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Biopsy for malignant melanoma – are we following the guidelines?

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ABSTRACT

INTRODUCTION Guidelines for suspected malignant melanoma recommend a prompt, full-thickness excision biopsy allowing diagnosis and assessment of the Breslow thickness. Incisional biopsy is acceptable only for extensive facial lentigo maligna or acral melanoma. Punch, shave and other types of biopsies do not allow pathological staging and are, therefore, not recommended.

PATIENTS AND METHODS A total of 100 referrals for histology-proven malignant melanoma were assessed retrospectively over a 1-year period (2005).

RESULTS Of the 100 patients included in this study, 52 were male and 48 female. Ages ranged from 18–91 years, with a mean of 63 years. Origin of referrals was: dermatology, 63%; general practitioner (GP), 33%; and other sources in the remaining 4% of cases. Malignant melanoma was suspected in 84% and a benign lesion in remaining 16% of patients. However, only 56% of the patients were seen in our unit within 14 days of the referral as per the 2-week cancer rule. In these 100 patients, various types of biopsy were performed: 50 were referred without biopsy, 17 excision, 20 punch, 3 shave, 1 curettage, and 1 incisional biopsy. The type of biopsy was not recorded in the remaining 3 patients. Of the GP group, 48% were referred without biopsy, 12% had excision and 3% had incisional biopsies. The remaining 30% were punch, shave biopsies, and even curettage, inconsistent with current recommendations. Of the dermatology group, 54% were referred without biopsy, 21% underwent excision biopsy and 22% were punch biopsies. In total, 20 punch biopsies were performed, of which 7 were for lesions on the face ranging from 1.7–25 mm in size. The remaining punch biopsies were for lesions on the trunk or limbs (4–50 mm). Of the 20 punch biopsies performed, Breslow thickness was available in only 9 cases (45%). Sixteen of the punch biopsies were done when malignant melanoma was suspected and lesion otherwise was suitable for excisional biopsy. In the GP group, 3 shave biopsies and 1 curettage were performed, of which malignant melanoma was clinically suspected in one patient. The Breslow thickness was not obtained from any of the shave biopsies or curettage cases. Of the 17 excision biopsies performed, 3 were incompletely excised (2 by dermatology and 1 by GP).

CONCLUSIONS A significant proportion of biopsies are inappropriate and inconsistent with the malignant melanoma guidelines. Punch biopsies are performed even when malignant melanoma is clinically suspected and excision biopsy is feasible. Only a small proportion of patients appear to be seen on an urgent basis within 14 days of referral. Such factors can lead to a delay in diagnosis, subsequent definitive treatment and adversely affect patient outcome. This study identifies a need to provide feedback and education to sources of malignant melanoma referrals.

KEYWORDS

Malignant melanoma – Biopsy – Audit – Guidelines

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The incidence of skin malignancy is increasing world-wide.[1] Although malignant melanoma accounts for only 4% of all skin cancers, it is responsible for 80% of deaths from skin cancer.[2]

A correctly performed biopsy is a crucial initial step in the management of malignant melanoma.[3] Excision biopsy is the recommended method for suspected malignant melanoma as it enables diagnosis, staging of the tumour, and determines future investigation, treatment, and prognosis.[3,4] Incision biopsy is only acceptable for large lesions in cosmetically sensitive areas (*e.g.* on the face or in acral melanoma).[4] Incision biopsy may also be warranted in an area of a recent change within a giant congenital naevus.[4] Other methods of biopsy, such as punch and shave, are not recommended as they do not allow complete histological staging.[4]

Patients and Methods

We performed a retrospective study of 100 patients with histology-proven malignant melanoma, referred to our plastic surgery unit for treatment in the year 2005. Referral letters were analysed to assess how initial diagnosis and biopsy for the malignant melanoma compared to current guidelines. Results of the performed biopsies were also analysed for adequacy of histological assessment.

Results

Of the 100 patients included in this study, 52 were male and 48 female. Ages ranged from 18 to 91 years with a mean of 63 years. The referrals to our unit originated from dermatology in 63%, general practitioners in 33%, and other sources in the remaining 4% (general surgery and orthopaedics).

Sizes of the lesions ranged from 2–70 mm (mean, 15 mm), located primarily in the face or scalp (32%) and lower limb (30%), with the remainder on the trunk (24%) or upper limb (13%). Increasing size and pigmentation were the most common presenting symptoms, being noted in 73% of our patients. Bleeding was present in 14% of cases and itching in 13%. Four percent of our patients had a history of previous malignant melanoma.

Of the 100 lesions, 84 were clinically suspected of being a malignant melanoma; and the remaining 16 were thought to be benign. Clinically, malignant melanoma was suspected in 92% of patients referred by dermatology (58 out of the 63), compared to 70% of the primary care patients (23 out of 33). Although, malignant melanoma was suspected in 84 of the patients, only 56% of these were seen within 14 days of the referral as per the 2-week cancer rule.

In our 100 patients, 50 were referred without biopsy and of the remainder there were 17 excisional, 20 punch, 3 shave, and 1 incisional biopsies and 1 curettage. The type of biopsy was not recorded in the remaining 3 patients. Of the patients referred by their GP (33 patients), 48% were referred without any biopsy, 12% had excision and 3% had incision biopsies. The remainder were punch (18%), shave (9%), and curettage (3%), inconsistent with current malignant melanoma recommendations. Of the dermatology group (63 patients), 54% were referred without biopsy, 21% underwent excision biopsy and 22% were punch biopsies. In 3% of the dermatology group and 9% of the GP group, the type of biopsy was not documented in the referral letter or the histology report. The histology result of original biopsy was not sent in 9% of the patients, with the referral.

Table 1 Types of biopsy performed in the 100 patients

Biopsy type	Total	GP	Dermatology
Punch	20	6	14
Shave	3	3	–
Excision	17	4	13
Incision	1	1	–
Curettage	1	1	–
No biopsy	50	16	34
Not recorded	5	3	2

In the 100 patients, 20 punch biopsies were performed by GPs (6 patients) and dermatologists (14 patients). Seven of the punch biopsies were for pigmented lesions on the face (lesion diameter 1.7–25 mm). The remaining punch biopsies were for lesions on the trunk, upper or lower limbs (lesion diameter, 4–50 mm). Sixteen of the 20 punch biopsies (11 by dermatology and 5 by GP) were done even when malignant melanoma was suspected and lesions were small or in areas, such as the limbs and trunk, where excisional biopsy and direct closure was possible. Of the 20 punch biopsies performed, Breslow thickness was available in only 9 cases (45%).

In the GP group, 3 shave biopsies were performed, of which malignant melanoma was clinically suspected in one patient. The Breslow thickness was not obtained from any of the shave biopsies or curettages. Of the 17 excision biopsies performed, 3 were incompletely excised (2 by dermatology and 1 by GP).

Discussion

Excision biopsy is the recommended method of diagnosing lesions suspected of being a malignant melanoma.[3,5] The initial biopsy should be performed with a minimum lateral clearance of 2 mm and a cuff of subcutaneous fat deep to the tumour.[6] This provides the pathologist with the maximum opportunity to diagnose a malignant melanoma in a given biopsy sample, as well as the depth of invasion, *i.e.* Breslow thickness.[3,7] Breslow thickness, the most powerful prognostic parameter, subsequently provides a guide to the margin of clearance required for delayed wide excision and need for adjuvant therapy.[3,6] Pathologists must also be able evaluate macroscopic features of the tumour such as the breadth, symmetry, and circumscription, and microscopic features such as ulceration, microsatellitosis, angiolymphatic invasion, and mitotic invasion, as they can also impact on management and prognosis (Table 1).[3,8] It is, therefore, crucial that all practitioners excising pigmented lesions ensure that an adequate margin of clearance is achieved at the time of initial excision biopsy.[6]

To assess the thickness of a neoplasm, the base must be visualised; this can be done with confidence only if excision is done with a scalpel and is complete.[5] An incisional biopsy is considered suboptimal because it does not provide the entire lesion for analysis.[9] It may be considered when the lesion is too large for complete excision, when the suspicion for melanoma is low, if the lesion is situated in a cosmetically sensitive

Table 2 Histological criteria for the diagnosis of malignant melanoma[8,10]

Architectural pattern
- Asymmetry
- Poor circumscription
- Failure of maturation of neoplastic cells with progressive depth
- Cells arranged in nests that vary in size, have irregular shapes, with tendency to confluence
- Melanocytes present throughout the epidermis (pagetoid spread)
- Melanocytes within epithelium of adenexal structures

Cytological features
- Cells with cytological features of melanocytes (*i.e.* melanin granules in cytoplasm)
- Cytological atypia
- Mitotic figures
- Necrosis of neoplastic cells

location, or when it is impractical to perform an excisional biopsy.[9] A superficial shave or curettage technique should not be used in the diagnosis of a suspected melanoma because it does not provide adequate tissue for either pathological analysis or the determination of depth of invasion.[9] Since melanoma prognostication depends upon the depth of invasion, the removal of a superficial skin lesion with punch biopsy, shave biopsy, or curettage is not recommended.[9]

Several studies have examined biopsy techniques for clinically suspected malignant melanoma. Witheiler and Cockerell[10] reported that 31 out of 503 melanomas had an inadequate biopsy technique where the diagnosis was compromised. Approximately a third (10) of the 31 lesions were not diagnosed as malignant melanoma on histology initially and were only detected with a second biopsy (Table 2). Of these, 5 were shave biopsies and the remaining five were punch biopsies (3 mm or less). Only 33% of punch biopsies were adequate for assessment and diagnosis (0% of the 2–3 mm, 25% of the 4 mm and 84% of the 5 mm or greater). Most of the deep shave biopsies performed were typically 5 mm in breadth and 4 mm deep extending into the reticular dermis. Of the deep shaves, 87% were adequate for complete and accurate assessment. The majority of curettages were not intact, rendering histological assessment impossible.[10] Macy-Roberts and Ackerman[8] reviewed biopsy methods of 143 clinically suspected malignant melanoma and found that 59% had excision, 23% had shave, and 17% had punch biopsies. The Breslow thickness could not be measured in 6 of 25 punch specimens (24%) and 14 of 33 shaved specimens (42%) as the tissue was of inadequate depth.[8] Pariser *et al.*,[5] in their study of 189 punch biopsies and 47 shave biopsies, reported that the diagnosis of malignant melanoma was uncertain in 47% and 40% of cases, respectively. The authors of these studies recommended complete removal of all lesions clinically thought to be malignant melanoma if size and location permitted. In our group of patients, overall, there were 17 excision biopsies, 1 incision and 20 punch biopsies. The dermatologists performed more punch biopsies but GPs performed more shave biopsies and curettage. GPs used excision biopsy less frequently than dermatologists in our study (12% compared to 21%). Punch biopsies (16 of the 20) were performed even when a melanoma was suspected and excision biopsy with direct closure was possible. A Breslow thickness was available in only 45% of the 20 punch biopsies, and none of the shave biopsies or curettages. Our study confirms that histological staging is inadequate when such inappropriate techniques are used.

In our study, only one incision biopsy was performed in comparison to the 20 punch biopsies, suggesting that physicians prefer punch biopsy as it is more accessible in the outpatient setting. Incision biopsy has been shown to have no adverse effect on outcome but can also compromise histological assessment including measurement of maximal tumour thickness. In a study of 1086 patients with stage 1 cutaneous malignant melanoma, 40% of the 96 who underwent incisional biopsy compared to 5% of the 292 excision biopsies were not fully accessible for histological assessment.[11] Incisional biopsy was associated with an unacceptably high rate of histological material that was not fully accessible. Incision biopsy may miss the thickest part of the tumour, causing difficulties in prognostication and determination of suitable excision margins. Care must be taken to ensure that the incision biopsies are only performed when excision is not possible and that the biopsy is of adequate width and appropriate depth to enable histological assessment. Lees and Briggs[11] suggested that family practitioners see fewer cases of skin cancers than hospital doctors, may be less confident in their diagnosis and, therefore, perform punch and incision biopsies when in doubt.

Surgical management of skin tumours by non-specialists may be suboptimal as a study comparing excision margins showed that complete excision of tumours was less common among GPs (13 of 15) than hospital surgeons (57 of 63).[12] Of the 17 excision biopsies performed in our 100 patients, three were incompletely excised (2 by dermatology and 1 by GP).

Skin biopsy specimens submitted by GPs have increased at least 4-fold since the new contract was introduced in the UK in 1990.[6] This contract allowed GPs to perform minor surgery, including skin biopsies for a fee. The National Institute for Health and Clinical Excellence (NICE) states that community doctors should only treat patients with low-risk BCC and precancerous skin lesions.[15] All doctors working in the community should only treat skin cancer patients if they are approved to be part of local hospital or specialist skin cancer MDT, and be

accountable to the lead skin cancer clinician.[14] However, contrary to these guidelines, our study shows that, of the 33 patients referred by GPs, 52% had either excision or some other form of biopsy. Concerns have been raised about the diagnostic accuracy and the completeness of excision of malignant lesions. The accurate diagnosis of skin malignancy is important to facilitate the urgent excision of malignant melanoma.[1] Diagnostic accuracy of skin malignancies excised by GPs has been found to be low in several studies. Herd *et al.*[6] looked at all malignant melanomas excised by GPs from 1982 to 1991 in southern Scotland. A total of 42 melanomas were excised, of which malignant melanoma was considered in the differential diagnosis in 31% of cases compared to 79% in referrals from hospital practitioners. Brown and Lawrence,[1] in a 6-month prospective study of skin cancers, reported 72 malignant melanoma cases of which 53 (74%) were correctly diagnosed by physicians overall. For skin cancers overall, the clinical diagnosis of dermatologists (89%) was more accurate than GPs (33%).[1] A study in Ireland showed that skin cancers were correctly diagnosed by only 22% of GPs compared to 87% by dermatologists.[15] In our study, index of suspicion was lower in the GP group (70% compared to 92%) but higher compared to the other studies. Although malignant melanoma was suspected in 84% of our patients, only 26% were seen according to the 2-week cancer rule. The lower diagnostic rate by GPs is most likely to be accounted for by the fact that they see malignant skin lesions less frequently than hospital practitioners such as dermatologists and plastic surgeons. Accurate assessment, diagnosis and prompt referral are essential to ensure optimum outcome for the patient.

Some authors have addressed the question of whether the initial mode of biopsy of malignant melanoma affected the final outcome (in terms of local recurrence and mortality). Herd *et al.*[6] reported that the time from excision biopsy to wider excision was no longer in the GP group (35 days) than the hospital group (31 days). No statistically significant difference was noted secondary to the different biopsy techniques in this series.

Conclusions

Malignant melanoma continues to affect a relatively young population and causes considerable mortality.[6] An excision biopsy allows 'complete assessment' of all histological criteria and should be performed whenever a malignant melanoma is clinically suspected unless it is in a cosmetically sensitive area and the wound can not be closed directly.[5,7] In large lesions, if total excision is not possible, a generous elliptical biopsy should be made in the area representing the most recent growth or change.[14] Punch and shave techniques often fail to provide entire margins of a lesion suspected of being a malignant melanoma to allow full assessment of crucial histological features and, therefore, should be avoided.[5,14]

A significant proportion of biopsies in our study are inappropriate and inconsistent with the malignant melanoma guidelines. Punch biopsies are being performed even when the lesion is clinically suspected of being a malignant melanoma and suitable for excision biopsy. Only a proportion of patients appear to be seen on an urgent basis within 14 days of referral. Such factors can lead to a delay in diagnosis, subsequent definitive treatment and can potentially adversely affect patient outcome. Further education is required to improve diagnostic accuracy of malignant melanoma among all practitioners, most notably GPs, and to provide minor surgery services to increase the frequency with which pigmented lesions are adequately excised.[6]

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