A Rational Approach to the Surgical Management of Melanoma

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Our experience with 294 regional lymph node dissections in 250 patients are reviewed. The relationship between the Clark's level of invasion and the thickness of the primary is related to regional lymph node metastases. Patients with Clark's Level III melanoma had a 29% incidence of regional lymph node metastases, Clark's Level IV had a 42% incidence of regional lymph node metastases and Clark's Level V a 58% incidence of regional lymph node metastases. Primary melanomas greater than 1.5 mm in thickness had a 38% incidence of positive regional lymph nodes. We therefore recommend a regional lymphadenectomy in patients with Clark's Levels III, IV and V and all melanomas that are greater than 1.5 mm in thickness. A new technique is described which is helpful in localizing the direction of ambiguous lymphatic drainage in patients with truncal melanoma. The use of radioactive colloidal gold scanning has been useful in predicting lymphatic shed in these ambiguous truncal melanomas. Certain technical aspects of inguinal lymph node dissection are emphasized in an attempt to reduce the morbidity of these dissections. It is emphasized that iliac-obturator lymph node dissections are not performed unless the inguinal lymph nodes are found to be involved by frozen section examination at the time of surgery.

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THE SURGICAL MANAGEMENT of malignant melanoma has long been a highly controversial subject. The basic principle of wide excision of the primary site is generally accepted as the proper management of the primary lesion.[9] The controversy, however, surrounds the appropriate management of the regional lymph nodes. When the regional lymph nodes are clinically palpable and suspicious of harboring metastases, it is agreed that therapeutic regional lymph node dissection is indicated. However, in the absence of clinically suspicious nodes, there is disagreement regarding the indications for elective regional lymph node dissection. The weight of evidence in the literature indicates that survival is better in patients with clinically negative nodes than in patients with clinically positive nodes.[6,8,12,13] However, there continues to be a justifiable concern over subjecting patients who may have negative nodes to regional lymph node dissection. This concern, of course, derives from the high incidence of complications following regional lymph node dissection, especially in the inguinal area. An additional deterent, in melanomas of the trunk, is that not infrequently, the lymph node drainage distribution is ambiguous and difficult to determine. In this setting, frequently regional lymph node dissection is deferred in view of the added morbidity of multiple lymphadenectomies.

Since survival is considerably better following regional node dissection for clinically negative and pathologically positive nodes than for clinically positive and pathologically positive nodes, it is desirable not to wait until clinically positive nodes develop before performing the node dissection.[4,6,8,12,13] It would therefore be highly desirable to be able to more accurately predict the presence of occult regional lymph node metastases preoperatively. In addition, any technique that would assist the surgeon in determining which regional lymph node group drained the ambiguous truncal melanoma would reduce the necessity of multiple regional lymphadenectomies.

Aside from possible therapeutic benefits, there are

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TABLE 1. *Thickness of Level III Melanomas*

Thickness	Number
<.65	3
.65–.76	7
.77–1.5	46
>1.5	35
Total	91

other real benefits of elective regional lymph node dissection. The presence of regional lymph node metastases is associated with an 80% chance of developing distant metastases and in their absence there is only a 20% recurrence rate.[13] This prognostic information can be very important in terms of reassuring the patient in those instances in which the lymph nodes are negative. Conversely when the nodes are positive, surgery alone is often inadequate and additional therapy may be required. Since at the present time surgical adjuvant therapy for melanoma is experimental, a knowledge of the status of the regional nodes allows the selection of those patients who have a poor prognosis for experimental trials and spares the patient with negative nodes the morbidity and inconvenience of adjuvant therapy. Therefore, in addition to the possible therapeutic benefits, elective regional lymphadenectomy provides valuable information which assists the clinician in the management of the patient.

With these considerations in mind, we have developed a plan of management of the patient with malignant melanoma. This approach includes 1) the use of microstaging for preoperative prediction of microscopic lymph node metastases, 2) certain pre and postoperative as well as operative considerations which diminish the morbidity associated with inguinal lymph node dissection, and 3) a technique which appears to be useful in predicting the direction of lymphatic drainage in the ambiguous truncal melanoma.

This report summarizes our experience with 294 consecutive regional lymphadenectomies for malignant melanoma over the past five years. In an attempt to more accurately predict the presence or absence of occult regional lymph node metastases, we performed careful clinical microstaging by the method of Clark[3] and more recently, we have added Breslow's[1] method. In addition, we have evaluated the use of radioactive colloidal gold scanning as a technique for determining the direction of lymphatic flow in malignant melanoma. Finally, a standard approach to the operative technique as well as the perioperative management has been developed which we feel results in acceptable morbidity for inguinal lymph node dissections.

Materials and Methods

Two hundred and ninety-four regional lymph node dissections were performed in 250 patients from January 1971 through December 1976. All the patients had biopsy proven melanoma and were referred to the Division of Surgical Oncology at the University of California Los Angeles (UCLA). One hundred forty-one were males and 109 were female. All patients had either previously undergone adequate wide excision of the primary or they had wide excision of the primary done concomitantly with the regional lymphadenectomy at UCLA. Seventy-seven per cent (226) of the regional lymphadenectomies were performed synchronously or within four months of the excision of the primary. Twenty-three per cent of the regional lymphadenectomies were performed four months or longer following wide excision of the primary. Forty patients underwent multiple lymph node dissections, 36 undergoing two regional lymph node dissections and four undergoing three. Twelve patients had unknown primaries. Nine patients had multiple primary melanomas, one patient with three, one patient with four and seven patients with two each. One hundred and twelve inguinal lymph node dissections, 56 radical neck dissections and 126 axillary dissections were performed for a total of 294 regional lymph node dissections in 250 patients.

In 202 of the 250 patients, the primary malignant melanoma was evaluated histologically by Clark. The primaries were classified by Clark according to Clark's classification into Level II, Level III, Level IV and Level V melanoma.[3] There were 12 unknown primaries. In 36 patients tissue from the primary lesion was not adequate or available for determination of a Clark's level. One hundred twenty-seven of these 202 were evaluated according to the greatest thickness of the lesion in accordance with the technique of Breslow.[1] This technique calls for the determination of the thickness by direct measurement with an optical micrometer determining the maximum depth in mm beneath the granular layer of the epidermis. Originally and for the first three and one half years of this

TABLE 2. *Thickness of Level IV Melanomas*

Thickness	Number
<.65	0
.65–.76	2
.77–1.5	3
>1.5	31
Total	36

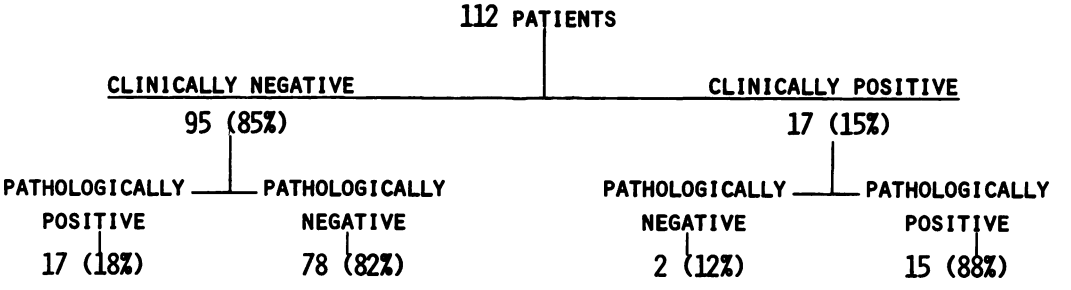

FIG. 1. Incidence of metastases to regional lymph nodes in patients with Level III melanomas greater than 0.76 mm thick. Total number of pathologically positive nodes = 32 (29% of 112 level III patients).

study, the thickness of each primary was not determined. However, recently we have begun to evaluate the thickness in mm of all primaries regardless of the Clark's Level. To date 127 patients have undergone regional lymph node dissection who had the thickness of the primary determined by the technique of Breslow.[1]

Since the median follow-up in this study is less than two years, no attempt was made to relate survival to the microstaging or the therapy described.

Each patient was carefully evaluated for clinically suspicious regional lymph nodes preoperatively and if present, these nodes were considered to be clinically positive. Following surgery, the regional lymph nodes were carefully dissected by the surgical pathologist and each node was examined microscopically.

In an attempt to evaluate the postoperative morbidity associated with inguinal node dissection, 84 of the 108 patients who underwent inguinal node dissections were evaluated for the presence of postoperative edema and activity limitation. Circumference measurements of both calves and thighs were performed in these 84 patients and a questionnaire was filled out regarding their activity.

In a pilot study over the last one and one half years, radioactive colloidal gold (^{198}Au) injection into the area of the primary melanoma was evaluated in an attempt to describe the distribution of lymphatic drainage from primary truncal melanomas. Each patient was injected intradermally around the primary lesion with 0.1 mCi of ^{198}Au. Radionucleotide scanning was accomplished 24 hours following injection by the use of a longitudinal multi-plane tomographic scanner. Details of this technique have been previously reported.[5] The patients then underwent regional lymphadenectomy and the presence or absence of metastases to the lymph nodes was correlated with the distribution of the colloidal gold in the regional lymph node sites.

Results

Correlation of Regional Lymph Node Metastases with Clinical Microstaging

In 202 instances, the Clark level of invasion was determined. In 127 instances the thickness of the thickest portion of the primary melanoma was determined by the technique of Breslow. Since throughout most of this study, only patients with Level III melanomas greater than .76 mm in thickness and patients with Level IV and Level V melanomas underwent elective regional lymph node dissection, we are unable at this time to comment upon the incidence of occult microscopic metastases in Clark's Level II lesions and Level III lesions less than .76 in thickness.

The thickness was determined in 91 of the 112 patients with Level III melanoma. Table 1 indicates that the majority of these lesions were greater than .65 mm in diameter. Only ten patients with Level III melanomas less than .76 mm in diameter underwent regional lymph node dissection and all had clinically positive regional lymph nodes. Table 2 indicates that 31 of the 36 Level IV melanomas were greater than 1.5 mm in thickness.

Of the 112 patients with Level III melanoma, 17 (15%) had clinically positive nodes and 95 (85%) had clinically negative nodes. Eighteen per cent or 17 pa-

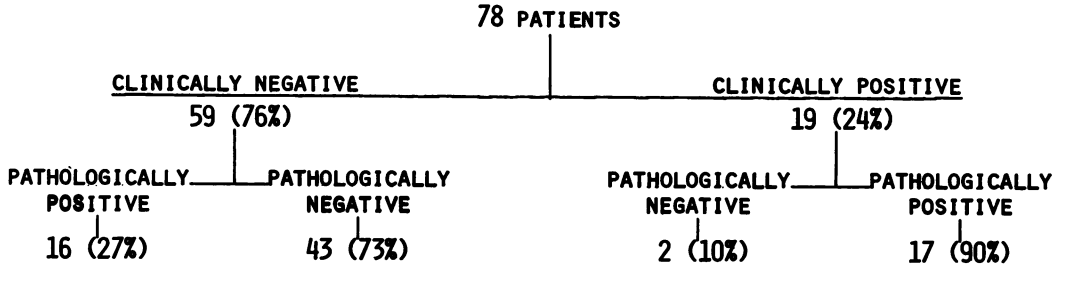

FIG. 2. Incidence of metastases to regional lymph nodes in patients with Level IV melanomas. Total number of pathologically positive nodes = 33 (42% of 78 level IV patients).

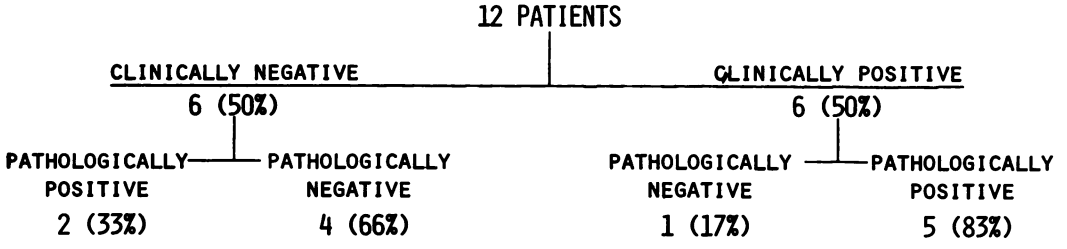

FIG. 3. Incidence of metastases to regional lymph nodes in patients with Level V melanomas. Total number of pathologically positive nodes = 7 (58% of 12 level V patients).

tients with clinically negative nodes were found to have microscopic metastatic disease on histological examination. Fifteen of the 17 clinically positive patients also had pathologically positive nodes. Therefore the overall incidence of pathologically positive nodes in these 112 patients with Level III melanomas was 29% (Fig. 1).

Figure 2 indicates the findings of regional lymph node dissections in patients with Level IV melanoma. During the five years of this study all patients with Level IV melanoma underwent regional lymph node dissection regardless of the clinical status of the regional lymph nodes. Seventy-eight Level IV melanoma patients underwent regional lymph node dissection. Nineteen (24%) had clinically positive nodes and 59 (76%) had clinically negative nodes. Of those patients with clinically negative nodes, 16 or (27%) harbored occult metastatic disease. The overall incidence of pathologically positive nodes was 42%.

There were only 12 Level V patients of whom half had clinically positive nodes (Fig. 3). Two or (33%) of the patients with clinically negative nodes had pathologically positive nodes. The overall incidence of positive lymph nodes in Level V patients was 58%. In spite of the small numbers, it is clear from this and other studies, that Level V melanoma has a high mortality rate and a high incidence of regional lymph node metastases.

Forty-eight patients with malignant melanomas between 0.77 and 1.5 mm in thickness underwent regional lymph node dissection (Fig. 4). Twelve per cent were clinically positive and (88%) were clinically negative. Of the clinically negative patients, four (10%) contained pathologically positive nodes. There were a total of seven patients (15%) with positive regional lymph nodes in the 48 patients with lesions between 0.77 and 1.5 mm in thickness.

Seventy-two patients with malignant melanoma of greater than 1.5 mm in thickness underwent regional lymph node dissection (Fig. 5). Fifty-six of these patients (78%) had clinically negative nodes and 16 (22%) had clinically positive nodes. Eleven of the patients with clinically negative nodes proved to have pathologically positive lymph nodes for an incidence of 20% occult positive lymph nodes in clinically negative patients. The overall incidence of positive lymph nodes in patients with lesions greater than 1.5 mm in diameter was 38%.

Colloidal Gold Scanning

To date, 57 patients with truncal melanoma have undergone preoperative gold scanning (Fig. 6). Seventeen of these proved to have nodal metastatic disease at the time of regional lymphadenectomy. No lymph node metastases were found at sites other than those taking up the colloidal gold. These studies have indicated that previous guide lines for predicting the direction of nodal metastases are not always accurate. Some lesions arising two centimeters or more from the central axis showed contralateral as well as ipsilateral lymph node drainage. There is also a zone of individual variation around the mid trunk that was also observed.[5] Because of the individual difference noted in the lymph node drainage of truncal melanomas, we have adopted a policy of performing ^{198}Au scans in all patients who have truncal melanomas in which the direction of lymph node drainage is ambiguous. We are using this technique to determine the appropriate regional lymph nodes to be dissected. The availability

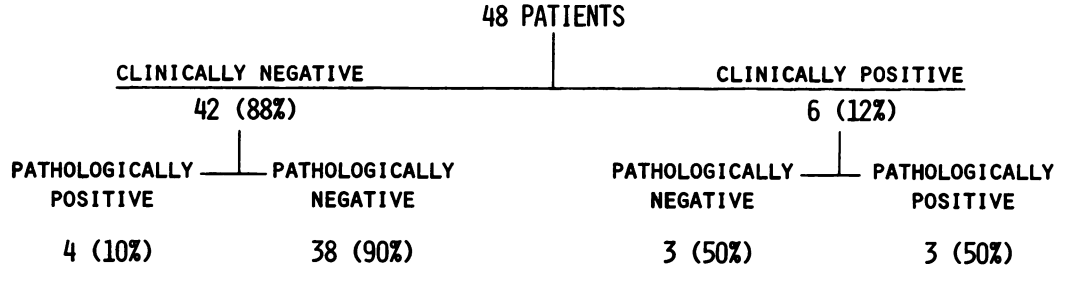

FIG. 4. Incidence of regional lymph node metastases in patients with primary lesions between 0.77 and 1.5 mm thick. Total number of pathologically positive nodes = 7 (15% of the 48 patients).

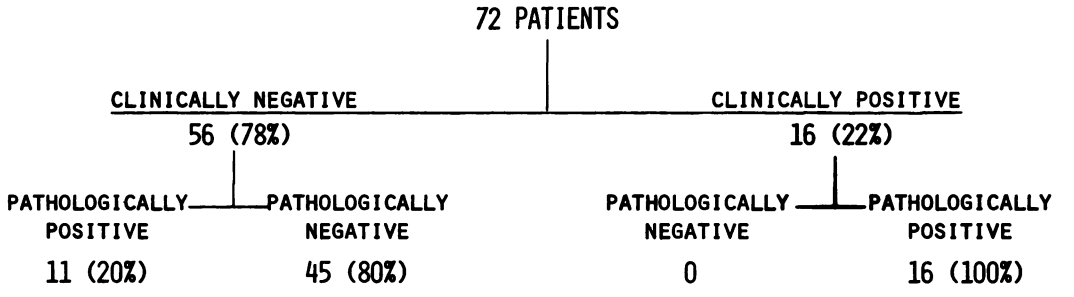

FIG. 5. Incidence of regional lymph node metastases in patients with primary lesions greater than 1.5 mm thick. Total number of pathologically positive nodes = 27 (38% of the 72 patients).

of this technique should reduce the number of lymph node dissections necessary in truncal melanomas.

Technique of Inguinal Lymph Node Dissections

Our experience with 112 inguinal lymph node dissections has led us to formulate certain technical considerations that we feel are important in reducing the morbidity of this procedure. We have come to believe that it is important that all patients who undergo inguinal node dissection be measured and fitted for Jobst stocking prior to admission. The stocking is then available when the patient is admitted to the hospital and can be applied in the immediate postoperative period. Postoperatively, the catheters are removed when the drainage in any 24 hour period is 20 cc or less. The patients undergoing inguinal node dissections were treated with a gram positive antibiotic beginning 12 hours preoperatively and continuing until the catheters were removed.

There are certain technical considerations regarding the operative procedure that we feel are important in diminishing postoperative complications. Figure 7 describes the skin incision which is placed in the inguinal crease. The skin incision is curved towards the anterior superior iliac spine in such a way that if an extension of the skin incision is required, it can be extended anterior to the anterior superior iliac spine. The inferior skin flaps are raised only to the extent that is necessary to dissect the contents of the femoral triangle, the lateral border of which we define as the sartorius muscle and the medial border, the adductor magnus. This dissection includes the subcutaneous fat and lymphatic tissue down to the adventitia of the femoral vessels. The great saphenous vein is divided at the point at which it crosses into this area overlying the adductor magnus. The inferior extent of the dissection terminates at the point where the sartorius muscle crosses the adductor. It is emphasized that it is only necessary to raise the skin flaps to an extent that allows one to perform a dissection confined to these limits. Extending the groin dissection more laterally or more medially or more inferiorly does not contribute any more to the lymphadenectomy but does contribute to rendering the inferior flap ischemic. The upper flap is elevated to the level of the anterior superior iliac spine laterally and medially one half the distance from the pubic tubercle to the umbilicus. The fat between Camper's fascia and the external oblique aponeurosis is reflected inferiorly to meet the specimen from the femoral triangle at Poupart's ligament. At this point the specimen is amputated and the inguinal ligament is elevated and the highest inguinal node, Cloquet's node, is carefully identified for the pathologist. The apex of the femoral triangle is also identified for the pathologist. The specimen is carefully dissected by the pathologist and any suspicious lymph nodes are examined by frozen section. If no positive lymph nodes are found by frozen section, the operation is then completed without an iliac-obturator node dissection. However, if positive inguinal nodes are found on frozen section, an iliac-obturator node dissection is performed. This retroperitoneal node dissection is performed without an additional skin incision (Fig. 8). The superior flap that has been previously raised is raised further if necessary by the extension of the skin incision superiorly. The aponeurosis of the external oblique is incised and through a muscle splitting incision and division of the inferior epigastric vessels, the peritoneum is swept medially exposing the external and internal iliac vessels. The external iliac and obtura-

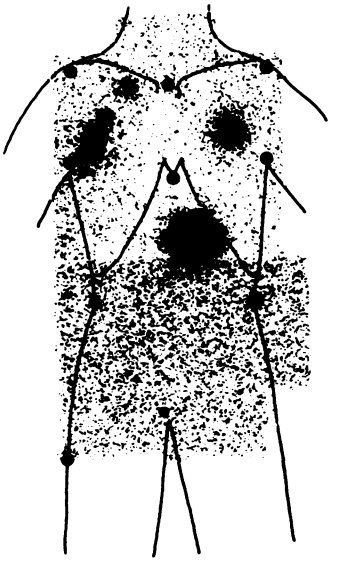

FIG. 6. Illustration of Radioactive Gold Scan. Primary truncal melanoma lying just above and to the left of the umbilicus was injected with ^{198}Au. Scan reveals bilateral axillary lymphatic drainage.

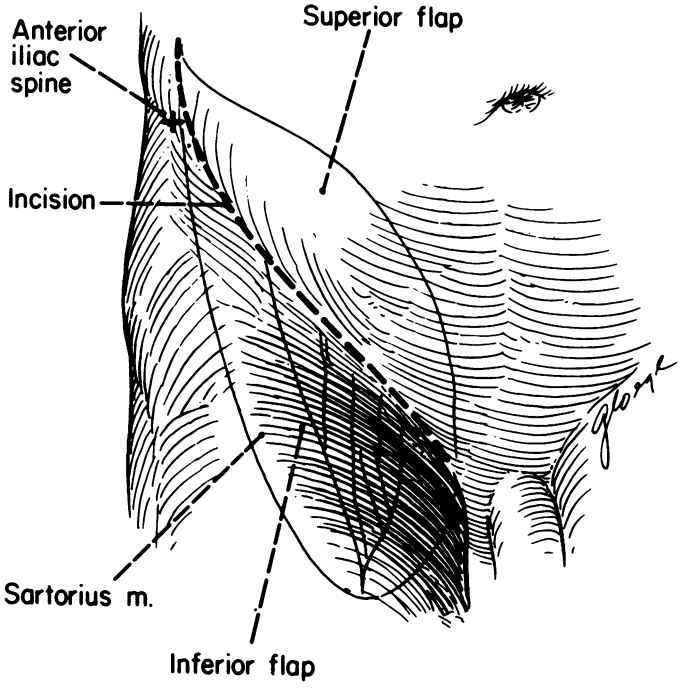

FIG. 7. The standard location of the skin incision is indicated. The area of dissection and the extent of the flap elevation above and below the inguinal ligament is indicated.

tor lymph nodes are then dissected as a separate specimen from the inguinal node dissection. The inguinal ligament is not divided. The iliac-obturator specimen is labeled and forwarded to the pathologist and the muscles of the abdominal wall are closed. In all instances regardless of whether an iliac-obturator node dissection is performed, the sartorius muscle is detached from it's origin from the anterior superior iliac spine and sutured to the inguinal ligament over the femoral vessels. After this has been accomplished, suction catheters are inserted superiorly above, not through, the upper flap and carefully placed in the wound. The skin edges of the incision are then excised for a distance of one centimeter on either side of the entire length of the skin incision. The subcutaneous tissue is closed carefully with interrupted 4-0 white cotton and the skin is always closed with interrupted sutures. A bulky dressing is not applied but simply a light gauze. High pressure wall suction is not used but merely the *hemovac* container. Suction is maintained continuously until the catheters are removed postoperatively.

Preoperatively, the patient is instructed regarding the possibility of edema and in the early postoperative period, they wear the stocking that has been measured preoperatively. Upon discharge, the patients are instructed to wear the stocking in order to prevent the formation of edema, and to elevate their leg for ten to fifteen minutes at least six times a day and to sleep with the leg elevated. Many patients find that within several months of the surgical procedure that it is not necessary to wear the Jobst stocking and that elevation of the extremity once or twice a day suffices to control any edema.

Morbidity of Regional Node Dissections

Of the 294 lymph node dissections performed in 250 patients, 112 were inguinal lymph node dissections, 126 axillary and 56 were neck dissections. There was no mortality with any of these regional node dissections. The complication rate in axillary dissection and neck dissection was quite low. With the axillary dissections there was one instance of hematoma, five instances of seromas, three instances of cellulitis and none developed permanent arm edema. There was one partial seventh nerve palsy and two instances of partial wound slough and one instance of infection in the 56 neck dissections. The two sloughs occurred in patients who had primaries widely excised within the cervical area and the creation of rotation neck flaps to close the defect.

It is clear from these studies and from other reports that the morbidity and mortality from axillary and

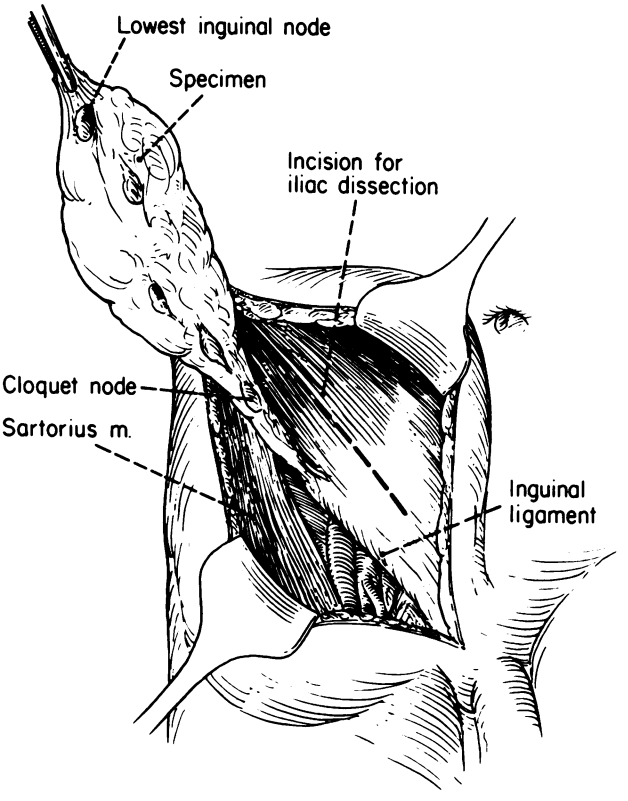

FIG. 8. The inguinal node specimen is about to be detached. Although not visible in this illustration, the dissection is carried down to the apex of the femoral triangle. The placement of the muscle splitting incision in the external oblique is indicated. This incision can be extended superiorly or inferiorly as needed.

TABLE 3. *Operative Complications of Groin Dissections* (108 Patients)*

	Minor	Major†
Seroma	7	1
Hematoma	0	2
Cellulitis	4	0
Abscess	0	2
Phlebitis	1	3
Slough	4 (Partial Thickness)	2 (Full Thickness)
Myocardial Infarction	0	2
Pulmonary Embolus	0	1
Total	16 (15%)	13 (12%)

* No operative mortality.
† Required hospitalization >9 days or required readmission.

cervical lymph node dissection is not a major deterrent to elective regional lymphadenectomy. However, the morbidity and mortality associated with inguinal lymph node dissection is significant and remains the major deterrent to elective node dissection. We have certainly had our share of complications with inguinal node dissections. However, we do feel that our 12% incidence of major, non fatal complications represents a considerable reduction in major complications, both in our previous experience and that reported in the literature.[6,12,15] Table 3 describes the minor and major complications that occurred in the 108 patients who underwent inguinal lymph node dissection. A major complication is defined as a complication which required hospitalization for greater than nine days or required readmission to the hospital. A minor complication is a complication which did not require initial hospitalization for longer than nine days or did not require readmission (Table 3).

There were seven minor seromas. These seromas were treated by repeated aspiration on an outpatient basis and were controlled in every instance within four weeks. There was one seroma which required readmission to the hospital for evacuation and reinsertion of suction catheters. There were two hematomas that occurred in the postoperative period which were considered major complications. These patients were returned to the operating room, the hematoma was evacuated and hemostasis was achieved. There were four instances of minor episodes of cellulitis which responded promptly to antibiotics. Two abscesses occurred, both of which required hospitalization for greater than nine days and both of which occurred in patients who had iliac node dissections. There was one minor episode of phlebitis and three episodes of phlebitis which required hospitalization for greater than nine days that were considered major complications. Four patients had a partial thickness of skin slough. These represented small superficial areas of partial skin necrosis which were easily cared for on an outpatient basis and did not require a prolonged hospitalization. In two instances, there was a major full thickness skin slough which required prolonged hospitalization and one of which required split thickness skin grafting for closure. Two patients had myocardial infarctions and there was one instance of a pulmonary embolism. Ten of the 13 major complications occurred in patients undergoing iliac-obturator node dissection. The duration of hospital stay for each of the regional lymph node dissections is indicated in Table 4. The average hospitalization for inguinal node dissections was 8.3 days with a range of five to 22 days. The average hospitalization for an axillary node dissection was 6.9 days with a range of three to 17 days and the range and the average duration hospitalization for a neck dissection was 6.4 days with a range from four to 15 days.

TABLE 4. *Hospital Stay*

	Range	Average
Inguinal	5–22	8.3
Axillary	3–17	6.9
Neck	4–15	6.4
Multiple	3–23	8.1

We were able to critically evaluate 84 of the 108 patients who underwent inguinal lymph node dissection for disability related to postoperative lymphedema. All 84 patients had thigh and calf measurements performed in both extremities. In addition, a questionnaire was filled out carefully questioning the patients regarding any limitation of activity. We considered significant edema to be present when the circumference of the operated extremity exceeded the circumference of the opposite extremity by two centimeters or more. There were 20 patients of the 84 evaluated in whom the circumference of the operated extremity was two centimeters or greater than the contralateral extremity (Table 5). However, in 11 of these 20 patients, the increase in circumference occurred only in the thigh. In nine of these 20 patients, there was an increase in the circumference of the calf of two centimeters or

TABLE 5. *Edema Following Groin Node Dissection (84 Patients Evaluated)*

Circumference		
>2.0 cm		20 (Thigh only—11 thigh and calf—9)
Activity Limitation		
Vigorous Only	10	
Affected Ability to Work	5	
Life Style Seriously Altered	3	

greater. Eighteen of the 84 patients had some degree of activity limitation. Ten of the 18 patients had only limitation of vigorous activity such as vigorous sports. Five of the 18 had some disability in their ability to perform their work. Only three patients felt that their life style was seriously altered by virtue of the operation. There was not a consistent correlation of severe activity limitation and lymphedema of the extremity.

While it is clear that a certain degree of morbidity can be expected in patients undergoing inguinal node dissection, the morbidity can be reduced if these technical considerations are carefully followed. The more severe limitation in activity and complications occur following iliac-obturator node dissections. Since it is well recognized that iliac-obturator node metastases in the absence of superficial inguinal node metastases is most unusual,[6] if the superficial inguinal nodes are carefully examined for metastatic disease and none is found, then the patient can be spared the considerable additional morbidity associated with the iliac-obturator node dissection.

Discussion

The introduction of clinical microstaging has provided a technique with which the clinician can more accurately predict prognosis as well as the presence or absence of regional lymph node metastases. Several recent studies indicate that with Clark Level IV and V lesions, there is a high incidence of regional lymph node metastases. The relationship between regional lymph node metastases and Clark's level of invasion observed in this study is consistent with these previous reports.[2,4,16] Level III melanomas greater than 0.76 mm in thickness and Level IV and Level V melanomas have a significant incidence of regional lymph node metastases (29–58%) and these patients have a high risk of recurrence. Three independent studies have indicated that lymph node dissection in these high risk primaries result in a statistically significant improvement in survival.[2,10,16] No advantage of elective lymph node dissection has been demonstrated for the low risk primaries. This new information along with the suggested improved survival in patients with occult node metastases compared to those with clinically positive nodes provides support for the concept that elective lymph node dissection may be therapeutic in patients with high risk primaries.[4,13] In addition to the potential therapeutic benefits of node dissections, valuable prognostic and staging information is obtained from elective node dissection. However, the significant morbidity associated with these dissections reported in the literature remains a deterrent, especially with groin dissections. In addition, the ambiguity of the lymphatic drainage of certain truncal melanomas also discourages elective dissections. Certainly in the modern era, the limited morbidity of axillary and neck dissections should no longer be considered prohibitive. However, the reported incidence of wound complications ranging between 30 and 40% and significant leg edema in up to 70% of patients undergoing radical groin dissection constitutes an unacceptable morbidity.[12,15] We believe that the number of patients subjected to this morbidity can be considerably reduced by preoperative clinical microstaging sparing those patients with low risk primaries the morbidity of regional lymph node dissection. In those patients with high risk primaries who require groin dissections, only those in whom the inguinal nodes contain metastases should be subjected to the morbidity of iliac-obturator node dissections. A significant proportion of the major complications following groin dissections occur when the iliac-obturator node dissection is added to the inguinal dissection. Ten of the 13 major complications that occurred in this series occurred in patients undergoing iliac-obturator node dissections. Since iliac-obturator metastases rarely occur when the inguinal nodes are histologically negative, it is unlikely that occult iliac-obturator metastases will be missed if the inguinal nodes are found to be negative on histological examination. It is for these reasons that we advocate careful frozen section examination of the inguinal nodes prior to proceeding with the iliac-obturator dissection.

Since survival in the presence of iliac-obturator node metastases is generally less than eight per cent,[6,14] it is likely that in most instances the iliac-obturator dissection is more a staging procedure than a therapeutic one. Therefore while the procedure provides important prognostic information and stages patients for surgical adjuvant therapy studies, it is imperative that this procedure only be performed when there is a high likelihood of pelvic nodal involvement.

We believe that the adherence to the techniques of groin dissection described herein will lead to a reduction in wound complications and late edema. If the principles described above are adhered to, the morbidity of elective groin dissection can be considerably reduced in comparison to previous reports. Radionucleotide scanning techniques for identifying drainage patterns for truncal melanomas can reduce the incidence of multiple lymph node dissections and we feel that the procedure has great promise.

At the present time, we recommend the following approach to patients with malignant melanoma. All patients with Clark Level III lesions which are greater than 0.76 mm in thickness, all Level IV, Level V and any lesion greater than one and one half millimeters in thickness should undergo wide excision of the primary and regional node dissection. When groin dissections are necessary, the iliac-obturator dissection should only be performed when metastases can be demonstrated in the inguinal nodes. Radioactive gold scanning

is a promising technique and we use it routinely in all truncal melanomas to assist in the selection of the appropriate area for lymphadenectomy.

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Discussion

Dr. John W. Raker (Boston, Massachusetts): This provocative paper has suggested some leads which may help to solve the vexing problem of the proper use of regional lymph node dissection in the therapy of malignant melanoma. Many of us agree that a reasonably aggressive approach is indicated.

There is one point in these data which intrigues me, and I shall confine my discussion to it. If I understood these numbers correctly, elective regional node dissections performed in patients with levels IV and V melanomas yielded metastatic nodes in something just under 60% of patients. This seems an astonishingly high figure to us. At the Massachusetts General Hospital, our corresponding figure is 18%. That is, 18% of elective node dissections performed in our patients with levels IV and V, superficial spreading and nodular melanomas, yielded positive nodes. Even if we add in all the therapeutic dissections, those done when nodes are clinically certainly positive, we still don't reach 60%.

Of these patients in our series with levels 4 and 5 melanomas, all node dissections, both therapeutic and elective, yielded positive nodes in 69 of 130 instances, or 54%. Since our over-all mortality figures seem to be comparable, it is difficult to explain this apparent discrepancy in clinical material. It is hard to believe that there could be such a striking difference in apparent mechanisms of metastasis in patients with melanoma seen on the West Coast, as opposed to the East. Perhaps the authors' Pathology Department searched more vigorously for metastases than ours does, or perhaps special techniques were used.

Finally, there may be differences in the criteria used for the definition of elective dissections, as opposed to therapeutic dissections. I hope Dr. Holmes can comment on this point.

Dr. Hiram C. Polk, Jr. (Louisville, Kentucky): This eloquently presented and carefully done study is a very significant extension of some work we presented to this Association in this same room six years ago. Indeed, Dr. Holmes and his associates have done a very careful job of speaking to both of the hypotheses we posed at that time: the definition of a high-risk group of people who might be benefited by the operation, which they have done very nicely, and the problem of reducing morbidity of a given operation, say, groin dissection, in order to make it more widely applicable. I think he's accomplished both of these ends in a very careful and, I think, clearly presented, way.

There is one question that he has acknowledged, but I would amplify for you. He is now able to identify a group that is at high risk of having occult nodal metastases. Will the nodal dissection *per se* change the course of the illness in those patients? Of course, a five- or ten-year follow-up will be necessary before we can answer that.

There's no question that by doing the operation only in those high risk patients who need it, and doing it with the kind of requisite care that has been demonstrated here, that this is a forward advance. Whether it will pay off in the five- or ten-year survival of these patients, of course, remains to be determined.

Dr. Alfred S. Ketcham (University of Miami, Florida): My prime reason for accepting an invitation to discuss this innovative paper from UCLA is related to the indication that they have developed a technique which may direct the surgeon toward a specific lymph node draining basin and this is so critical if one believes in the value of prophylactic node dissection. But I also take this opportunity to speak of another important aspect of melanoma understanding, for if it was possible Oliver Beahrs to be here today, I am sure he would remind you that the work of the American Joint Committee for Cancer Staging and Classification is finally coming to a completion, at least arriving at the point where we are now going to publish in one manual that staging information which has been accumulating during the past ten years of committee labor.

You will recall that the American Joint Committee is that group of individuals who have been appointed from their different colleges and are representative of the American College of Surgeons, Pathologists, the Radiologists, Medicine, along with representatives from the American Cancer Society and the National Cancer Institute.

Within the immediate future the American Joint Committee's Staging and Classification manual will be available along with "checklists" which will enable all of us, residents, practitioners or professors to list those criteria which appear to be most critical in establishing a clinical, a surgical, a pathological or a post mortum staging of disease.

Unfortunately we will always have published differences in remission rates, local recurrence incidences and metastatic potentials and survival rates between seemingly like diseases in patients who have undergone seemingly like therapy. But one aspect contributing to these differences can be essentially eliminated. To eliminate differences due to surgical technique or different degrees of surgical aggressiveness is quite impossible. And to avoid innate host variances of response to their tumor and their treatment is