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INVESTIGATIVE REPORT

Referrals by General Practitioners for Suspicious Skin Lesions: The Urgency of Training

Margit C. J VAN RIJSINGEN[1], Sabine C. A. HANSSEN[1], Joannes M. M. GROENEWOUD[2], Gert Jan VAN DER WILT[2] and Marie-Jeanne P. GERRITSEN[1]

[1]Department of Dermatology and [2]Department for Health Evidence, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Skin cancer is common among white populations and rapid increases in incidence are being observed in many countries, leading to a large burden on healthcare systems. Unnecessary referrals from general practitioners (GPs) may contribute to this burden. The aim of this study was to analyse the quality of referrals from GPs of patients with skin tumours. Referral letters for 734 patients were collected. The proposed diagnoses were compared with definitive diagnosis made by dermatologists. In 44.5%, lesions appeared to be benign. Malignant skin tumours were poorly recognised by GPs and seborrheic keratoses were often mistaken for naevi (33.6%). Furthermore, with total body examination, dermatologists found 111 additional malignant lesions. We discussed several recommendations to minimise unnecessary referrals as well as the future role of GPs in skin cancer care. ***Key words: skin cancer; general practitioner; education; total body examination; unnecessary referrals.***

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Margit van Rijsingen, Department of Dermatology, Radboud University Nijmegen Medical Centre, Postbus 9101, NL-6500 HB Nijmegen, The Netherlands. E-mail: m.vanrijsingen@derma.umcn.nl

Skin cancer (SC) is a public health problem of increasing magnitude among fair-skinned populations worldwide, and it is responsible for an increasing contribution to health care costs (1, 2). The occurrence of SC at young age (3, 4) and the development of multiple tumours in many SC patients contributes to this problem (5). A recent study showed that almost one in 5 persons will develop SC (6).

Basal cell carcinoma (BCC), squamous cell carcinoma (SCC), and the premalignancies SCC *in situ* (SCC i.s.) and actinic keratosis (AK) belong to the group of non-melanoma skin cancers (NMSC). In these skin malignancies, the mortality rate is low; however, morbidity and disfigurement may be caused by excision of large tumours in functional and visible areas. The incidence of melanoma is much lower (4, 7), but these tumours are responsible for the highest mortality rate. Treatment of SCC i.s. and high risk AKs, especially in those with multiple lesions (e.g. field cancerisation), is recommended to eliminate the risk of evolution into invasive SCC (8). Early detection may lower SC associated morbidity and mortality.

Most skin cancer presents in primary care, and an important determinant of outcome may be initial recognition and management of the lesion. Previous studies have shown that general practitioners (GPs) have difficulties in diagnosing various types of skin diseases, including SC (9–11). A study performed in the U.K. showed that 81% of malignancies sent for pathological analysis, was treated by dermatologists and 2% by GPs, the others were treated by other hospital physicians (12). The latter may indicate that GPs refer high numbers of patients to dermatologists. The aim of our study was to investigate the necessity and quality of referrals made by GPs in a population of patients with skin tumours.

METHODS

Study population

We collected all referral letters sent by GPs of patients who were referred with the diagnosis of a possible skin tumour to the department of Dermatology of the Radboud University Nijmegen Medical Centre (RUNMC) in the period from January 2008 to November 2010. Selection was based on the final diagnosis of a malignant or benign tumour in the hospital's registration system. This computerised system is able to perform a patient selection based on a patient's final diagnosis. Only few patients who were incorrectly diagnosed may be missed in our inclusion. Of all patients, referral letters, dermatological charts (filled out by the dermatologist or dermatology resident [DR]), and pathological results (when available) were collected.

The following data were recorded: 1) socio-demographic data including gender and age; 2) description of the lesion; 3) the number of diagnostic biopsies; 4) the referral diagnosis; 5) listed number; and 6) location of (additional) lesions found by dermatologist or DR.

The diagnoses at referral were compared with the pathological diagnoses. If no additional pathological analysis was performed, the clinical diagnosis made by the dermatologist or DR was used as the final diagnosis. If necessary, mainly in case of a pigmented lesion or BCC, dermatologists or DRs made use of a dermatoscope. Since the RUNMC is a training hospital, many clinical diagnoses of DRs were confirmed by a supervising dermatologist. In case a differential diagnosis was proposed, the first diagnosis mentioned was used in the analysis.

A diagnosis was defined as 'correct' when the diagnosis of the GP was in line with the diagnosis of the dermatologist and DR, or (if available) with the pathologic results. The differential

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diagnoses of the dermatologists and DRs were defined as 'correct' when they were in line with the pathological diagnosis. Therefore, the dermatologists' and DRs' diagnoses could only be verified in case a pathological result was available; mainly in malignancies and some premalignancies.

Data analysis

Statistic analysis was performed using the Statistical Package for Social Sciences (SPSS®) for Windows (version 20.0). Only descriptive statistics were used.

RESULTS

A total of 734 referral letters were collected from patients referred by GPs to the department of Dermatology at the RUNMC. The population consisted of 325 men (44.3%) and 409 women (55.7%), with a mean age of 58.3 years.

Location and number of lesions

Over 90% of patients were referred by their GP with one suspicious lesion. In < 10% the GP discovered > 1 lesion. Of all lesions, 61.0% was located on the face or scalp, 29.3% on the trunk or extremities and 5.9% on multiple body parts. In 3.8% the lesion location was not mentioned in the referral letter.

By performing total body examination, dermatologists and DRs diagnosed 234 additional premalignant and malignant lesions, including AKs, SCC i.s., dysplastic naevi, BCCs, SCCs, melanomas, and atypical fibroxanthoma (Table I).

Diagnostics

Overall, 327 (44.5%) of the lesions, which were reason for referral appeared to be benign, 204 (27.8%) were malignant, and 204 (27.8%) premalignant. Of the 255 lesions referred as malignant, 22.4% was diagnosed as premalignant and 25.1% as benign. Of all lesions referred as benign, 63.9% was diagnosed as benign. A cross tabulation of GPs' diagnosis at referral and the final diagnosis presents an overview of the most occurring diagnostic errors made in these referrals (Table II). Additionally, positive predictive values (PPV) for GPs' diagnosis at referral were calculated (Table III).

In 18.3% of the referrals a diagnosis was missing, the correct diagnosis was mentioned in 39.8% of letters. In 1.2% a diagnostic biopsy was taken by the GP prior to referral.

Table I. *Additional lesions found by dermatology resident or dermatologist after referral by general practitioner. Total of 146 patients with additional lesions (min. 1 and max. 20 per patient)*

	Head/ neck	Limbs	Trunk	Total lesions
Premalignancies				
Actinic keratosis	75	14	15	104
Dysplastic naevus	0	0	5	5
Squamous cell carcinoma *in situ*	9	3	2	14
Total				123
Malignancies				
Basal cell carcinoma	36	12	48	96
Squamous cell carcinoma	6	0	2	8
Melanoma	1	0	4	5
Atypical fibroxanthoma	2	0	0	2
Total				111

Non-melanoma skin cancer

GPs referred 188 patients with the possible diagnosis of a BCC. Ninety-one of these were finally diagnosed with a BCC, 11 with SCC, 34 with AK, one with SCC i.s., one melanoma, and 45 with benign lesions. Of 153 patients who were ultimately diagnosed with BCC, 29 were referred without a diagnosis, and 16 with the question 'malignant'. Out of 38 SCCs, 6 were referred as SCC. None of the 13 SCC i.s. was referred with this diagnosis.

As compared to the pathological diagnosis, dermatologists and DRs mentioned the correct diagnosis of a BCC in 95.4%, a SCC in 55.3%, and a SCC i.s. in 30.8%. Additional PPVs were calculated (Table III).

Table II. *Overview of referral diagnosis of general practitioner (GP) and the final diagnosis.*

	Final diagnosis										
Diagnosis made by GP	BCC	SCC	AK	SCC i.s.	Melanoma	Other benign	Other malignant	SK	Naevus/ lentigo	Dysplastic naevus	Total
Basal cell carcinoma (BCC)	**91**	11	34	6	1	26	0	11	8	0	188
Squamous cell carcinoma (SCC)	3	**6**	4	1	0	5	0	0	0	0	19
Actinic keratosis (AK)	7	4	**72**	1	0	8	0	4	2	0	98
SCC *in situ* (SCC i.s.)	0	1	0	**0**	0	0	0	0	0	0	1
Melanoma	0	0	0	0	**2**	0	0	0	1	0	3
Other benign	4	5	14	1	1	**34**	2	6	5	0	72
Other malignant/'Malignant?'	16	2	12	0	0	2	**1**	10	1	0	44
Seborrheic keratosis (SK)	1	1	0	0	1	3	0	**32**	1	0	39
Naevus/lentigo	2	0	3	0	1	5	0	33	**62**	1	107
Diagnosis missing	29	8	48	4	0	16	1	20	8	0	134
Dysplastic naevus	0	0	3	0	2	1	0	9	14	**0**	29
Total	153	38	190	13	8	100	4	125	102	1	734

Bold figures represents number of correct diagnosis by GPs.

Pigmented lesions

Forty-two of 125 of the finally diagnosed seborrheic keratosis were referred as (atypical) naevi. Furthermore, in 2 out of 8 melanomas and of 62 out of 102 benign naevi the correct diagnosis was mentioned in the referral letter.

As compared to the pathological diagnosis, dermatologists and DRs mentioned the correct diagnosis of a melanoma in 62.5% and a dysplastic naevus in 100%. Additional PPVs were calculated (Table III).

Lesion description

In 15.4% of the referrals, GPs added an adequate lesion description by using dermatological terminology. In 24.0%, a lesion description was missing, in 39.5% the word 'spot' was used as a description, in 5.3% the word 'lesion', and in 15.8% the description: 'looks like' was used.

DISCUSSION

The present study provides insight in the quality of GPs' referrals of patients with skin tumours, and their ability to differentiate between malignant and benign skin lesions.

Forty-four percent of all referred patients had benign tumours. Therefore, the question arises whether these referrals were really necessary, and if these numbers might be reduced in the future.

With respect to NMSC, we found that GPs made the diagnosis of BCC in 188 of 734 referrals (PPV 48.4%); 45 of these lesions were diagnosed as benign. The fact that the referral diagnosis of BCC was commonly used for other tumours may be explained by the fact that BCCs are more common than other malignancies (4, 7, 13) and therefore BCC might be the first diagnosis a GP thinks of in these cases. Furthermore, it was also found that dermatologists and DRs were also less accurate in the diagnosis of SCC and SCC i.s., meaning that these tumours are probably more difficult to recognise (14).

Almost 1/3 of SCCs was referred with the diagnosis of BCC. Given the fact that BCCs do not metastasise, whereas SCCs have the potential to do so, this may have the effect that patients with a SCC are not seen by a dermatologist with the urgency needed. In this study, only a few GPs provided an adequate lesion description (15.4%) or performed a biopsy (1.2%). In case of a misdiagnosis (e.g. SCC referred as BCC), an adequate lesion description may help the dermatologist to triage the correct level of priority for a hospital appointment. The encouragement of biopsy use in primary care may be worthwhile since it may lower the number of unnecessary referrals and contribute to the decision of the urgency of a referral. Furthermore, the performance of a biopsy may provide immediate reflection on their differential diagnosis, which could be of educational value. On the other hand, in case of a suspicious lesion, a dermatologist might perform an excision without previous biopsy, in which case referral without biopsy would save pathological costs.

In pigmented lesions GPs only recognised 25.6% of seborrheic keratosis (SK), although they are very common. Thirty-four percent of these SK were diagnosed as (atypical) naevi, a misdiagnosis which is often made (15, 16). Furthermore, only 2 out of 8 melanomas and 62 out of 102 benign naevi were correctly diagnosed. This might indicate that GPs have difficulty in differentiating between pigmented lesions. There are some studies which indicate that dermatoscopy would be of additional value for GPs (17, 18). This may suggest that dermatoscopy may help GPs in differentiating SK from other pigmented lesions, which might reduce unnecessary referrals. However, appropriate training and frequent use are necessary for adequate dermatoscopy performance and the question may arise whether GPs would make sufficient use of dermatoscopy to gain its additional value.

The number of additional lesions found in these patients is alarming, and proves the fact that many SC patients develop more than one lesion. The distribution of SC over the body surface has been described in several studies, showing that SC not only appears on the chronically sun-exposed areas of the skin (4, 19, 20), which pleads for total body examination. In a study of Terril et al. (21), additional (treatment requiring) skin lesions were detected in 67% out of 100 referred patients, 34 of the additional lesions were localised on sites covered by clothing. Therefore, we conclude that total body examination is not performed on a large scale, although it would lead to early SC detection. An explanation of the fact that GPs do not perform full body examination in all cases, could be unawareness of the lesion distribution over the body surface or lack of time.

A possible limitation of our study may be that, in case of a differential diagnosis, only the diagnosis listed first was included in our analysis. Therefore, in some cases the GP or dermatologist and DR could have mentioned the correct diagnosis, but not first in line. Additionally,

Table III. *Positive predictive values of general practitioners' (GPs) diagnosis mentioned in the referral letter and of dermatologists and dermatology residents (DR) prior to pathological results*

	Positive predictive values	
Diagnosis	GP, %	Dermatologist and DR, %
Basal cell carcinoma	48.4	72.6
Squamous cell carcinoma	31.6	65.6
Actinic keratosis	73.5	Not applicable
Squamous cell carcinoma i.s.	0.0	28.6
Melanoma	66.7	100.0
Seborrheic keratosis	82.1	Not applicable
Naevus/lentigo	57.9	Not applicable
Dysplastic naevus	0.0	20.0

i.s.: *in situ*.

it should be noted that GPs do not always have a diagnosis for a skin lesion, and sometimes only refer suspicious lesions with the question 'malignant?', or without a question or diagnosis, therefore, 'malignant?' and 'diagnosis missing' were also added to our cross tabulation. We also included benign tumours to establish a complete overview of (unnecessary) referrals made in the full array of skin tumours.

On the basis of our study, we conclude that referrals of patients with skin tumours could be optimised. With the increasing incidence of SC it is worthwhile to reduce the number of unnecessary referrals, to gain more capacity for patients in need of specialist care, e.g. reducing the number of referrals of benign lesions may lead to a decrease of almost 50% of patients referred with skin tumours.

Therefore, adequate training in clinical tumour characteristics of most common SCs, and more frequent use of additional diagnostic techniques are worthwhile to gain appropriate competency in GPs. With the rising numbers of SC the question arises whether more specialised SC care performed by dermatologists is needed in primary care. Another solution might be the training of GPs with a special focus on dermatology to contribute to low-key dermatological care. In Australia this concept is already in use, as SC is a major health problem in the fair-skin population of this country, thereby leaving more capacity for dermatologists to treat severely affected patients.

At present, GPs could contribute to optimise their referrals by adding appropriate dermatological lesion descriptions in their referral letters and by total body examination in patients with suspicious lesions.

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