Cutaneous melanoma: an audit of management timeliness against New Zealand guidelines

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ABSTRACT

AIM: The New Zealand Ministry of Health's "Faster Cancer Treatment" programme aims for timely care for patients with cancer, including melanoma. Melanoma care guidelines detail investigation and treatment timeliness standards. This audit assesses compliance with these.

METHOD: Patients admitted to Waikato Hospital for melanoma surgery during the year ending February 2016 were retrospectively identified. Time intervals between care events were calculated. Demographic, lesion, surgical and histopathological characteristics were analysed.

RESULTS: For patients referred with skin lesions suspicious for melanoma, referral to first treatment (Standard 2.1), referral to diagnostic skin biopsy (Standards 2.2, 2.3), biopsy histology report to first treatment (Standard 2.4), referral to first treatment (Standards 2.2, 2.3, 2.4, 4.4) and biopsy to first treatment (Standards 2.4, 4.4) compliance was 0%, 17.6%, 21.7%, 9.3% and 21.7%, respectively. For patients referred with biopsy-confirmed melanomas, referral to first treatment (Standards 2.2, 2.4) and skin biopsy to first treatment (Standards 2.2, 2.4, 4.4) compliance was 42.2% and 42.9%, respectively.

CONCLUSIONS: Compliance was low. Attention to logistical constraints in the department reviewed may improve this. Recommendation inconsistencies within and between suspicious-lesion and confirmed-diagnosis referral pathways suggest the investigation and treatment events selected and intervals mandated by the guidelines may usefully be reconsidered.

Cutaneous malignant melanoma is a significant public health problem in New Zealand.[1,2] There were 2,366 new cases in 2013, being the fourth most commonly diagnosed cancer during that year with 10.7% of new cancer registrations.[2] Although the cost of melanoma care, currently without immunological or specific pharmaceutical modalities, is low per case when compared with other cancers, it is still an important contributor to the total cost of cancer care in New Zealand (2.1% in 2010–2011).[3]

The New Zealand Ministry of Health's "Faster Cancer Treatment" programme aims to ensure timely clinical care for patients with cancer, including melanoma. By promoting nationally coordinated and consistent standards of service provision, the expectation is efficient, sustainable best-practice management of tumours, providing equitable assess and care across New Zealand.[4]

Ten clusters of standards for melanoma care are contained in the "Standards of Service Provision for Melanoma Patients in New Zealand – Provisional".[4] A cluster concerning "investigation, diagnosis and staging" includes a standard detailing timeliness of histopathological reporting on biopsy specimens of cutaneous lesions suspicious for melanoma (Table 1). Another cluster deals with "timely access to services" by patients (Table 1).

Using data from a New Zealand tertiary hospital, this paper presents an audit of timeliness of melanoma management by the Department of Plastic and Reconstructive Surgery, assesses compliance with New Zealand standards and examines possible influences on that compliance.

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Table 1: Standards of service provision for melanoma patients in New Zealand.[4]

Cluster	Clinical standard	
Timely access to services	Standard 2.1	Patients referred with a high suspicion of melanoma receive their first cancer treatment within 62 days of receipt of referral.
	Standard 2.2	Patients referred urgently with a biopsy-confirmed or high suspicion of melanoma (including locally recurrent and metastatic melanoma and excluding melanoma in-situ) have their first specialist assessment within 14 days of receipt of referral.
	Standard 2.3	Urgent diagnostic excision for lesions suspicious for melanoma occurs within 14 days of specialist assessment or image-based triage. Image-guided core or fine needle aspiration biopsy of suspected tumour occurs within 14 days of the request being received.
	Standard 2.4	Patients with a confirmed diagnosis of melanoma (including locally recurrent or metastatic melanoma and excluding melanoma in-situ) receive their first cancer treatment within 31 days of the decision to treat.
Investigation, diagnosis and staging	Standard 4.4	A histopathological diagnosis of melanoma is reported within five working days in 80 percent of cases, and all cases are reported in 10 working days.

Methods

Discharge coding and histopathology records were used to retrospectively identify all patients who were admitted to Waikato Hospital, Hamilton, for melanoma surgery during the year ending 16 February 2016. The dates of receipt of referrals to the Department of Plastic and Reconstructive Surgery, histopathological reports and diagnostic biopsies (suspicious skin lesions) and surgical treatments (wide local excision and complete regional lymph node dissection) were retrieved from histopathology and other hospital databases.

Demographic, referral, surgical and histopathological data were entered into PASW/SPSS Statistics 18.0 software (SPSS Inc, Chicago, IL), and analysis of time intervals between elements of care performed. Differences in categorical variables and means of two and three or more independent quantitative variables were assessed using chi square (or Fisher's exact/Mid-P test if any cell frequency was less than five), t-test and ANOVA, respectively. Significance was accepted at two-sided $p<0.05$.

The Health and Disability Ethics Committees of the New Zealand Ministry of Health do not require ethical approval of this low-risk observational activity.

Results

There were 143 unique patients admitted to Waikato Hospital for melanoma surgery during the year reviewed (Table 2).

A. Patients referred for skin lesion suspicious of melanoma, with diagnostic biopsy in hospital

Fifty-four patients were referred for a suspicious skin lesion which, on biopsy in the hospital, proved to be either in-situ or invasive melanoma. The referrers of these patients and the clinicians who performed the diagnostic biopsies must have considered these lesions to be "highly suspicious" of melanoma (Table 1), because of history, size and/or appearance.[4]

1. Standard 2.1

The service standard for patients with a skin lesion suspicious for melanoma is 62 days from receipt of referral to first treatment (Table 1). First treatment is not the initial excision biopsy (a procedure to secure a specimen to establish diagnosis and provide information [Breslow thickness] to determine definitive excision margin), but is wide local excision, or when this is not performed, completion lymph node dissection.

Of the 54 patients who were biopsied in hospital, eleven were excluded from

Table 2: Demographic, lesion and surgery characteristics of 143 patients admitted to Waikato Hospital for cutaneous melanoma surgery.

Ethnicity (N†=143)	European	N (%)	136 (95.1)
	Māori		2 (1.4)
	Other		5 (3.5)
Gender (N=143)	Male	N (%)	84 (58.7)
	Female		59 (41.3)
Age at initial skin biopsy (N=137)	Years	Mean (SD‡)	68.4 (12.9)
		Range	30.9–100.2
Initial skin lesion site (N=143)	Head/neck	N (%)	21 (14.7)
	Trunk		49 (34.3)
	Limb		73 (51.0)
Initial skin biopsy performed (N=143)	Hospital	N (%)	54 (37.8)
	Other location		89 (62.2)
Type of initial skin biopsy (N=143)	Excision	N (%)	140 (97.9)
	Punch		2 (1.4)
	Incision		1 (0.7)
Tumour stage (N=141)	In-situ	N (%)	4 (2.8)
	T1		57 (40.4)
	T2		28 (19.9)
	T3		32 (22.7)
	T4		20 (14.2)
Wide local excision (N=143)	Yes	N (%)	132 (92.3)
	No		11 (7.7)
Sentinel node biopsy (N=143)	Yes	N (%)	66 (46.2)
	No		77 (53.8)
Completion lymph node dissection (N=143)	Yes	N (%)	11 (7.7)
	No		132 (92.3)

†Number.
‡Standard deviation.

analysis. One patient had been the subject of ongoing surveillance since referral in January 2014, and did not have an excision biopsy until August 2015, followed by wide local excision in October (635 days after referral). Another two patients were biopsied by dermatologists before transfer to plastic surgeons. And a further eight patients did not go on to wide local excision or completion lymph node dissection for various reasons, including the presence of metastatic disease beyond the lymph system.

For the remaining 43 patients (Table 3), including one who did not have wide local excision but underwent completion lymph node dissection, the mean interval from referral-receipt to first treatment was 139.7 days (standard deviation [SD] 67.4 days), with a median of 114 days. Although the Ministry of Health's "Faster Cancer Treatment" programme currently benchmarks compliance with this standard at 85%, no patient received first treatment within 62 days (range 63–320 days).

Table 3: Timeliness of melanoma care and association with patient and tumour characteristics for patients referred for a skin lesion suspicious of melanoma, with diagnostic biopsy in hospital.

Characteristic		Standard									
		Standard 2.1: receipt of referral for suspicion of melanoma—wide local excision (or completion lymph node dissection if no wide local excision) treatment		Standards 2.2 and 2.3: receipt of referral for suspicion of melanoma—diagnostic biopsy in hospital		Standard 2.4: histology report of diagnostic biopsy in hospital—wide local excision (or completion lymph node dissection if no wide local excision) treatment		Standards 2.2, 2.3, 2.4 and 4.4: receipt of referral for suspicion of melanoma— wide local excision (or completion lymph node dissection if no wide local excision) treatment		Standards 2.4 and 4.4: diagnostic biopsy in hospital—wide local excision (or completion lymph node dissection if no wide local excision) treatment	
		≤62 days N[†]=0 (0%)	>62 days N=43 (100%)	≤28 days N=9 (17.6%)	>28 days N=42 (82.4%)	≤31 days N=10 (21.7%)	>31 days N=36 (78.3%)	≤73 days N=4 (9.3%)	>73 days N=39 (90.7%)	≤45 days N=10 (21.7%)	>45 days N=36 (78.3%)
Age (years)	Mean (SD[‡])	-	67.4 (14.2)	65.9 (11.7)	69.4 (14.4)	62.5 (13.3)	69.1 (13.9)	62.5 (27.7)	67.9 (12.7)	67.9 (17.7)	67.6 (13.0)
	P-value	-		0.5		0.2		0.5		0.9	
Site of primary lesion (N)	Head/neck	-	6	1	6	0	7	2	4	1	6
	Trunk	-	16	1	17	5	12	1	15	4	13
	Limb	-	21	7	19	5	17	1	20	5	17
	P-value	-		0.2		0.4		0.1		1.0	
Initial skin biopsy horizontal clearance (mm)	Mean (SD)	-	4.1 (2.6)	-	-	3.0 (1.3)	4.2 (2.9)	4.9 (0.3)	4.0 (2.7)	3.6 (1.7)	4.0 (2.8)
	P-value	-		-		0.2		0.5		0.7	
Initial skin biopsy horizontal clearance threshold 2.0mm (N)[4]	≤2.0mm	-	11	-	-	4	9	0	11	3	10
	>2.0mm	-	32	-	-	6	27	4	28	7	26
	P-value	-		-		0.4		0.3		0.9	
Initial skin biopsy deep clearance (mm)	Mean (SD)	-	6.4 (2.5)	-	-	5.9 (2.6)	6.6 (2.5)	6.0 (3.4)	6.4 (2.4)	5.8 (3.1)	6.6 (2.3)
	P-value	-		-		0.4		0.7		0.4	
Breslow thickness (mm)	Mean (SD)	-	1.8 (1.6)	-	-	1.9 (1.2)	1.8 (1.7)	1.8 (1.6)	1.8 (1.6)	2.0 (1.4)	1.8 (1.7)
	P-value	-		-		1.0		0.9		0.7	
Clark's level of invasion (N)	II	-	10	-	-	2	9	0	10	1	10
	III	-	18	-	-	3	16	2	16	4	15
	IV	-	14	-	-	5	10	2	12	5	10
	V	-	1	-	-	0	1	0	1	0	1
	P-value	-		-		0.6		0.7		0.5	
Presence of primary satellite lesion (N)	Yes	-	1	-	-	1	0	0	1	1	0
	No	-	42	-	-	9	36	4	38	9	36
	P-value	-		-		0.2		0.9		0.2	
Presence of primary in-transit lesion (N)	Yes	-	2	-	-	0	2	0	2	0	2
	No	-	41	-	-	10	34	4	37	10	34
	P-value	-		-		0.6		0.8		0.6	
Meets criterion for consideration of sentinel node biopsy (N)[4]	Yes (Stage ≥T1b)	-	33	-	-	8	27	3	30	8	27
	No (Stage T1a)	-	10	-	-	2	9	1	9	2	9
	P-value	-		-		0.8		0.9		0.8	

[†]Number.
[‡]Standard deviation.

2. Standards 2.2 and 2.3

Patients referred urgently with a high suspicion of melanoma should have their first specialist assessment within 14 days of receipt of referral (Standard 2.2; Table 1). Then, urgent diagnostic excision of these lesions should occur within 14 days of that specialist assessment (Standard 2.3; Table 1). The interval from referral-receipt to cutaneous biopsy in hospital should therefore be ≤28 days.

Of the 54 patients referred who had cutaneous melanoma diagnosed by biopsy performed in hospital, one had been under long-term surveillance by the plastics department, and two were biopsied by dermatologists before referral to plastics. These three patients were excluded from analysis.

For the remaining 51 patients (Table 3), the mean interval from referral-receipt to skin biopsy was 69.2 days (SD 56.2 days; range 0–287 days), with a median of 51 days. Nine (17.6%) patients had biopsy within 28 days of referral.

Fifteen (29.4%) and 13 (25.5%) patients were referred during the October-December and January-March quarters, respectively, with seven (13.7%) during December. There was no difference (p=0.8) in month of referral for those biopsied ≤28 or >28 days from referral.

3. Standard 2.4

For patients who have cutaneous biopsy in the hospital, if it is assumed that a melanoma diagnosis for a skin biopsy would immediately trigger a booking for wide local excision treatment (or completion lymph node dissection if no wide local excision), then first cancer treatment should occur within 31 days of the histopathology report (Table 1).

Of the 54 patients who had skin melanoma diagnosed by a biopsy performed in hospital, eight did not proceed to wide local excision or completion lymph node dissection, and were excluded from analysis.

For the remaining 46 patients (Table 3), including one who did not have wide local excision but underwent completion lymph node dissection, the mean interval from histopathology report to first treatment was 53.3 days (SD 36.5 days), with a median of 43 days and range 8–223 days. Ten patients (21.7%) had first cancer treatment within 31 days of reporting of skin biopsy histopathology.

4. Standards 2.2, 2.3, 2.4 and 4.4

From referral for a suspicious skin lesion, through specialist assessment (Standard 2.2; Table 1), biopsy (Standard 2.3; Table 1) and histopathology reporting (Standard 4.4; Table 1), without any delay on decision to proceed to wide local excision, first treatment (Standard 2.4; Table 1) should occur ≤73 days.

Although this timeframe is inconsistent with that recommended in Standard 2.1 (Table 1), if it is accepted, four (9.3%) of the eligible 43 patients received timely treatment (Table 3).

5. Standards 2.4 and 4.4

For patients who have cutaneous biopsy in the hospital, a melanoma diagnosis should be confirmed within 14 days (being the 10 working days stipulated by Standard 4.4; Table 1). If this immediately activates a booking for wide local excision treatment, then first cancer treatment within 31 days of the decision to treat (Standard 2.4; Table 1) should occur ≤45 days of the diagnostic biopsy.

For the 54 patients who had skin biopsy in hospital, the mean interval from biopsy to histopathological report was 14.9 days (SD 9.5 days; range 2–46 days). The 25, 50 and 75 percentiles were 8.0, 14.0 and 18.3 days, respectively.

Of these patients, 46 had subsequent wide local excision or completion lymph node dissection (Table 3). No patient had melanoma in-situ. The mean interval from biopsy to first treatment was 68.1 days (SD 36.4 days; range 27–238 days), with a median of 61 days. Ten (21.7%) patients had first treatment within 45 days.

B. Patients who had diagnostic biopsy outside hospital, with referral for confirmed cutaneous melanoma

1. Standards 2.2 and 2.4

Within 14 days of receipt of referral, patients with a biopsy-confirmed melanoma (including locally recurrent and metastatic melanoma, but excluding melanoma in-situ) should have their first specialist

Table 4: Timeliness of melanoma care and association with patient and tumour characteristics for patients who had diagnostic biopsy of a skin lesion outside hospital, with referral for confirmed melanoma.

Characteristic		Standard			
		Standards 2.2 and 2.4: referral of confirmed melanoma—wide local excision (or completion lymph node dissection if no wide local excision) treatment		Standards 2.2, 2.4 and 4.4: diagnostic biopsy outside hospital—wide local excision (or completion lymph node dissection if no wide local excision) treatment	
		≤45 days N[†]=35 (42.2%)	>45 days N=48 (57.8%)	≤59 days N=33 (42.9%)	>59 days N=44 (57.1%)
Age (years)	Mean (SD[‡])	66.6 (14.6)	69.0 (11.8)	67.9 (10.7)	68.0 (14.3)
	P-value	0.4		1.0	
Site of primary lesion (N)	Head/neck	7	5	3	8
	Trunk	10	18	12	16
	Limb	18	25	18	20
	P-value	0.4		0.5	
Initial skin biopsy horizontal clearance[#^] (mm)	Mean (SD)	2.5 (1.7)	3.1 (1.8)	2.8 (2.0)	2.9 (1.7)
	P-value	0.2		0.7	
Initial skin biopsy horizontal clearance threshold 2.0mm[#^] (N)[4]	≤2.0mm	9	11	9	11
	>2.0mm	19	29	19	28
	P-value	0.7		0.7	
Initial skin biopsy deep clearance[#^] (mm)	Mean (SD)	2.8 (2.0)	4.8 (2.7)	3.5 (2.6)	4.3 (2.7)
	P-value	0.001		0.2	
Breslow thickness[#^] (mm)	Mean (SD)	2.4 (2.1)	2.0 (1.7)	2.6 (2.4)	1.8 (1.4)
	P-value	0.3		0.08	
Clark's level of invasion[#^] (N)	II	2	8	4	5
	III	10	13	7	16
	IV	10	20	12	15
	V	3	0	2	1
	P-value	0.08		0.6	
Presence of primary satellite lesion[#^] (N)	Yes	1	0	1	0
	No	26	39	25	38
	P-value	0.4		0.4	
Presence of primary in-transit lesion[#^] (N)	Yes	0	0	0	0
	No	26	39	25	38
	P-value	-		-	
Meets criterion for consideration of sentinel node biopsy[#^] (N)[4]	Yes (Stage ≥T1b)	28	34	23	34
	No (Stage T1a)	5	13	9	8
	P-value	0.2		0.4	

[†]Number.
[‡]Standard deviation.
[#]Data incomplete for Standards 2.2 and 2.4 cut at 45 days: initial skin biopsy horizontal clearance (N=68), initial skin biopsy horizontal clearance threshold 2.0mm (N=68), initial skin biopsy deep clearance (N=68), Breslow thickness (N=82), Clark's level of invasion (N=66), presence of primary satellite lesion (N=66), presence of primary in-transit lesion (N=65) and meets criterion for consideration of sentinel node biopsy (N=80).
^Data incomplete for Standards 2.2, 2.4 and 4.4 cut at 59 days: initial skin biopsy horizontal clearance (N=67), initial skin biopsy horizontal clearance threshold 2.0mm (N=67), initial skin biopsy deep clearance (N=67), Breslow thickness (N=76), Clark's level of invasion (N=62), presence of primary satellite lesion (N=64), presence of primary in-transit lesion (N=63) and meets criterion for consideration of sentinel node biopsy (N=74).

assessment (Standard 2.2; Table 1), at which a decision to treat will be made. Their first cancer treatment should follow within 31 days (Standard 2.4; Table 1), being ≤45 days since referral.

Of the 89 patients who were biopsied outside the hospital, three had melanoma in-situ, two did not have wide local excision or completion lymph node dissection, and one had been the subject of long-term surveillance before treatment (581 days after referral). These six patients were excluded from analysis.

For the remaining 83 patients (Table 4), the mean interval from referral-receipt to first treatment was 73.0 days (SD 57.3 days; range 16–282 days), with a median of 54 days. Thirty-five (42.2%) patients underwent wide lesion excision within 45 days.

Thirty (36.1%) and 20 (24.1%) patients were referred during the October-December and January-March quarters, respectively, with 13 (15.7%) during each of March and November. There was no difference (p=0.6) in month of referral for those first treated ≤45 or >45 days from referral.

2. Standards 2.2, 2.4 and 4.4

Patients biopsied outside hospital should have a histopathological diagnosis within 14 days (Standard 4.4; Table 1), and expect that this would generate an electronic referral.[4] The referral would be received by the hospital on the same day as the histopathological report was issued. Then, with a specialist appointment and decision to treat within 14 days (Standard 2.2; Table 1), first treatment should occur within a further 31 days (Standard 2.4; Table 1). Therefore, biopsy to wide local excision should be within 59 days.

Date of biopsy was unknown for six of the 89 patients who were biopsied outside the hospital. Three patients had melanoma in-situ and another two did not have wide local excision or completion lymph node dissection. One patient had been the subject of long-term surveillance before treatment (685 days after biopsy). These 12 patients were excluded from analysis.

For the remaining 77 patients (Table 4), the mean interval from skin biopsy to first treatment was 69.5 days (SD 34.7 days; range 5–241 days), with a median of 63 days. Thirty-three (42.9%) patients underwent wide lesion excision within 59 days.

Discussion

This practice audit evaluated the timeliness of melanoma management for patients referred to a New Zealand tertiary hospital plastic surgery department, and compared this with investigation and treatment times suggested by New Zealand guidelines. We found that compliance with recommended time intervals was poor for patients referred with skin lesions suspicious for melanoma (Table 3): from referral to first treatment (Standard 2.1), compliance was 0%; from referral to diagnostic skin biopsy (Standards 2.2 and 2.3 combined), compliance was 17.6%; from histology report of diagnostic skin biopsy to first treatment (Standard 2.4), compliance was 21.7%; from referral to first treatment (Standards 2.2, 2.3, 2.4 and 4.4 combined), compliance was 9.3%; and, from skin biopsy to first treatment (Standards 2.4 and 4.4 combined), compliance was 21.7%. Patients referred with biopsy-confirmed cutaneous melanomas received more timely intervention, but compliance was still low (Table 4): from referral to first treatment (Standards 2.2 and 2.4 combined), compliance was 42.2%; and, from skin biopsy to first treatment (Standards 2.2, 2.4 and 4.4 combined), compliance was 42.9%.

Demographic (age), lesion (site), surgical (horizontal and deep skin biopsy specimen margins, tumour criterion for consideration of sentinel node biopsy) and histopathological (Breslow thickness, Clark's level of invasion, satellite and in-transit lesions) characteristics of patients and their melanomas that may influence timeliness of interventions were examined. For patients referred with skin lesions suspicious for melanoma, the distribution of these characteristics across patients managed within and outside guideline times was such that no characteristic was likely to have influenced management (Table 3). The same is likely true for patients referred with biopsy-confirmed melanomas (Table 4), although greater skin specimen deep clearance margin was associated with waiting longer from referral to first treatment (p=0.001).

The determinants of timeliness of care are therefore likely to be non-clinical. Although there was some seasonal variation in referrals, with a slight preponderance over the reduced-service months of summer,

no association of timing of referral with compliance-failure was noted. However, administrative and ongoing systemic logistical constraints such as staff shortages may well offer explanation for much of the failure to comply. More rapid histopathological reporting of skin biopsy specimens would also improve timeliness of care for those biopsied in the hospital.

There are internal inconsistencies generated by the timeliness standards. For example, for patients referred with skin lesions suspicious for melanoma, Standard 2.1 suggests from receipt of referral to first treatment should not exceed 62 days (Table 1). However, applying Standards 2.2, 2.3, 2.4 and 4.4 gives up to 73 days for this to occur (Table 1), which raises the compliance rate from 0% to 9.3% (Table 3). So, because such differences likely have little or no effect on patient mortality or morbidity, perhaps with the exception of mental health, the appropriateness of time intervals specified could be reviewed, and recommendation consistency established.

Despite the recommendations aiming for equity in care,[4] there are expectation inconsistencies for patients, depending on their pathway of investigation and treatment. For example, for patients referred with a suspicious lesion, diagnostic skin biopsy to first treatment (Table 1: Standards 2.4 and 4.4 combined) should be completed within 45 days (Table 3). However, for patients referred with biopsy-confirmed melanoma, diagnostic skin biopsy to treatment is afforded 59 days (Tables 1 and 5: Standards 2.2, 2.4 and 4.4 combined). Allowable intervals between events should be equal for, and independent of, different pathways of care if equity is to be attained.

This audit revealed poor compliance with timeliness recommendations. However, it is unlikely, as a group, that the patients for whom management was audited suffered any consequent deleterious effects. This, with the timing inconsistencies within and between the suspicious-lesion and confirmed-diagnosis referral pathways, suggest the investigation and treatment events selected and intervals mandated between may usefully be reconsidered. Then, given the apparent lack of influence of demographic, lesion, surgical and histopathological factors on timeliness, perhaps attention to logistical constraints in the surgical department reviewed may improve compliance and care.

Competing interests:
Nil.

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