Acral Lentiginous Melanoma

A Clinicopathologic Entity

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Acral lentiginous melanoma (ALM) is the fourth clinicopathologic variant of malignant melanoma. It occurs on volar surfaces of hands and feet, subungual sites, and fingers or toes. It is characterized by slow lentiginous radial growth and central plaque-like thickening, heavily pigmented tumor cells, markedly thickened papillary dermis, and diffuse reticular infiltration. Lesions are unusually large and, in most cases, thick and ulcerated. There were 180 patients with acral melanoma (AM), which includes 67 in whom the specific features of ALM could be documented. One hundred sixty had primary lesions on the foot, and 20 occurred on the hand. There were 104 men and 76 women. There were 41 black patients and 139 whites. Five-year survivals following all modalities of therapy in 122 patients with Stage I acral melanoma is 63% for plantar/palmar lesions, 58% for subungual lesions, and 27% for skin of digits. For the subgroup of Stage I patients with ALM treated by surgery and regional chemotherapy by perfusion, the five-year survival for all sites is 72% and 56% at 10 and 15 years, respectively. Survival in ALM is essentially the same as for all AM lesions.

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ACRAL LENTIGINOUS MELANOMA (ALM) has been recognized as the fourth clinicopathologic variant of malignant melanoma of the skin. It occurs in the acral or peripheral portions of the limb, on the plantar or palmar surfaces of the hands and feet, or the subungual areas of the fingers or toes. ALM is histologically and clinically distinct from nodular melanoma, (NM), superficial spreading melanoma (SSM), and lentigo maligna melanoma (LMM).

In the early 1970s, Reed described the histopathologic characteristics of acral malignant melanoma.[28] In 1977, Arrington et al.[1] reported on 27 acral melanomas from Charity Hospital of Louisiana, in which the characteristic lentiginous radial component of melanocytic proliferation was noted, and described the distinctive features of this special group of volar or subungual melanomas. In 1979, Clark et al.[5] described the characteristics and management of the volar-subungual melanomas as determined by 37 cases from the Temple University Pigmented Lesion Study Group. In 1980, Coleman et al.[9] expanded the Charity Hospital report on ALM to include 35 cases. The current literature contains several interesting case reports on ALM,[30,32] further classifying and elaborating on the diagnosis and treatment, and several collected series on acral melanomas of the foot,[31] the palm, the sole, and the nailbed[15] and subungual melanomas.[26]

Acral lentiginous melanoma is reviewed as a clinicopathologic entity, and the results of experience in the treatment of acral melanomas in general and acral lentiginous melanomas in particular are reported.

Histologic and Clinical Characteristics

There are five general histologic features used to characterize the variants of melanoma. They are: (1) the preliminary radial growth of atypical lentiginous cells at dermal-epidermal interface, (2) expansile growth into the papillary dermis or infiltrative vertical growth in the reticular dermis, (3) cytology of the malignant cell (epitheloid or spindle cell), (4) response of the epidermis to the abnormal clone of melanocytes, and (5) host immune response (lymphocytic infiltrates and patterns of regression).

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The clinical and histologic characteristics of the four variants of melanomas can be described as follows:

Lentigo maligna melanoma is characterized clinically by slowly growing, tan or brown macules on sun-exposed skin, most often the face or forearm, and predominately in elderly, fair-skinned Caucasians.[7] Gradually, black pigmentation develops within the lesions, and, eventually, a nodular element signals the appearance of the vertical growth phase. This evolution takes 5–15 years, and the prognosis is usually favorable, even after the lesion becomes invasive. Histologically, (1) atypical dysplatic melanocytes extend along the dermalepidermal junction, as a manifestation of the lentiginous radial growth phase; (2) the vertical growth component appears late, and usually consists of spindle cells; (3) the pigmented lentiginous malignant spindle cells are arranged diffusely in the basal layer of the epidermis; and (4) the epidermis is atrophic, with effaced rete ridges. Actinic damage is seen with basophillic staining in a thin papillary dermis, and (5) variable lymphoid response with irregular areas of regression in the radial growth component is seen.

Superficial spreading melanoma occurs predominately on the trunks of middle-aged men, and on the limbs of women.[6] It evolves more rapidly than lentigo maligna melanoma, usually in one to four years, and may be accompanied by actinic damage in the dermis.

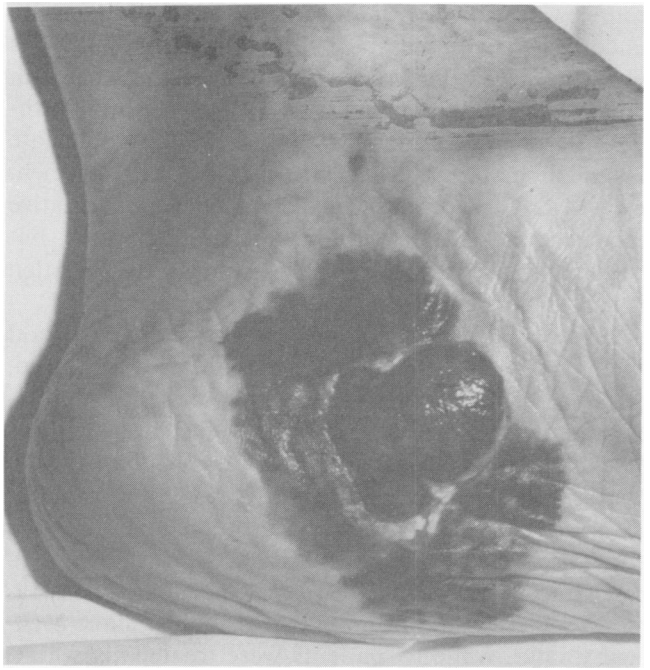

FIG. 1. A 90-year-old white man with acral lentiginous melanoma of 20 years' duration. Note the lentiginous radial growth and the central ulcerated nodule (vertical growth component). Histologic Level IV.

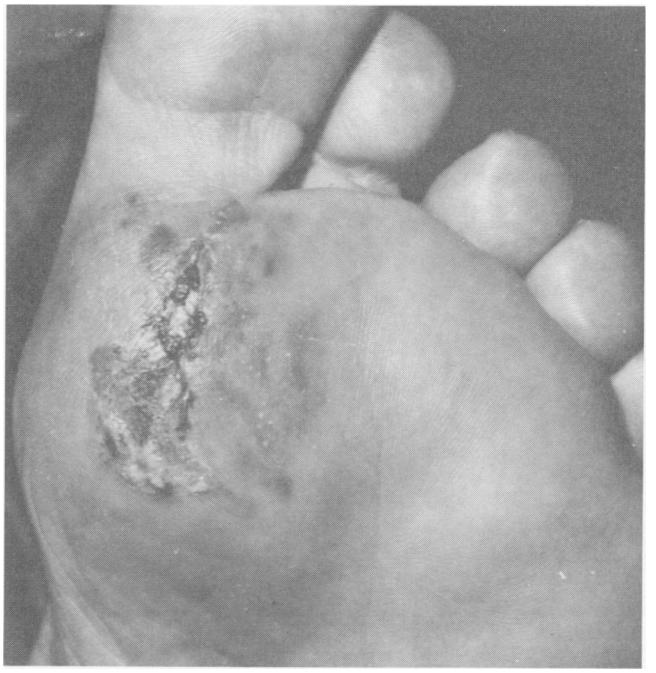

FIG. 2. A 79-year-old white woman with ALM of three years' duration. Patchy radial growth on ball of foot surrounds hyperkeratotic central thickened area of tumor. Histologic Level III.

The radial growth phase is characterized by slightly raised macular lesions with irregular margins and variations in color from brown to red to white, blue, or black. Microscopically, (1) there are pagetoid or nevocytic cells with uniform melanocytic dysplasia extending along the dermal-epidermal layer in the radial growth phase, with "skip" areas of normal epidermis followed by epidermis containing small nests of single "surround" cells at the periphery of the tumor; (2) the vertical growth phase evolves as an expanding nodule in the papillary dermis; (3) the malignant melanocytes are epitheloid; (4) there is hyperplasia of the stratum malpighii of the epidermis; and (5) there is usually a marked immune response by the host, with focal areas of regression and lymphocytic infiltration.

Nodular melanoma evolves rapidly, usually in a few months, and often metastasizes early.[6] (1) The lesions develop *de novo* with no radial growth phase; (2) the vertical growth phase starts with the inception of the tumor; (3) tumor cells may be spindle or epitheloid; (4) thinning of the epidermis over the expanding tumor nodule, with early ulceration, occurs; and (5) cellular host immune respose is seen with focal areas of regression at the base of the tumor.

Acral lentiginous melanoma occurs on the volar surfaces of the hands or feet (Figs. 1 and 2). ALM also occurs in the subungual sites. The subungual lesions

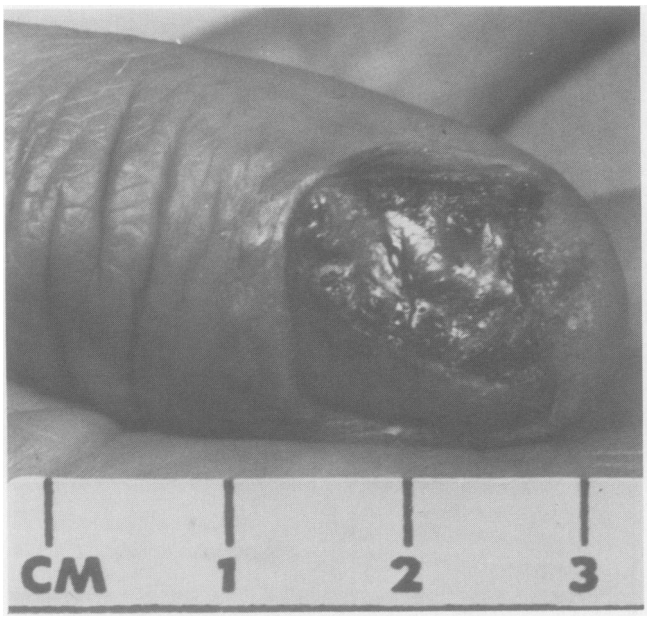

FIG. 3. A 39-year-old white woman treated for over two years for "fungus" infection of thumbnail, presented with positive epitrochlear and axillary nodes. Biopsy revealed subungual melanoma, Histologic Level V.

were first described by Sir Jonathan Hutchinson in 1886 as a melanotic sarcoma of the nailbed, which he chose to call a melanotic whitlow.[19] He described the little coal-black border in the eponychium surrounding the inflamed nail as typical, and noted that the lesion is always missed in the early stages, and usually attributed to injury (Figs. 3 and 4). ALM occurs only in the atrichous skin and in mucous membrane. This lesion is frequently seen in black patients. The evolution is slow, usually years, and is not related to actinic damage. Histologically, (1) the radial growth phase consists of lentiginous dysplastic melanocytes, extending along the basal cell layer (Figs. 5 and 6), with extension of single atypical melanocytes up into the thickened epidermis; (2) the vertical growth phase usually consists of a progressive central plaque-like thickening of malignant cells in the papillary dermis (Fig. 7), with (3) extension of the spindle cells into the deeper levels, accompanied by prominent dysplasia; (4) there is epidermal hyperplasia with elongation of the rete ridges and acanthosis and central ulceration (Fig. 8); and (5) host immune response is active, with areas of tumor regression.

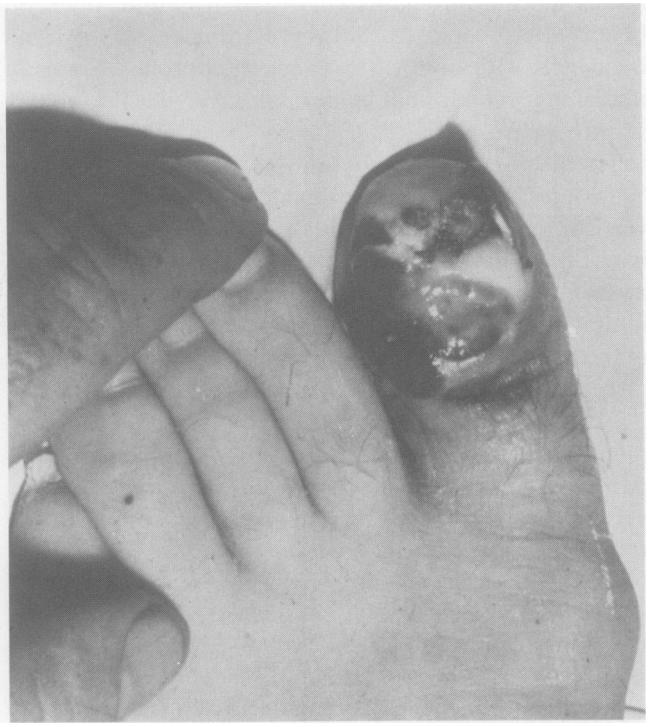

FIG. 4. A 52-year-old white man with subungual melanoma showing Hutchinson's melanotic whitlow in paronychium.

Clinical Material

In the past 25 years, approximately 1600 melanoma patients have been treated by the Tulane Surgical Oncology Service, both in private practice and on the service at Charity Hospital of Louisiana in New Orleans. The development of the technique for isolated limb perfusions has been an important factor leading to the referral of patients with malignant melanomas to this center. Consequently, most of the patients in this series underwent chemotherapy by perfusion at some stage of their disease. This report includes 180 patients with acral melanoma. Since the concept of ALM was introduced, 67 cases have been accumulated where adequate histologic material has been available to classify them as ALM. These 67 are not felt to reflect the relative incidence of ALM in the total patient population, but rather are cases in which exact histologic classification has been possible.

Since 1972, 40 of the last 51 new patients with acral melanomas have been classified as ALM by Dr. Reed, with the remainder being classified as nodular melanoma in four instances, and in seven instances, the histologic material was inadequate for evaluation. All AM that have pigmented, lentiginous areas on the adjacent skin are ALM, even though lack of adequate material for review may prohibit histologic classification as such.

Of the 180 patients with acral melanoma, 111 patients received their primary treatment at Tulane Medical Center, while 69 patients were treated elsewhere, usually with excisional surgery only and were subsequently referred here for perfusion therapy. Table 1 indicates the stage of disease at presentation and extent

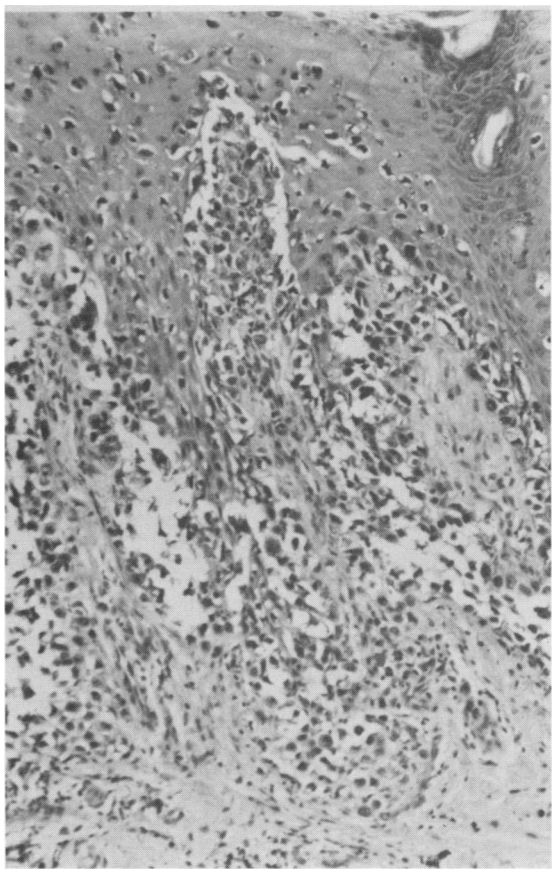

FIG. 5. Photomicrograph showing epidermal hyperplasia, marked elongation of rete ridges, melanocytic dysplasia, and an area of regression in papillary dermis with numerous melanophages.

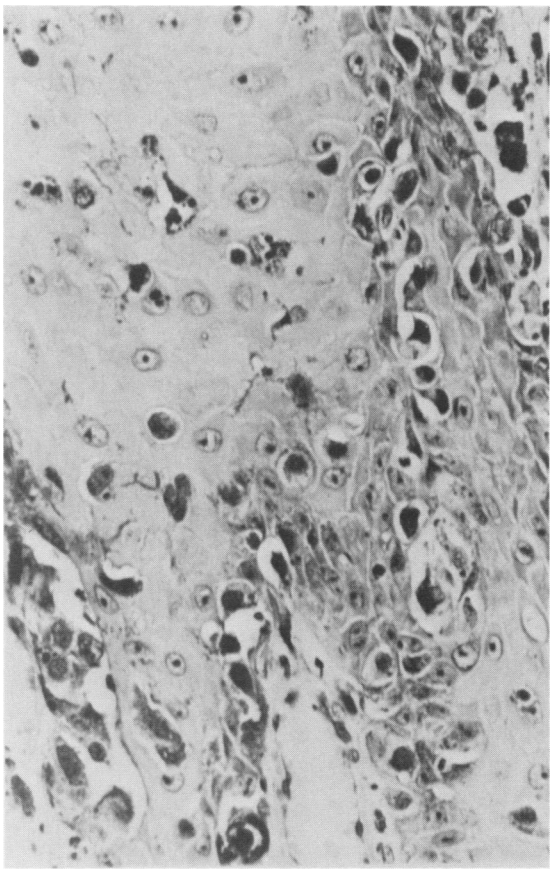

FIG. 6. Photomicrograph showing migration of melanocytes into the epidermis. Many of the cells have pigmented dendrites.

of initial therapy in 180 patients. Stage I includes those patients with localized disease only. Stage II patients are those with regional metastases, and Stage III with distant disease, which includes iliac or supraclavicular nodes in patients with limb melanoma. There were 122 patients with Stage I disease, 73 of whom were initially

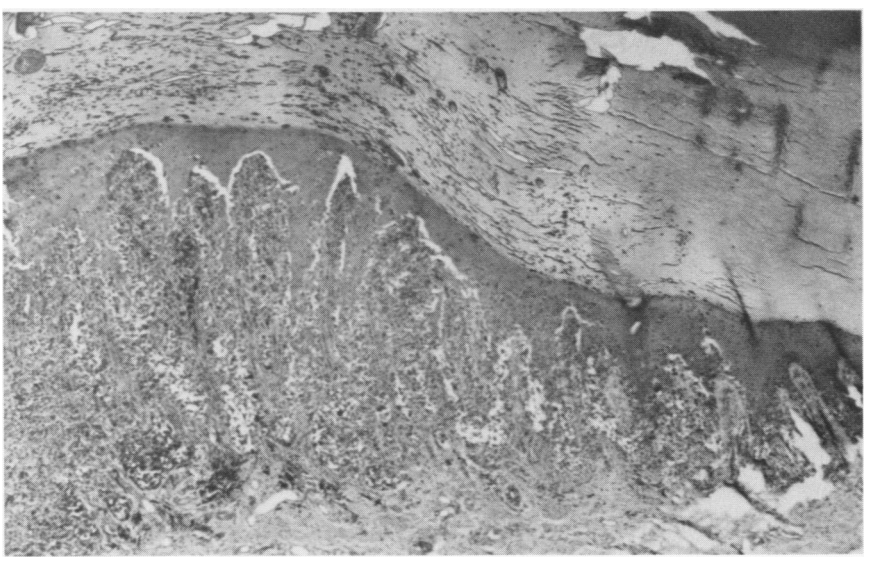

FIG. 7. Photomicrograph of radial growth component. Atypical melanocytes are distributed in lentiginous patterns along the basal layer and individually migrating into the overlying epidermis. Central plaque-like thickening apparent.

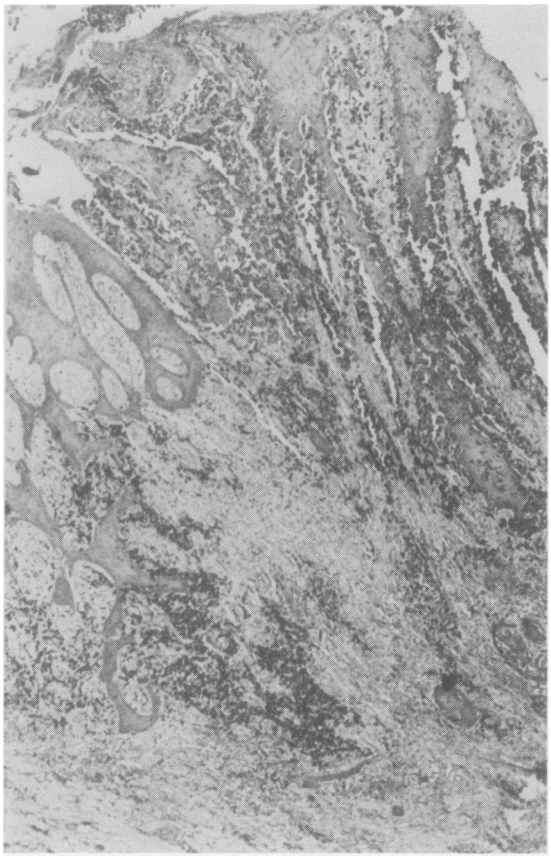

FIG. 8. Photomicrograph showing transition from radial to vertical growth phase with extension of nests of malignant cells into widened papillary dermis.

treated by perfusion and surgery at Tulane Medical Center, and 49 treated elsewhere by excision and referred to us for treatment of recurrent disease. There were 58 patients who had Stage II and III disease at diagnosis, 38 of whom were treated at the center primarily by perfusion and excisional surgery, and 20 who were treated elsewhere by excision and subsequently referred for treatment of progressive disease.

TABLE 1. *Distribution of 180 Acral Melanomas by Clinical Stage and Initial Therapy*

	Primary Treatment at Tulane Medical Center		Primary Treatment Elsewhere*		
	Perfusion, Excision	Perfusion, Excision, and RLND	Excision Alone	Excision and RLND	Total
Stage I	25	48	27	22	122
Stages II & III	1	37	4	16	58
Total	26	85	31	38	180

* Referred to Tulane Medical Center for treatment of recurrent disease.
RLND = Regional lymph node dissection.

TABLE 2. *Distribution of Primary Sites in 180 Patients with Acral Melanoma of Foot or Hand by Stage and Sex*

	Hand			Foot			
Stage	Palmar	Sub-ungual	Fingers	Plantar	Sub-ungual	Toes	Total
I							
Women	3	3	1	34	9	4	54
Men	3	2	0	52	4	7	68
							122
II & III							
Women	1	1	1	13	3	3	22
Men	0	4	1	23	2	6	36
							58
Total	7	10	3	122	18	20	180

The distribution of 180 acral melanomas is shown in Tables 2 and 3, indicating the relative occurrence by stage and sex (Table 2) and by race and sex (Table 3). The majority (88.8%) of lesions occurred on the foot, and 122 (76.2%) of the foot lesions are on the plantar skin. Of the 20 lesions occurring on the hand, 13 (65%) involved the fingers, and only seven occurred on the palm. Among the nonpalmar lesions on the hand, 9/10 subungual primaries involved the thumb, while the three finger lesions arose on the third, fourth, and fifth fingers. For nonplantar lesions, the great toe was the site of occurrence in 23 (60%) of cases (14 subungual lesions and nine on the skin of the toe). Subungual lesions occurred in 4/18 cases on other toes (Fig. 9). The distribution on the skin of the second, third, and fourth toes was even (two each), and four occurred on the fifth toe. In the subgroup of 67 ALM cases, there are only five patients with subungual melanomas, which is indicative of a frequent problem in the classification of digital lesions where the histologic material needed may be obliterated by ulceration or necrosis or by the mechanical elimination of the periphery of the tumor during manipulative or diagnostic procedures.

TABLE. 3. *Distribution of Primary Sites in 180 Patients with Acral Melanoma of Foot and Hand by Race and Sex*

	Hand			Foot			
	Palmar	Sub-ungual	Fingers	Plantar	Sub-ungual	Toes	Total
Black							
Women	1	0	1	10	1	0	13
Men	0	0	0	24	0	4	28
White							
Women	3	4	1	37	11	9	65
Men	3	6	1	51	6	7	75
Total	7	10	3	122	18	20	180

In the ALM subgroup, there were 39 men and 28 women, of whom 29 were black and 38 were white. Four patients had melanoma on the hand, and 63 had foot lesions (Table 4). There were 53 patients with Stage I disease, 46 of whom were treated here initially by surgery and perfusion, and seven who underwent initial surgical therapy elsewhere. There were 14 patients with metastatic disease present at diagnosis, 11 of whom had surgery and perfusion, and three who had surgery elsewhere. Twelve of the 14 had regional node involvement, and two had metastases to iliac lymph nodes.

The distribution of primary lesions on the hand and foot is shown in Table 5. The relatively large number of lesions on the heel is notable, in that it was a common site of occurrence in blacks and seen less often in whites (13/20 occurred in blacks). The ALM patients ranged in age from 21 to 90. The age distribution by race is shown in Figure 10. With 38 white patients, the distribution extended from age 20 to more than 80, while in the 29 black patients, the range was from 40–80, with the majority of the patients in the 50–70 age group. In black women, 60% of cases occurred in the 60–70 year range. Ten of the 28 women were black, but nearly half (19/39) of the men were black. The ratio of black to white was 1:1.3 in the ALM group and 1:3.4 in the larger series of all acral lesions.

The distribution of ALM primary lesions according to size (area), calculated in mm^2, is shown in Figure 11. Nearly 60% (39 patients) had lesions measuring

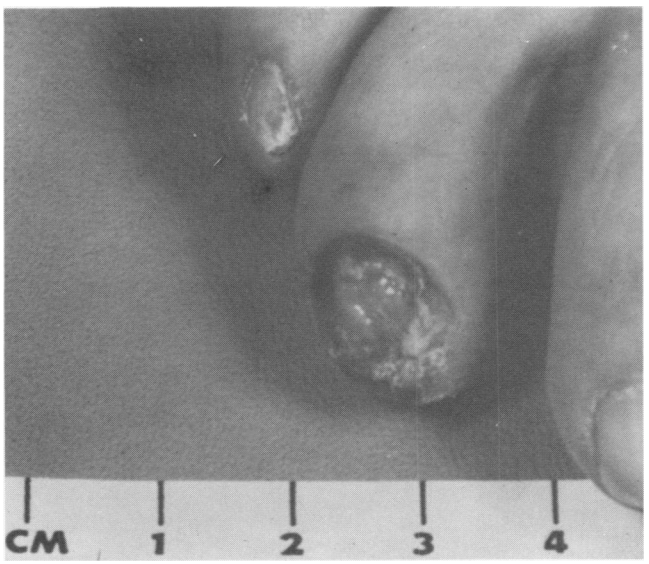

FIG. 9. Subungual melanoma of fourth toe of a 35-year-old woman. Melanoma of fingers and toes other than thumb or great toe are rare. Only five subungual tumors occurred on lesser digits, while nine occurred on the thumb and 14 on the great toe.

TABLE 4. *Distribution by Race, Sex, and Upper or Lower Limb in 67 Acral Lentiginous Melanoma Patients*

	Upper Limb		Lower Limb
White		White	
Men	1	Men	19
Women	2	Women	16
Black		Black	
Men	0	Men	19
Women	1	Women	9

600 mm^2 or less. Even in this smallest range, the average size was more than 250 mm^2, a large lesion by ordinary standards. There were 13 patients with lesions measuring 1200 mm^2 or larger, and three were greater than 3600 mm^2. There is a significant difference in average lesion size between blacks and whites. For patients with Stage I disease, blacks had lesions 1.8 times larger than whites. For patients with Stage II or III disease at presentation, the difference between races was less marked (1:1.3), and the overall average size for each race was less, perhaps the reflection of a biologic difference in tumor behavior, with less aggressive lesions having a longer local growth period. Ulceration is present in 53 of 67 ALM lesions and is almost invariably present in large lesions.

Results of Treatment

The results of treatment for all patients with Stage I ALM are shown in Figure 12. Seventy-three of 122 patients (69%) were treated with excision and regional chemotherapy by perfusion, and 49 (41%) by excisional surgery alone. The five- and ten-year cumulative survival rates[10] were 63% and 35% for subungual melanoma, 58% and 24% for plantar/palmar lesions, and 27% and 9% for lesions of the fingers and toes. The 49 patients undergoing surgery only as the initial therapy were all subsequently referred to us for treatment of recurrent or metastatic disease. Therefore, no surgical

TABLE 5. *Distribution of 67 Acral Lentiginous Melanoma Patients According to Primary Site*

Hand	4
Hypothenar	1
Thenar	1
Subungual	1
Finger	1
Foot	63
Subungual	4
Toe	1
Ball of foot	18
Instep	11
Heel	18
Sole, NOS*	11

* NOS = not otherwise specified.

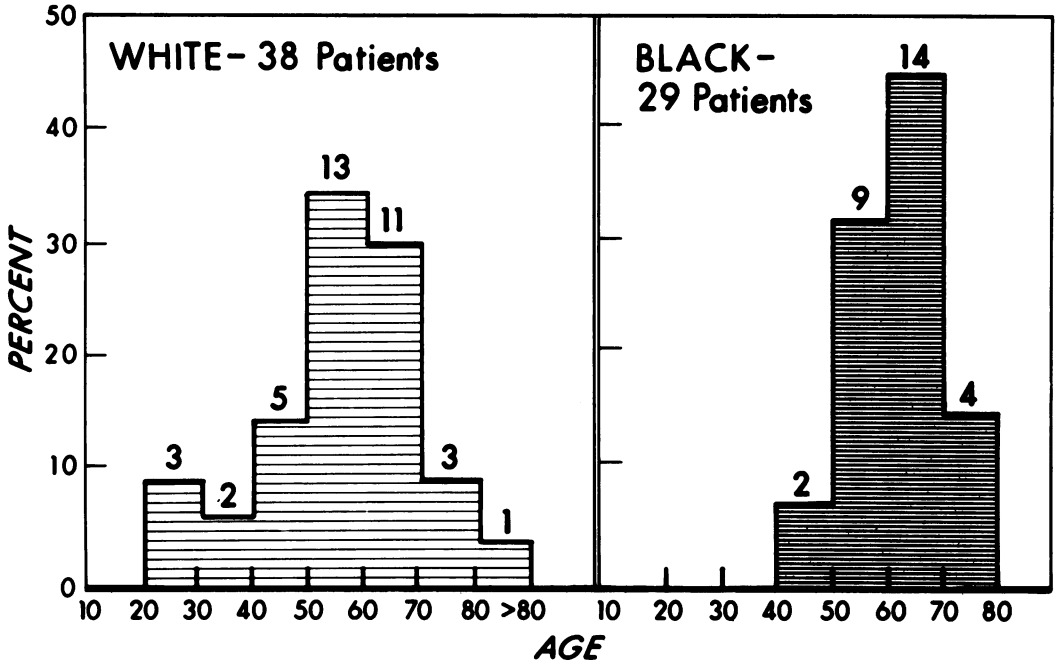

FIG. 10. Age distribution by race in 67 acral lentiginous melanoma patients.

cures are represented in this group, and no comparison of results by type of treatment can be made with these samples. The average disease-free intervals for the 49 patients treated by surgery alone and for 31 patients treated by surgery and perfusion who developed recurrence or metastasis are shown in Table 6. The average disease-free interval for 31 Stage I patients who failed after excision and adjuvant chemotherapy by perfusion was 25.3 months, with a median survival of 19 months. The average disease-free interval for 49 Stage I patients who were treated by excisional surgery alone was 22.9 months, with a median survival time of 18 months. This small difference is obviously not significant.

The survival experience in 63 patients with Stage I ALM of the lower extremity treated by adjunctive chemotherapy by perfusion and excisional surgery is shown in Figure 13. The five- and ten-year survivals for women are 82% and 58%, and for men, 61% and 44%. There were only ten patients with hand lesions, too few for survival calculations. They had all been observed two years or longer, and six of ten were free of disease from 2–15 years. Four died of disease at 4, 5, 10, and 15 months. The survival curve for the subgroup of 46 patients with Stage I ALM, following perfusion and excision, is plotted with the larger group of AM patients with palmar and plantar, and subungual lesions to il-

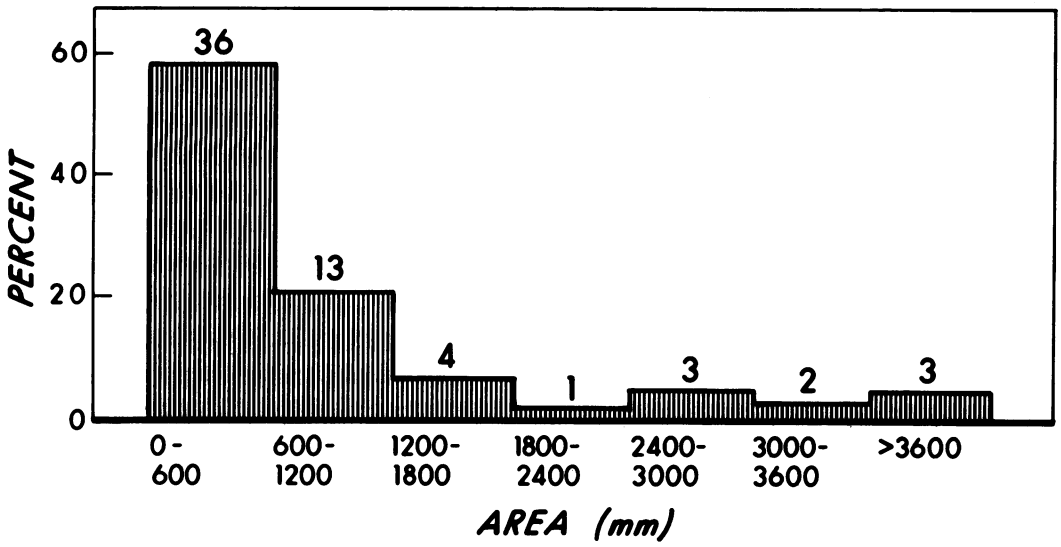

FIG. 11. Distribution by size of primary lesions in mm^2 in 62 patients with acral lentiginous melanoma.

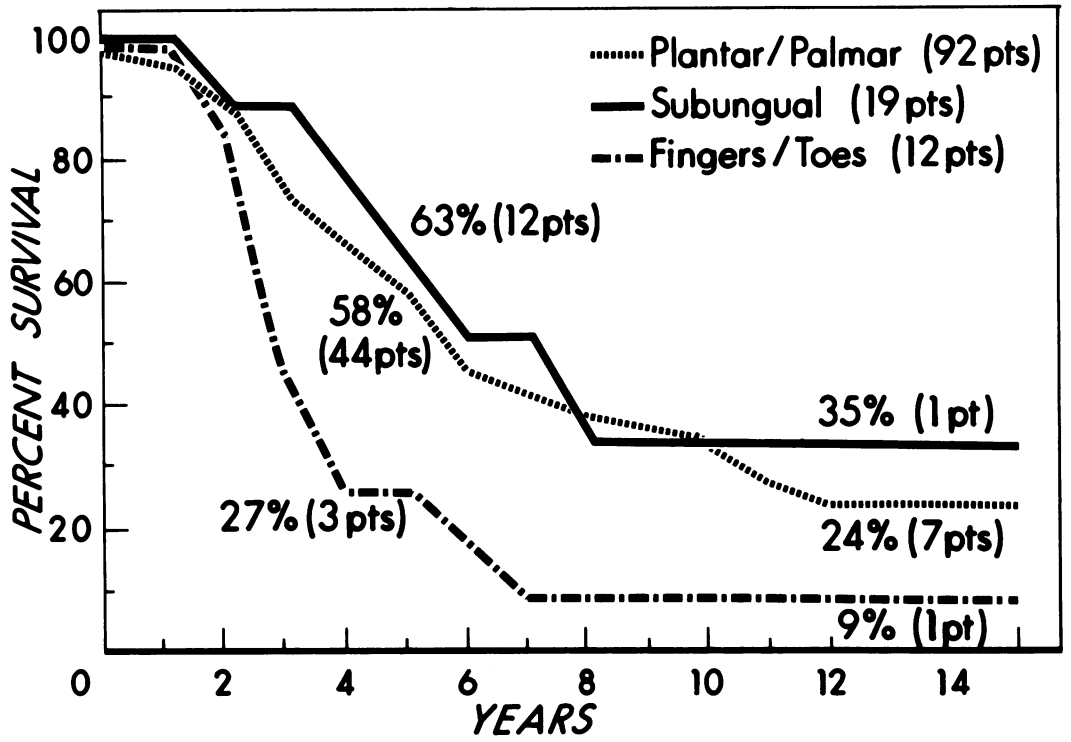

FIG. 12. Survival in 122 patients with Stage I acral melanoma according to site.

lustrate that their survival is not different from the group as a whole (Fig. 14). The cumulative survival at five years was 72% and 56% at 10 and 15 years.

The results of treatment in 38 patients with Stage II and III disease at presentation, who underwent excisional surgery and perfusion, are predictably poor. Twenty-six of 38 (68.4%) had regional node involvement. Two patients had intransit regional disease, and three had both nodal and intransit metastasis. Seven patients had iliac node involvement, with and without additional regional metastasis, and two patients had distant disease. The cumulative survival was 16.6% at five years, and only four patients have survived longer than three years completely free of disease. They have no evidence of disease at 5, 8, 11, and 16 years.

The disease-free intervals by level of invasion in 53 ALM patients are shown in Figure 15. There were 26 patients who remained free of disease, and seven patients who died of other causes with no evidence of disease. Two recent patients who had recurrence are living without evidence of disease at 20 and 22 months, after retreatment. The single patient with a Level II lesion had local recurrence soon after initial therapy, but lived seven years after retreatment and died of cancer of the prostate, predating melanoma. The correlation between the level of invasion of the primary lesion and incidence of recurrence is good. In Level III, there were four patients who died of disease before the third year, and there were nine patients who had no evidence of disease from three to 15 years. With Level IV, the differences are marked, with nine patients dying before seven years, and 14 patients free of disease from one to 14 years. In Level V, eight patients died before four years, and two are alive at two years.

When the disease-free intervals were compared by thickness (Fig. 16), there were two patients with lesions reported to be less than 0.75 mm thick, who died of disease at 27 and 37 months. Both were Level III, and

TABLE 6. *Average Disease-Free Interval in Months in Stage I Patients with Acral Melanoma by Type of Treatment*

			With RLND		With Perfusion		With Perfusion and RLND	
	Pts.	Months	Pts.	Months	Pts.	Months	Pts.	Months
Wide excision	18	28.8	15	21.2	7	20	14	29.7
Major amputation	2	29	1	10	—	—	—	—
Minor amputation	7	11.1	6	15.3	2	9	8	29.5

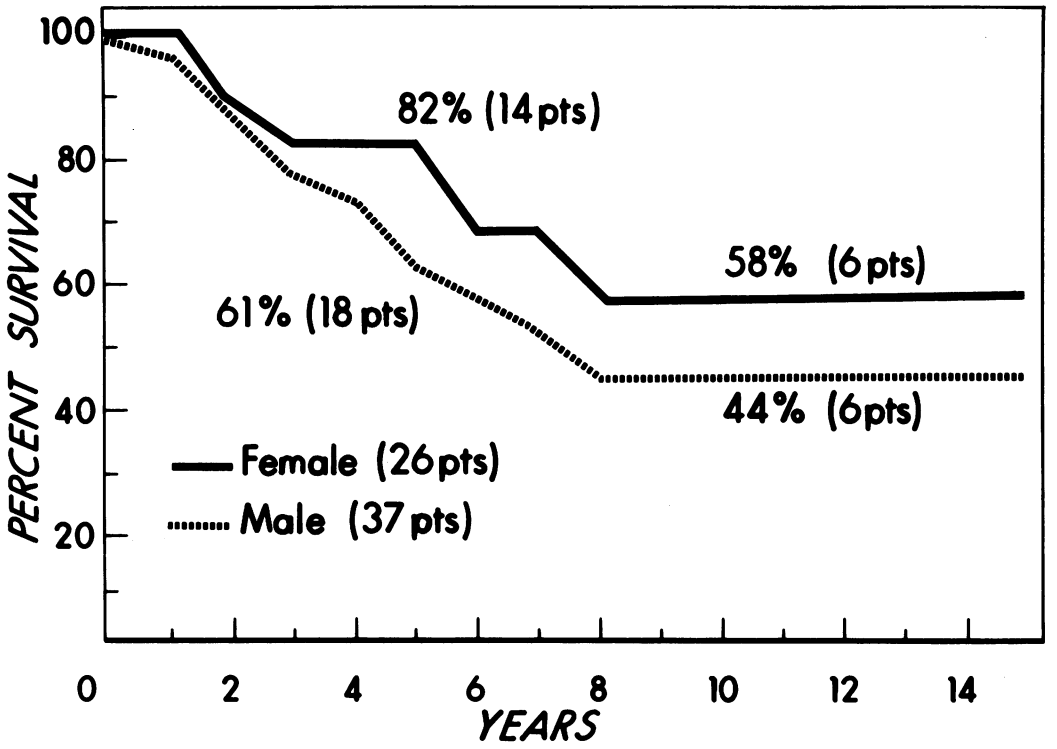

FIG. 13. Survival in 63 patients with Stage I acral melanoma of the lower limb treated by perfusion and excision according to sex.

in both the maximum lesion thickness was probably not represented on the available slides. In lesions from 0.75 mm to 1.5 mm thick, only one of six patients had recurrence. In lesions measuring 1.6 mm to 2.5 mm, 50% (5/10) patients recurred. In lesions measuring 2.6 mm to 3.5 mm, only one of five developed recurrence. The patient who died of other causes suffered a ruptured abdominal aneurysm. In patients with lesions over 3.6 mm, five died before two years, and three are still alive at four and five years. One patient died at age 92, and

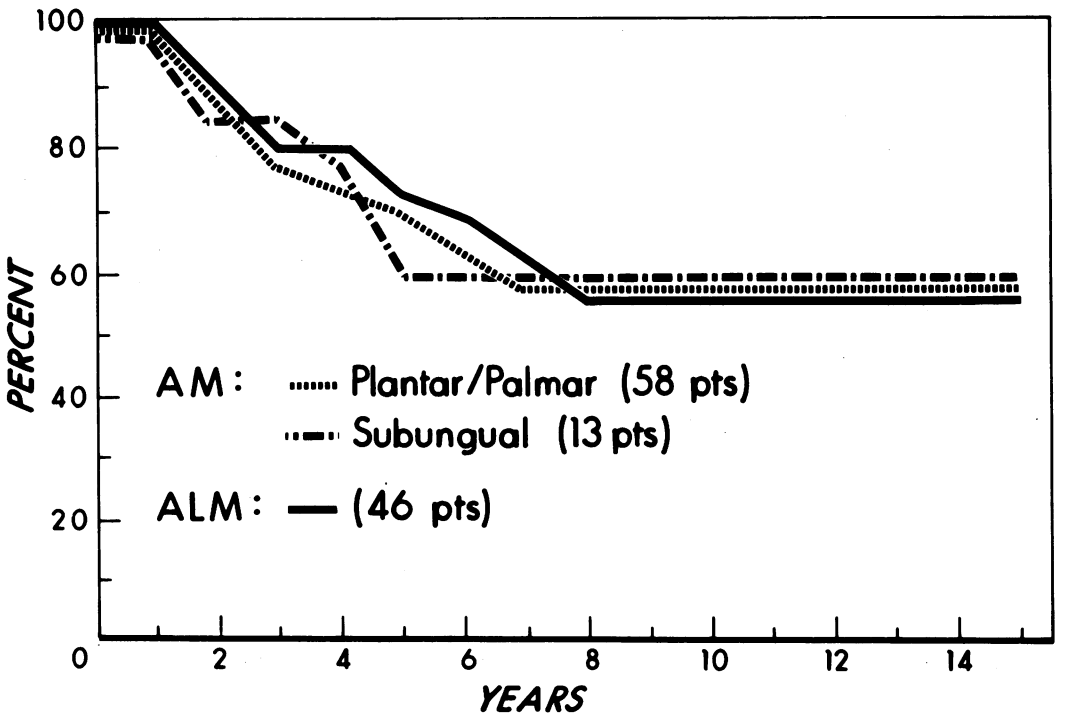

FIG. 14. Survival in 71 Stage I acral melanoma of the lower extremity patients following perfusion and excision, with a subgroup of 46 Stage I acral lentiginous melanoma patients treated in the same manner. (Note similarity in survival rates.)

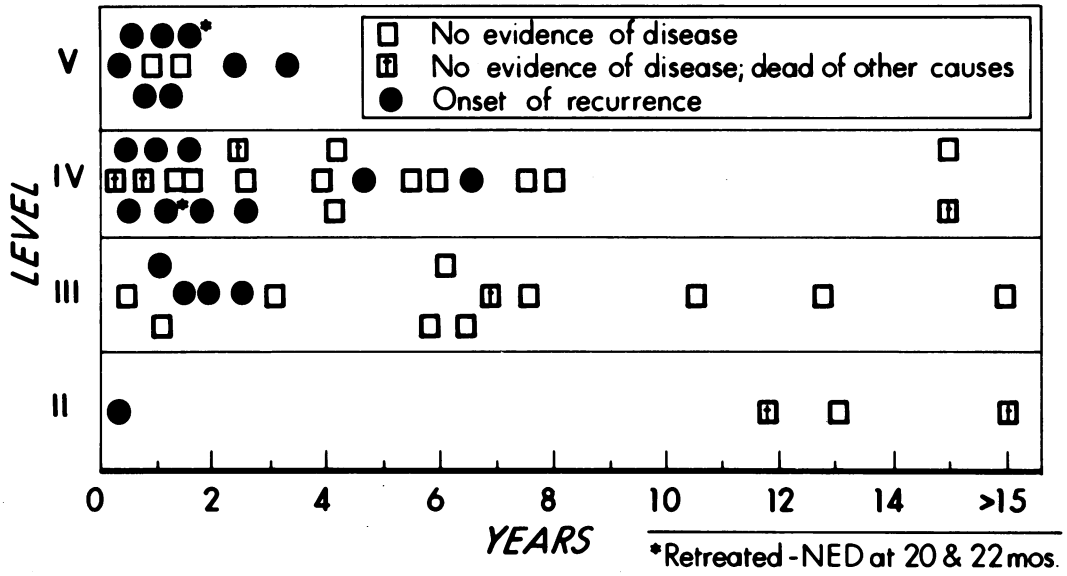

FIG. 15. Disease-free interval by level in 53 Stage I acral lentiginous melanoma patients.

an autopsy was not performed, but no recurrence was evident.

Discussion

Management of Acral Melanoma

While acral lentiginous melanoma has acquired a reputation for bad prognosis that is justifiable when reports from the literature are reviewed (Table 7), ALM should be readily curable if diagnosed and treated in the radial growth phase. Perhaps the delay in diagnosis is due to the benign clinical appearance and slow development in this variant of melanoma, as opposed to NM or SSM (Figs. 17 and 18). The flat brown-black margins enlarge slowly, causing no pain, deformity, or physical limitation, and large areas of the volar surface may be involved before symptoms develop. Consequently, the lesion is overlooked by the patient or misdiagnosed by the physician as a bruise, a tineal infection, a nevus, or lentigo. Close observation and early biopsy is to be encouraged if cure rates for ALM are to be improved. A small incisional or punch biopsy can be done expiditiously under local anesthesia, with little discomfort or deformity, and should provide the diag-

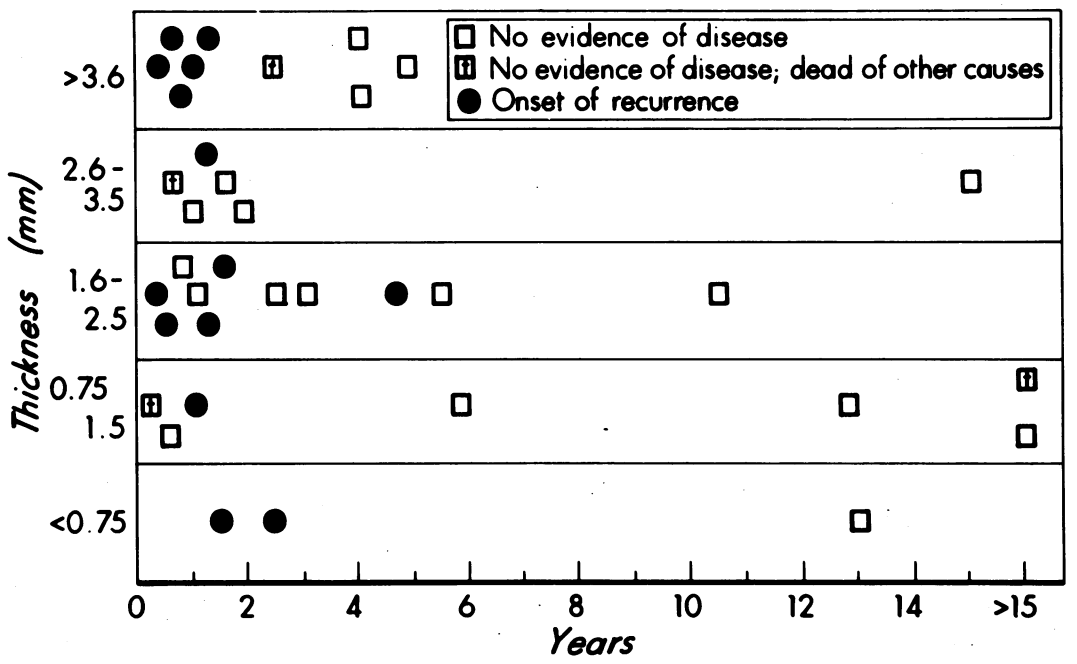

FIG. 16. Disease-free interval by thickness in 34 Stage I acral lentiginous melanoma patients.

TABLE 7. *Reported Five-year Survival of Acral Melanoma Patients Following Excision*

Year and Author	Site Palmar	Plantar	Subungual	Five-year % Survival
1922 Hertzler et al.			17	Not stated—all died of disease (Some survive to ten years)
1950 Decker et al.		25		5%
1964 Das Gupta et al.			34	38%—Stage I, 11/21-52% Stage II, 2/13-15%
1967 Pack et al.			72	27%*
1968 Petersen et al.		35		13%*
1973 Graham et al.			22	50%
1980 Sondergaard et al.			14	32%
		50		50%
1980 Patterson et al.			66	16%
1980 Feibleman et al.	7			19%
		49		43%
			13	19%
1980 Day et al.		29 (foot)		64.5%†
		19 <3 mm		100%†
		10 >3 mm		0%†
1981 Day et al.	44 (hand & post. upper arm)			
	21 <2.25 mm			95%†
	23 >2.25 mm			37%†

* Determinate cases.
† Cumulative % survival.

nosis. The early subungual melanoma is more difficult to detect. The subungual hematoma heads the list in the differential diagnosis, but fortunately, the darkly pigmented lesion is visible and will move distally on weekly observation. If onychomycosis nigricans, chronic paronchia, and racial pigmentation of the nailbed can be ruled out, removal of part of the nail with adequate biopsy of the nailbed down to, or near, the periosteum is indicated. When done properly, little deformity occurs.

Subungual melanomas are usually treated by minor amputation. Small lesions can be treated with distal phalyngeal amputation, but most will require two to three phalynxes, and in extensive involvement, a ray amputation is recommended, including the distal metatarsal or metacarpal head.[11] It is desirable to save the thenar eminence and ball of the foot when the tumor margins are not compromised. When the lesion involves the proximal phalynx of the fingers or toes, ray amputation is required.

When the volar surfaces are involved, wide excision with 3-cm margins, down to the deep fascia, repaired by split thickness skin grafts, should suffice. Occasionally, partial amputation of the distal foot is required when large neglected lesions are encountered.

Comment on ALM in the Black Patient

The large number of black patients in the AM group (41/180) and the ALM group (29/67) is deserving of comment. The incidence according to the Surveillance Epidemiology End Results data for the greater New Orleans metropolitan area for melanoma per 100,000 population is 6.2 for whites and 0.4 for blacks,[17] thus indicating that melanoma is an uncommon tumor among blacks, with the largest number occurring in acral sites. It has long been noted that the anatomical distribution of melanomas among blacks is different than whites. In our report on melanoma in the American black from Charity Hospital of Louisiana in 1976, it was pointed out that the majority of melanomas occurred on the hands, feet, and mucous membrane.[21] Of 96 black patients, 44 occurred on the feet, 11 on the hand, and 6 in mucous membrane. There was no particular difference according to sex, other than a few more black women melanoma patients (52) than men (44). Men had more melanomas on the skin of the lower limbs (30:19), while women had more melanomas in the trunk, vulva, upper limb, and mucous membrane. Thus, it is apparent that melanoma in blacks is rare, with the most common site being on the hands and feet. As most of the AM falls in the ALM category, the most common pathologic variant is ALM.

The propensity for melanoma in the black to occur in the lightly pigmented portions of the skin has long been noted,[8,24] but no etiologic significance has been attributed to this observation. It has been suggested in the past that trauma was an etiologic factor, causing the high incidence of melanoma among the shoeless native black African tribesmen.[22] Also, some authors have pointed out that melanoma of the plantar surfaces occur more frequently on the heel and ball of the foot,

an area more subject to trauma.[22] Inasmuch as the American black is subject to no more foot trauma than any other race, the traumatic etiologic relationship seems not acceptable. The theory presented by Lewis[23] regarding unstable pigmented spots on the foot better explains the high incidence of acral melanoma in the

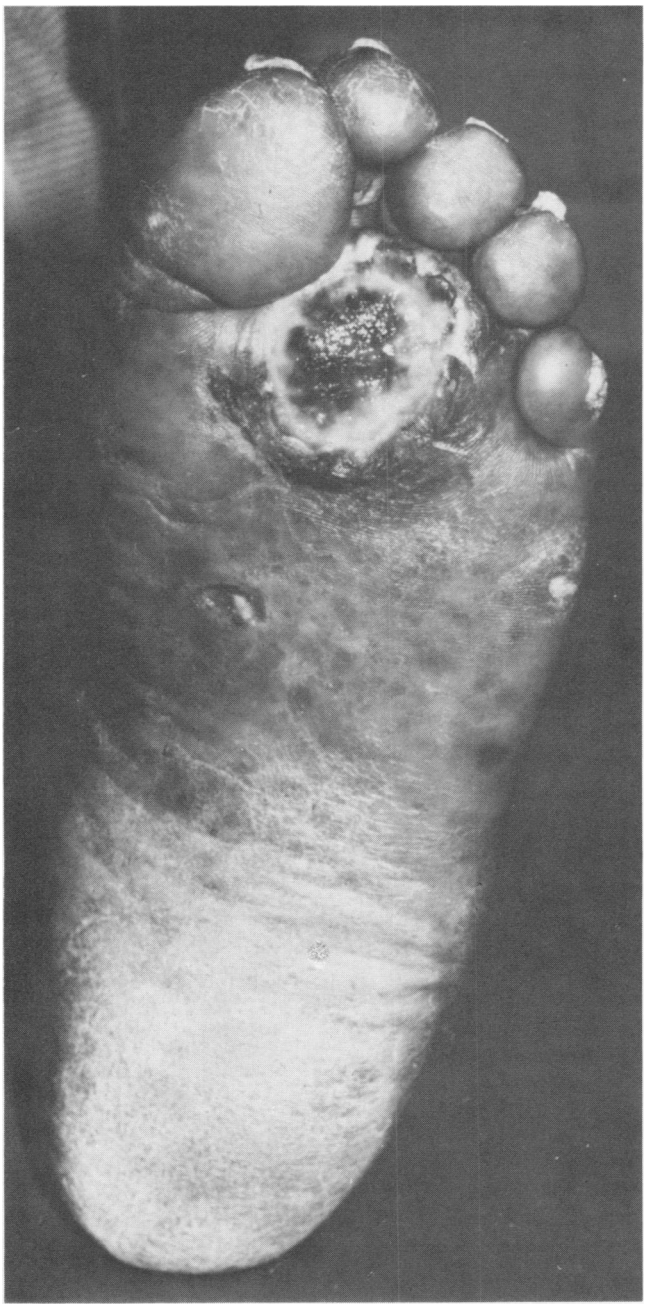

FIG. 17. Acral lentiginous melanoma in a 50-year-old black man of several years' duration. Patient had diabetes and was thought to have gangrene. Biopsy proved a Level V melanoma. Despite the large area of ulceration, the lentiginous radial growth phase is apparent. A number of lentigines and nevi can be seen on the sole. Second biopsy site revealed satellites.

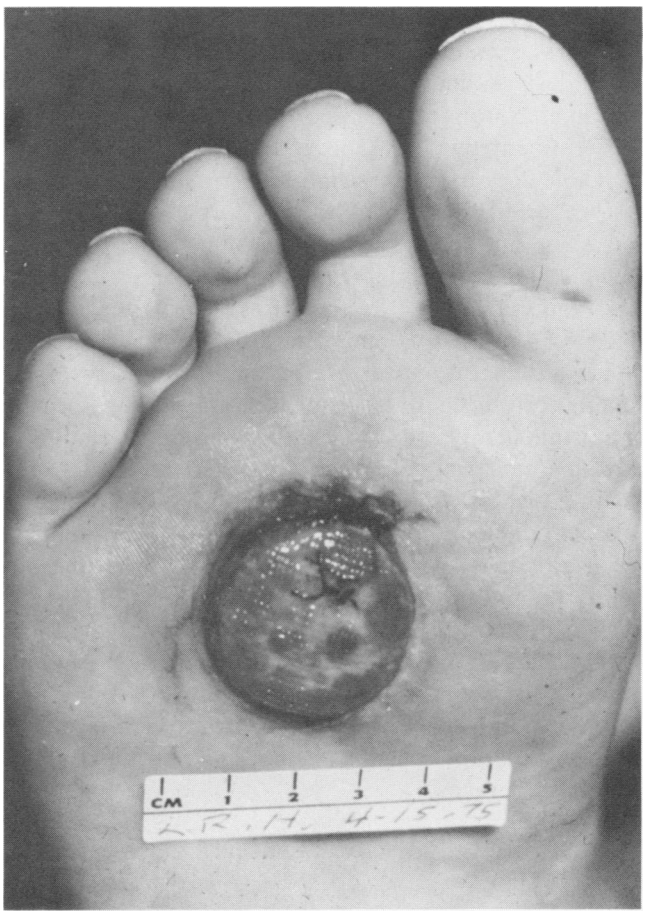

FIG. 18. A 40-year-old white man with typical example of nodular melanoma of the foot. No radial growth component seen.

black. Plantar and palmar surfaces are common sites of nevi in blacks, the dark-skinned blacks having more pigmented lesions on the volar surfaces than the lighter-skinned blacks.[8,24] Even if the instability of volar lentigo in the black is uncertain, the dysplastic lentigo is a likely precursor of ALM.

The fact that there is little mention of melanomas in blacks in the reports on plantar or subungual melanomas in European and American literature reflects the samples studied. Feibleman, Stoll, and Maize report on only two black patients among the 64 studied from upstate New York.[15] Pack et al. noted that five of 27 patients from the New York metropolitan area with subungual melanomas were black.[25] In Patterson and Helwig's report only three of 56 patients were black.[26] However, papers from Africa indicate a high incidence of acral melanomas in blacks,[22,29] and in other dark-skinned races, such as the Hindus.[3]

Summary

By all current prognostic criteria using characteristics of the primary lesion that have been shown to cor-

relate with survival of melanoma patients, *i.e.*, level, thickness, size, ulceration, and anatomic location,[2] most acral lesions, including specifically acral lentiginous melanomas, fall into the poor prognosis group. Results of treatment by several investigators are summarized in Table 7, and reflect generally poor survivals. Day et al.[11] reported on 151 patients, analyzing 13 independent variables, and found primary location on the foot to be one of three independent risk factors, along with thickness and mitosis rate. In the series reported here, 26 of 34 (76.5%) ALM patients had lesions thicker than 1.5 mm, and ulceration was present in all but a few of the small, early lesions. It is apparent that some form of adjuvant therapy is indicated, in addition to wide local excision and regional lymph node dissection (RLND). In the authors' experience, the addition of adjunctive regional chemotherapy by isolated limb perfusion has been effective and provides high dose chemotherapy with minimal toxicity, and, perhaps equally important, avoids compromising the host immune system.[20] The five-year cumulative survival for 68 Stage I patients with AM, Levels III, IV, and V, is 60.8% at five years and 39.4% at ten and 15 years. Additional systemic adjuvant therapy may also be appropriate in extremely high-risk patients.

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Discussion

DR. ROBERT BEAZLEY (New Orleans, Louisiana): Dr. Krementz and his colleagues at the Tulane Medical Center have reviewed a clinicopathologic group of malignant melanoma, a new variant entitled acral lentiginous melanoma. From reading the manuscript and from listening to the talk, I wonder if there's really any difference between acral lengitinous melanoma and acral type melanoma. We're probably talking about the same thing, but there is some question of whether or not we'll ever be able to make this decision, because of the pathologic difficulties that Dr. Krementz alluded to. The area of ulceration, the extensive size of the lesion, and the inappropriate biopsy specimens