persists as to their origin and histologic nature. Indeed, Lever questions whether these are an entity at all. They have been regarded as perifollicular fibromas, involuting melanocytic nevi, angiofibromas, or as simply the result of trauma, such as folliculitis or excoriating pimples. Histologically, the lesion presents as a papule composed

of numerous spindle-shaped and stellate cells, with occasional multinucleate cells present. Once the lesions have grown, they are generally quite stable and may be present for years. They may be treated by excision or curettage and electrodesiccation. They are of no significance unless related to tuberous sclerosis.

Trichoepithelioma

A trichoepithelioma is an uncommon entity, most often presenting as small rounded nodules on the cheeks, eyelids, and nose. It appears to be dominantly inherited; however, pedigrees indicate a greater preponderance of affected females. The lesions are skin colored to slightly pink and gradually increase in both number and size with time. A few telangiectatic vessels may be present, and there may be a slightly translucent quality to the lesions, which may lead to confusion with basal cell carcinoma; however, the lesions rarely ulcerate. If ulceration does occur, basal cell carcinoma should be considered. The histologic appearance of these lesions also closely resembles basal cell carcinoma. Distinguishing between the two is often difficult. There are basophilic cells similar to those seen in basal cell carcinoma. The cells are arranged in masses, which may have fully keratinized centers. Abortive attempts at hair growth may also be noted, in which case differentiation from basal cell carcinoma is easy.

Occasionally, the presence of a solitary lesion makes differentiation from basal cell carcinoma somewhat more difficult, and unless definite differentiation toward hairlike structures is present, the tumor should be treated as a carcinoma. In the cases in which multiple lesions are present, treatment is difficult because of the large number of tumors. Some success has been obtained with dermabrasion of the entire affected area.

Cylindroma

Cylindromas may be single or multiple. When multiple, they appear to be dominantly inherited and may literally cover the scalp, a syndrome termed "turban tumors" (Plate 6, E). The condition affects females twice as often as males. It appears to originate from apocrine glands, and the tumors may be associated with trichoepitheliomas. The tumors generally appear in adult life and are most common on the face or scalp. They present as smooth, dome-shaped, or pedunculate lesions, which may be pink to red and are firm. They grow slowly and can reach 2 to 3 cm in diameter. Histologically, these tumors are composed of nests of darkly staining epithelial cells surrounded by a narrow band of hyaline material. The solitary lesion must be differentiated from basal cell carcinoma. Surgical excision is the only treatment. When large areas of the scalp are involved, this may be quite difficult and may require grafting.

Hidrocystoma

A hidrocystoma may be either eccrine or apocrine in origin. In either case, the tumor usually presents as a solitary lesion and is most frequently seen on the face. The lesion consists of translucent nodules with a firm, cystic consistency. The eccrine hidrocystoma is generally from 1 to 3 mm in diameter, whereas the apocrine may attain a diameter of 1 cm. Both may have a bluish hue. The two types are distinguishable by histologic criteria. Microscopic examination reveals differing cellular detail and secretion patterns for the two

types. Treatment is excision in either case.

Syringoma

Syringomas are benign tumors of eccrine sweat gland ductal origin. They appear more often in women than in men. Syringomas are most commonly located on the face, with the lower eyelids being the most common site. They generally occur in adolescence or early adulthood and may be eruptive or occur in crops. They present as small, 1- to 5-mm papules that are usually flesh colored but may be slightly translucent or yellowish. They may resemble trichoepitheliomas, but their location and histology help to differentiate them. Histologically, these tumors appear as small nests of cystic ductal structures as well as solid epithelial strands, many of which have a characteristic tail-like projection. They are not associated with underlying abnormality. They do not tend to involute, however, and may present a cosmetic problem when located on the face. Treatment is difficult, but light electrocoagulation with a fine epilating needle appears to be the most successful modality at this time.

Sebaceous hyperplasia

Sebaceous hyperplasia occurs mainly on the face, particularly the forehead, and represents benign enlargement of the normal sebaceous gland (Plate 6, F). It is frequently called senile sebaceous hyperplasia because it is usually seen in older persons. One or hundreds of lesions may be present. They may be from 2 to 5 mm in diameter, and there is usually a central umbilication. These lesions are soft and yellowish and must be differentiated from basal cell carcinoma. Histologically they present as hyperplastic sebaceous lobules that are otherwise normal in appearance. They are only a cosmetic problem; and solitary lesions can easily be treated by shave excision, electrodesiccation and curettage, or cryosurgery. When the lesions are quite numerous, surgical excision is unwarranted. Therapy with systemic 13-cis retinoic acid has also been described.

Xanthelasma

Xanthelasmas present on the eyelids, or close by, as soft yellowish irregular plaques. They usually appear in middle age and affect either sex. They are not often associated with xanthomas elsewhere on the body. Frequently they are an isolated finding and do not always signify elevated serum triglyceride levels, although each patient should be examined for the existence of such a systemic problem. Histologically these lesions present as an accumulation of xanthoma cells, although giant cells and fibrosis are uncommon. Treatment is application of 20% to 35% trichloroacetic acid, light cautery, or excision.

Lipoma

Lipomas are benign tumors composed of adipose tissue and may be single or multiple. They are soft and may be lobulated or rounded and cystic in nature. They are generally freely movable. Except in rare syndromes, lypomas are non-tender. They generally occur on the trunk but may also occur on the neck or any other part of the body. Histologically they present as proliferations of normal-appearing fat cells that may be surrounded by a thin connective-tissue capsule. Single lesions present only cosmetic problems, and they are generally easily excised. Despite attaining sizes of more than 1 inch in diameter, they may

often be expressed through a small, 4-mm punch hole.

Treatment Methods and Biopsy Techniques

Scalpel surgery

The *shave* excision or biopsy is one of the most common performed on cutaneous lesions. It is a rapid means of removing tissue either as part of therapy or to establish a diagnosis. A shave can be performed using various techniques, with the depth of the shave dependent on the angle of the blade as it enters the skin. Usually either a No. 15 or No. 10 Bard-Parker blade is used. One should remember that the sharpest point of the No. 15 blade is the rounded tip, whereas the No. 10 has its sharpest edge along the belly of the blade. The shave should be performed using the sharpest portion of the blade. The sharpest blade is a Gillette Blue Blade; it is excellent for shaving lesions. A blade breaker or hemostat can break the Blue Blade into any size or shape desired. The blade can then be held between thumb and forefinger and flexed, allowing the performance of a superficial shave in which the blade sculpts along the contour of the surface being excised (such as the ala of the nose or the helix of the ear). Hemostasis can then be obtained with aluminum chloride. Monsel's solution (ferric subsulfate) should be avoided on the face or cosmetic areas because of the ability of macrophages to phagocytose the iron, causing a tattoo.

The *punch,* a fixed-diameter surgical knife, is an extremely valuable tool to a dermatologist for excision or biopsy. It comes in various sizes, from 2 mm to 1 cm, with 0.5-mm increments. Punches can be purchased as disposable instruments (Baker) or as permanent, sterilizable instruments. The commonest sizes used for biopsy are 3 mm and 4 mm. However, a 2-mm punch can provide a cosmetically elegant biopsy of sufficient size for the pathologist. Whenever possible, the 4-mm punch should be used. All punch-biopsy incisions should be closed.

Some tricks help in the use of a punch. By putting tension on the skin perpendicular to the anticipated line of closure (skin tension lines), one can cause the circular punch to leave an oval or ellipse for easier closure. The incision is usually closed with sutures or the recently introduced single-shot staple. A valuable trick is to use a punch to excise intradermal nevi. By selecting a punch that just fits around the nevus, one can easily excise it to the depth necessary to remove the entire lesion. Another trick, which can be used when nevi occur in areas of neutral skin tension or where skin tension lines are not obvious (for example, the chin), is to use the punch to help determine the best lines of closure. If the surgeon uses a punch excision with no tension placed on the skin, the resulting circle will usually form itself into an oval along lines of facial expression and help determine skin closure lines. Often the skin closure lines can occur at an angle perpendicular to what one might expect.

The *wedge* excision or biopsy, a variation of the fusiform excision (ellipse), can be used to remove lesions cosmetically or to perform biopsies. As a biopsy technique, it is either incisional or excisional. Whenever possible, especially in dealing with pigmented lesions, the excisional biopsy is preferred to give the pathologist the best chance for an accurate diagnosis. When the wedge procedure is performed as an incisional biopsy of a large, nodular lesion, the narrowest possible wedge (greater than the classic 3:1 length-width ratio) is made at the edge of the lesion so that one end of the wedge is through normal skin. Then, one side of

normal skin is available through which to pass suture. This is an especially important advantage if the other side of the wedge is within friable tissue.

Scissors excision is a valuable method of cosmetically removing benign skin tumors. In experienced hands, scissors can be used to produce an often elegant cosmetic result very quickly. They are best used on raised, pedunculate skin lesions in which the pedicle can be easily and rapidly cut with scissors. Our preference is to use fine-tipped, curved Iris or Gradle scissors. Tricks similar to those for the shave apply to scissors excisions. Raising a bleb of anesthesia under a pedunculate lesion will allow for better scissors access to the base. Scissors are an excellent tool around eyelids. Often a small chalazion clamp can be placed around a lesion, permitting easy excision with fine scissors. Filiform or pedunculate lesions on eyelids can be lifted with fine forceps and then cut with curved scissors held with the tips up. This procedure will produce a small ellipse upon release of the eyelid skin, which will either heal by itself or by the placement of one small stitch. Scissors can also be used for biopsies of the oral mucosa. Again, a chalazion clamp can be placed on the lip, or a stitch can be placed around the area of the biopsy. One can then pull up on the stitch, creating a tent of tissue that can be scissors excised at the base to obtain a biopsy specimen.

A *curette* is a valuable tool to the skin surgeon. One should have a variety of sizes of curettes available; larger curettes are used to debulk or remove larger tumors, and smaller curettes are used to do the same for small tumors or to help track small extensions of cutaneous tumors such as basal cell carcinoma. A curette is held like a pencil, with the ring finger or small finger placed on the skin to anchor and stabilize the hand. Normal skin ha a "gritty" feel with the curette, whereas abnormal skin or tumor often feels mushy or soft. One way to remove multiple molluscum contagiosum lesions on the face, for example, is to individually curette each small lesion (a small curette is used). If anesthesia is required, one can use either the usual local anesthetic or one of the refrigerant anesthetics, which will induce some anesthesia in the skin as well as harden the lesion. Hardening allows the lesion to be easily flicked off with a curette. A curette is often used in conjunction with electrosurgery.

Electrosurgery

Electrosurgery is a useful way to remove small benign lesions, to assist the curette in removing malignant lesions, and to assist the surgeon in obtaining hemostasis. Most electrosurgery performed in the office requires nothing more than a Hyfrecator-like unit. This versatile instrument is easy to use because the patient does not need to be grounded, and the electrodesiccation or fulguration is at a more superficial depth than the electrocoagulation or cutting seen when a patient is grounded. Most of these electrosurgical units have two current settings. The low current is best for light electrodesiccation of benign lesions. One also can purchase a fine steel tip or place a 30-gauge needle on the standard tip. This tip can then be threaded down adnexal structures to treat benign adnexal tumors or to coagulate arterial vessels feeding vascular lesions. The high setting, a destructive mode, is used to burn tumor and surrounding tissue, as in electrodesiccation or fulguration of basal cell carcinomas. Bipolar units, with the patient grounded, can be used in the cutting mode with a loop to remove benign lesions and to help sculpt lesions, such as in the case of a rhinophymatous nose.

Cryosurgery

Cryosurgical removal is the treatment of choice for many lesions. Systems vary from elaborate cryospray and cryoprobe units to something as simple as a Styrofoam cup containing liquid nitrogen to be applied with a cotton-tipped applicator. Most physicians prefer the latter method because of its simplicity. Use of the cryospray and cryoprobe machines is often reserved for treatment of malignant lesions. The superficial use of cryosurgery destroys tumor tissue, often with excellent cosmetic results. Hypopigmentation and other sequelae can develop, however, which make the use of cryosurgery in darker skin more difficult.

Chemical or abrasive surgery

Many superficial cutaneous lesions of the head and neck can be removed by application of a chemical or by abrasion. The chemicals most commonly used as peeling agents are trichloroacetic acid and phenol. The concentration of trichloroacetic acid used varies from 35% to 70%. Phenol is usually used as a concentrated solution (88%) or mixed as Baker's solution. These chemicals can be used to peel benign pigmented or melanotic lesions with good success.

The most common form of abrasion is spot dermabrasion. Our favorite tool is the Bell hand engine with the diamond fraise or wire brush. The fraise can be purchased in varying sizes and shapes; small, 2-mm wheel, cone, or cylindrical fraises are excellent tools for removing multiple small epithelial tumors.

Laser surgery

The use of lasers has gained increasing popularity in the treatment of many lesions of the head and neck. Laser surgery was first used in the treatment of vascular tumors - in particular, port-wine stains and hemangiomas. The argon laser was the first type used on such lesions, and its current use meets with a good degree of success. Because it seals lymphatics and vessels as well as nerve endings, the argon laser can be used in highly vascular areas or for the excision of lesions such as keloids, in cases of which minimal surgical trauma seems to play a role in preventing re-formation. The carbon dioxide laser followed and has been used in the treatment of vascular lesions as well as other cutaneous lesions. Its value is that it can be defocused and used as a destructive instrument or focused and used as a cutting unit.

Other lasers, including the tunable dye unit and the Nd:YAG unit, await further refinements for cutaneous applications. One interesting use of the tunable laser set at the correct focal length (630 nanom) is to photoactivate a hematoporphyrin derivative that becomes attached to neoplastic tissue, thus causing the destruction of the cutaneous neoplasm.