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Time delays and related factors in the diagnosis of cutaneous melanoma

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Abstract

Delay in melanoma diagnosis was investigated in a population-based sample of 130 patients. The median time elapsing from the first notice of the lesion to excision was 110.5 days. There was no linear correlation between total delay time and Breslow-thickness of the diagnosed melanomas ($P = 0.19$). Patient delay, defined as the time from first notice of a (change in a) lesion to the first observation by a physician, exceeded 2 months in half of all patients. Only 41% of the patients consulted a doctor because they were worried about the lesion. Colour change and itch were associated with a longer patient delay. There was no correlation with age, gender, socio-economic factors, localisation of the lesion and the person who first noticed the lesion. In one quarter of all patients, the time from first observation by a physician to excision of the lesion exceeded 2.5 months. This physician delay seemed to be attributed to misdiagnosis and to a delay occurring during referral.

Keywords: Melanoma; Diagnosis; Delay; Prevention

1. Introduction

Cutaneous melanoma (CM) constitutes approximately 11% of all skin cancers [1] but it is associated with a significantly higher morbidity and mortality than non-melanoma skin cancers [2]. CM is responsible for over 75% of skin cancer deaths [3].

The most important prognostic factor in local-stage disease is the Breslow-thickness [4]. This is the depth of the tumour measured microscopically and expressed in millimetres [5]. Estimated 10-year survival for CM with a Breslow-thickness $\leqslant 1$ mm ranges from 85 to 97% (depending on additional prognostic factors), while for CM with a Breslow-thickness $\geqslant 4$ mm survival rates drop to 14–59% [6]. Because of the limited curative treatment options for the most advanced disease stages [4], one of the most important steps to improve outcome seems to be early detection of the disease.

The aim of this study is to get a picture of the diagnostic pathway for CM in a Belgian community with a horizontal healthcare system, to quantify both patient and physician delay and to define factors related to it.

2. Patients and methods

From November 1996 until May 2000, a population-based melanoma registration programme was performed in the province East-Flanders (Belgium, 1 300 000 inhabitants). This registration included patients with a first manifestation of CM between 1 January 1995 and 31 December 1999 [7]. These patients were also asked to participate in a questionnaire dealing with topics of delay in diagnosis, risk factors, investigations and treatment, clinical and histological tumour characteristics and some demographic and socio-economic factors. Patients were informed by their treating physician with the help of an information leaflet designed by the research group. If they agreed to participate, a written consent was asked. The treating physician could choose to complete the questionnaire him/herself or to contact someone of the research group to complete the questionnaire together with the patient. It took approximately half an hour to complete the questionnaire.

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131 questionnaires were completed. This paper presents the results of the analysis of time delays in the diagnosis of CM. Forty per cent of the questionnaires were completed by a treating dermatologist or plastic surgeon, 60% were completed by one of the authors. The time between the diagnostic biopsy and the questionnaire ranged from less than 1 month to 52 months. A quarter of the patients were questioned within the first 3 months after the diagnostic biopsy, 50% completed the questionnaire within 13 months after diagnosis and 75% within 2 years after diagnosis.

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) 9.0. Descriptive statistics were used to calculate minima, maxima, means, medians and percentiles. The Spearman rho's coefficient was used to investigate a linear correlation between two continuous variables. The Chi-squared test was used to compare proportions. For calculation of the Chi square for linear trend Epi Info 6.0 was used. The Mann–Whitney U and Kruskal–Wallis test were used to test the equality of medians of two respectively multiple independent samples.

3. Results

Eighty-nine (68%) participants were females, 41 (31%) were males, in the rest gender was unknown. Their age ranged from 18 to 89 years, with a mean of 53 years. Nine CM were *in situ* (non-invasive) and the Breslow-thickness of the invasive tumours ranged from 0.25 to 11 mm, with a median of 1.2 mm. There were no gender differences in Breslow-thickness (Mann–Whitney, $P=0.20$).

The male/female ratio among participants was similar to that of the cases included in the melanoma registration programme for whom no questionnaire was available ($\chi^2=0.00$, $P=0.98$). There was a significant age difference between participants and non-participants in males (median age 47 versus 56 years, Mann–Whitney U test, $P=0.016$), but not in females. For both sexes, there were more individuals who had been seen at the university hospital dermatology department among participants compared with non-participants (34% versus 16% in males, $\chi^2=4.85$, $P=0.027$; 40% versus 20% in females, $\chi^2=12.26$, $p=0.0005$).

The time elapsing from the first notice of a new or changing lesion until excision was on average 301 days (median 110.5 days (Table 1). No correlation was found between the total delay time and Breslow-thickness of the tumours for the global dataset ($r=-0.13$, $P=0.19$), nor in the subset of superficial spreading melanoma ($r=-0.055$, $P=0.69$) and nodular melanoma ($r=0.018$, $P=0.94$).

The time elapsing from the moment a new or changing lesion was first noticed to the first observation by a physician constitutes a substantial part of the total delay time. In some cases, there is also a considerable delay between the first attention by a physician and the final excision of the lesion (Table 1). Factors influencing these time delays were analysed and are presented in Table 2.

One in 12 patients mentioned a prior trauma at the site where melanoma was diagnosed (Table 3). More than half of the patients reported the presence of a former mole or another pigmented lesion. Most patients first noticed changes in a pre-existing lesion or new lesions themselves. In 19%, a family member was the first to bring the change/lesion to attention and in 13% of the cases the lesion was coincidentally detected by a physician. There was no gender difference in the self-detection of lesions, but lesions in men were detected more frequently by family members (30% versus 14%, $\chi^2=4.31$, $P=0.038$), while in women CM tended to be more often detected by a physician (17% versus 5%, $\chi^2=3.32$, $P=0.069$). Of the 12 cases where the partner detected CM, in 10 cases this was in male patients. Lesions on less visual localisations (dorsal side of the neck, back, flexor side of the legs) were more often detected by family members than those localised on other sites (34% versus 15%, $\chi^2=5.58$, $P=0.02$). However, there was no difference in patient delay for lesions on these sites compared with lesions on more visual localisations such as head and neck, chest, abdomen,

Table 1
Different components of delay in melanoma diagnosis (in days)

	Mean	Median	25th percentile	75th percentile
Total delay = time from first notice of a new or changing lesion until excision (days)	301	110.5	36	366.5
Patient delay = time from first notice of a new or changing lesion to the first observation by a physician[a] (days)	169	61	15	192
Physician delay = time from first observation by a physician to the final excision of the lesion (days)	122	16	4	78
Referral delay = time from first observation by a physician to referral (days)	71	0	0	7
Ratio patient delay/physician delay	46	4	0.5	30

[a] In patients where the CM was coincidentally detected by a physician, patient delay was considered zero.

arms, extensor side of legs (Mann–Whitney, $P=0.44$). Patients of whom the lesions were coincidentally detected by a physician were significantly older (median 62 versus 51 years of age; Mann–Whitney, $P=0.01$). These coincidentally-detected CM were not associated with a thinner Breslow-thickness (Mann–Whitney, $P=0.40$).

Changes in size and colour, and elevation were the characteristics most frequently reported (Table 3). Fifty-three per cent of the patients reported the presence of more than one sign. The size of the lesion at the time of diagnosis ranged from 3 to 65 mm, with a median of 12 mm. Change in colour and itch were associated with a significantly longer patient delay (Table 2). CM for which patients reported a change in colour were significantly thinner (median 0.8 versus 1.58 mm; Mann–Whitney, $P=0.02$), while bleeding/ulceration was associated with a higher Breslow-thickness (median 2.5 versus 0.78 mm; Mann–Whitney, $P<0.001$).

Only 41% of the patients consulted a physician because of a certain anxiety about the lesion (Table 3). No specific signs were found to be associated with anxiety of the patients, but there was a significant difference in the number of reported lesional changes between worried and other patients (χ^2 for linear trend $=4.35$, $P=0.04$). There was no difference in Breslow-thickness (Mann–Whitney, $P=0.41$) nor in the size of the lesion (Mann-Whitney, $P=0.11$) between these two patient groups. Worried patients tended to have a longer patient delay, although the difference did not reach statistical significance (median 56.5 versus 24 days Mann–Whitney, $P=0.07$). General practitioners (GPs) and dermatologists were the physicians most frequently involved in the first medical advice about a lesion (55 and 33% of all cases, respectively) (Table 3). There were no differences in tumour thickness between patients presenting first to the GP versus the dermatologist (Mann–Whitney, $P=0.47$). Patients who were worried about their lesion more frequently consulted a dermatologist than those who were not anxious (44% versus 25%, $\chi^2=4.95$, $P=0.03$).

Of the physicians who first observed the lesion, 34 of the 43 dermatologists suspected the lesion immediately, compared with 38 of 72 GPs ($\chi^2=7.95$, $P=0.005$). There were significant differences in the time to excision if the physician took immediate action, referred the patient or took no immediate action (Table 2). Most referrals were done by GPs (77%) and the dermatologist was the physician most frequently referred to (83%). In half of the cases, the patient was referred on the day of the consultation (Table 1).

Seventy-seven per cent of the final diagnoses were made by a dermatologist. Half of these cases were referred, while the other half consulted the dermatologist on their own initiative. Time from the initial observation by a physician to excision of the lesion was significantly shorter in patients who went for a consultation on their own initiative, compared with patients who were referred (Mann–Whitney, $P=0.04$). There were, however, no significant differences in the total delay and Breslow-thickness of the tumours.

More than 1 in 5 patients reported a prior treatment of the lesion (Table 3). This was not associated with a longer total delay (Mann–Whitney, $P=0.56$) nor with a higher Breslow-thickness of the melanoma (Mann–Whitney, $P=0.26$).

Table 2
Factors affecting patient and physician delay

Patient delay	
Gender	$P>0.05$
Age	$P>0.05$
Marital status	$P>0.05$
Educational level	$P>0.05$
Employment status (at diagnosis)	$P>0.05$
Person who first paid attention	$P>0.05$
Localisation (less visual versus more visual)	$P>0.05$
Lesional characteristics:	
Colour change	$P<0.05$
Yes: median 64 days	
No: median 24 days	
Itch	$P<0.01$
Yes: median 137.5 days	
No: median 29 days	
Consultation reason: worry versus other	$P>0.05$
Physician delay	
Action undertaken by the first physician	$P<0.001$
No immediate action: median 119 days	
Immediate action (biopsy/referral): median 7 days median 1 day	
Immediate biopsy: median 1 day	($P<0.01$)
Immediate referral: median 16 days	

4. Discussion

This paper presents the results of a study investigating the contributing factors to the delay in diagnosis of melanoma in 130 patients in a Belgian province. To our knowledge, this is the first study trying to document this delay within the specific structure of the Belgian healthcare system. While most studies conducted in other countries included exclusively hospital-treated patients, patients in this study were recruited both from a university hospital setting and from normal routine practices, creating a more population-based sample.

Time between diagnosis and interview ranged from less than 1 month to 52 months. Half of the questionnaires were completed within 13 months after diagnosis. There may be inaccuracy of the data due to incomplete recall by the patient. Where possible, time intervals were checked with medical documents of the

Table 3
Part of the questionnaire with corresponding answers

• Was there a prior trauma at the site of the malignant lesion?		
○ don't know	11 (8%)	
○ yes	11 (8%)	
○ no	109 (83%)	
• Was there a mole or other lesion at the site where melanoma occurred?		
○ don't know	18 (14%)	
○ yes	79 (60%):	○ mole/pigmented lesion in 74 (57%) Since how long was this lesion present? - since birth in 11 - since childhood in 18 - since X months/years in 26 median 10 years, range 2 months - "as long as I can remember" in 8 - "don't remember" in 8 - missing in 3 ○ other in 5 (4%): pink spot, wart, tattoo, nodule, pustule
○ no	3 (26%)	
• Who was the first to pay attention to this changing/new lesion?		
○ the patient him/herself	83 (63%)	
○ a family member	26 (20%):	partner (12), brother/sister (6), son/daughter (4), father/mother (2), uncle/aunt/nephew/niece/grandparent (1), not further specified (1)
○ a physician	17 (13%):	GP (9), dermatologist (3), gynaecologist/occupational physician (3) surgeon/orthopaedist (1), internist (1)
○ other	5 (4%):	paramedics (2), friend (1), neighbour (1), colleague at work (1)
• Which changes/what was exactly noticed?		
○ increase in size	58 (44%)	
○ elevation	44 (34%)	
○ colour change	57 (44%)	
○ bleeding/ulceration	27 (21%)	
○ itch	24 (18%)	
○ pain/tenderness	6 (5%)	
○ other	29 (22%):	prominent mole, irregular lesion, recurrence, "strange lesion" bruise- or haematoma-like, inflammatory border, nodule
• Which physician first observed the lesion?		
○ general practitioner	72 (55%)	
○ dermatologist	43 (33%)	
○ internist	6 (5%)	
○ plastic surgeon	3 (2%)	
○ general surgeon/orthopaedist	2 (1%)	
○ gynaecologist/occupational physician	4 (3%)	
○ missing	1 (1%)	
• What was the reason for consulting this physician?		
○ other reason than the lesion	53 (40%)	
○ worry, anxiety about the lesion	39 (30%)	
○ advice of someone else	10 (8%)	
○ cosmetic aspect/trouble by the lesion	7 (5%)	
○ preventive skin examination	1 (1%)	
○ medical advice when accompaying a family member on consultation	1 (1%)	
○ combinations worry, anxiety involved in 13 (10%)	14 (11%)	
○ missing	6 (4%)	
• How was the lesion treated prior to the excision leading to the diagnosis of melanoma?		
○ no prior treatment	102 (78%)	
○ topical treatment	9 (7%)	
○ excision	5 (4%):	partial excision (2), complete excision (3) all histologically diagnosed as benign; one was considered malignant during revision
○ coagulation	3 (2%)	
○ cryotherapy	2 (2%)	
○ alternative treatment	2 (2%):	saliva (1), herbs (1)
○ partial nail extraction	1 (1%)	
○ systemic treatment	1 (1%)	
○ missing	6 (4%)	

GP, general practitioner.

patient. Analysis of the subset of patients questioned within one month after diagnosis did not influence the major conclusions.

Patients volunteering to participate may represent a selection from the total CM population. Older men and their specific behaviour in the diagnostic pathway of melanoma could be underrepresented in the present study. In contrast, patients seen at the melanoma clinic of a university hospital seem to be overrepresented among participants. Since most of these cases were referred by dermatologists, they may represent a selection of more serious conditions, although there was no significant difference in Breslow thickness for the cases seen at the melanoma clinic compared with the other participants (median 1.3 mm versus 0.8 mm, Mann–Whitney U test, $P=0.11$).

On average, approximately 10 months elapsed from the first notice of a (change in a) lesion to excision. In half of the cases, this total delay did not exceed 4 months. These results are very similar to those of an American study, where the total delay was on average 11.4 to 12.7 months, with 50% of the patients being treated within 4 months [8]. Patient delay, defined as the time from first notice of a (change in a) lesion to the first observation by a physician, is an important contributing factor to this total delay. Half of the patients waited more than 2 months before seeking medical advice and a quarter waited more than 6 months. These results seem quite comparable to other studies [9]. Although 61% of the patients were aware that a mole or other pigmented lesion had been present at the site of melanoma, only 41% of the patients consulted a physician because they were worried.

Change in colour and diameter were the changes most frequently reported by CM patients, as has been observed in other studies [8,10]. There were no clear differences in lesional characteristics reported by worried patients versus others, but worried patients mentioned more characteristics. Patients seemed to be insufficiently alarmed by colour change of a mole — as suggested by the longer delay times — although this characteristic was correlated with thinner tumours. In Australia, which is presumed to be an area of high awareness about melanoma (melanoma is the fourth most common cancer [11]), 11.9% of a random population sample of 1344 persons had experienced a changing mole in the previous 12 months [12]. Itch was the most commonly reported sign (6.8%). Only 57% of the patients consulted a doctor and only one third consulted within the recommended period (within 1 week after a continuous change over 4 weeks). No particular signs were found to be associated with seeking medical advice.

In the present study, patient delay was not influenced by age, gender or socio-economic factors. In the context of the Belgian health insurance system, the horizontal health care system and the plethora, it is unlikely that cost of care or long medical waiting lists have a major impact on this delay. Several studies demonstrated an association between patient delay and knowledge of the signs and treatment of melanoma [13–16]. In the study by Temoshok and colleagues, patients who minimalised the seriousness of their condition had a shorter patient delay [13].

Studies in Scotland, South Africa and France demonstrated that patient delay was the major contributing factor in delaying CM diagnosis [9,17,18]. In contrast, an American and German study reported a considerable physician delay as well [8,15]. In this study, physician delay, defined as the time from first observation by a health professional to excision of the lesion, was more than 2 weeks in half of the cases. In one quarter of the patients this time exceeded 2.5 months. This physician delay definitely involves a component of (initial) misdiagnosis. In 16 patients the first-contacted physician had taken no action and their delay was significantly longer. Of the 73 patients who were referred, referral was delayed in 33 (10 cases were referred 1–50 days after the first consultation, 15 after 50–100 days and 8 after 100–1001 days). We observed that clinical experience in diagnosing CM seems to be related to the frequency with which melanoma and other pigmented lesions are dealt with in everyday practice [19]. Because of the relatively low incidence of CM in Belgium — estimated one CM every 7 years of general practice [19] — it may be difficult for the non-dermatology medical profession to stay alert. Attention to melanoma during medical training and continuing education of the health professionals are needed if one wants to prevent the loss of valuable time once the patient finally gets to a doctor. This need is also illustrated by the fact that most patients present the lesion to their doctor during another medical occasion. Seventeen lesions were coincidentally detected, of which nine were detected by a GP. This occurred more often in older patients, possibly because they have more regular medical examinations. Several studies reported these physician-detected CM to be thinner [9,14,18,20]. Our data could not confirm this.

Even if referral took place immediately, time to excision was still longer compared with the situation where the physician took immediate action (median 16 days versus 1, $P<0.01$). This suggests that — in addition to misdiagnosis — there may be another factor affecting 'physician delay'. Another delay by the patient who is advised to take an appointment with a specialist could be one reason. Misunderstanding about the urgency of the problem between the referring physician and the physician referred to — which might again be due to lack of suspicion — could be a second explanation. However, we have no data that can further substantiate either of the two assumptions.

As in several other studies, no linear correlation was found between delay and the Breslow-thickness of the CM [8,9,15,21]. Although it seems logical to assume that a tumour will grow deeper with time once it started its invasive growth, there may not be a simple linear correlation between time and Breslow-thickness. The depth of the tumour is the result of both its growth velocity and the time to grow. Growth speed may vary among different tumours [22]. In a large French prospective multicentre study, a significant, but weak, correlation was found between the time for a patient to identify a lesion as suspicious and tumour thickness [18]. However, there was a negative correlation between Breslow-thickness and the time to seek medical advice in the thicker tumours, patient delay was surprisingly shorter. The authors concluded that these thick CM with a short delay represent rapidly growing tumours. They also suggested that the biological behaviour of the tumour may be the most important determining factor of tumour thickness in populations with sufficient melanoma awareness. A benefit from early detection may be most expected for slow-growing tumours. The public should be informed about the importance of a changing mole [23]. Since changes in slow-growing CM tend to establish gradually over a period of several months, it is possible that they might go unnoticed by the patient [8]. Therefore, in providing information to the public, more static signs of melanoma ('ABCD'-rule (asymmetry, border irregularity, colour variegation, diameter >6 mm) should also be addressed.

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