A dedicated dermatology clinic for renal transplant recipients: first 5 years of a New Zealand experience

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Abstract

Aim Cancer following organ transplantation is a growing public health concern. We describe the first 5 years’ experience of a dedicated dermatology clinic for renal transplant recipients, the first of its type in New Zealand.

Methods Data from patients seen in the clinic were collected on a nephrology/dermatology database.

Results 86 of 99 transplant recipients had a baseline dermatology assessment. Seventy-one skin cancers (45 squamous, 25 basal cell carcinomas, 1 melanoma) were found in 17 patients. Eighteen of these were an incidental finding at the baseline post-transplant examination of 7 patients: they had not been noted either by the patient or by their nephrologist. A further 44 cancers were found in 13 patients at follow-up examinations in the dedicated clinic. Squamous and basal cell carcinomas received definitive treatment after 26 and 38 days (median) respectively. A brief analysis showed this to be a cost-effective way of diagnosing and treating skin cancer in this cohort of patients.

Conclusion The clinic is enabling prompt diagnosis and cost-effective treatment of skin cancers developing in renal transplant recipients and is also identifying significant numbers of pre-existing skin cancers in these patients.

Skin cancer, in particular squamous cell carcinoma (SCC), is the commonest post-transplant malignancy and is a growing public health concern. A recent New Zealand study of 384 renal transplant recipients (RTRs) showed that 25% had developed at least one non-melanoma skin cancer (NMSC) by 10 years post-transplant, with a 15% case fatality rate for SCC. Following their first NMSC, they develop further NMSCs at a rate of 1.7 per year. Post-transplant skin malignancies are likely to become even more common as a result of increasingly potent immunosuppression, longer patient and graft survival and increasing age of recipients at transplantation.

In an attempt to address this issue, the UK-based National Institute for Health and Clinical Excellence recommend the following. “All patients with a high risk of developing skin cancer should be counselled effectively by a dermatologist or a clinical nurse specialist (CNS) about sun protection before they develop any skin lesions, and should have annual checks carried out thereafter. Transplant patients who have precancerous skin lesions or who have developed a skin cancer should be seen in a dedicated ‘transplant patient skin clinic’, either in the transplant centre or in a hospital closer to the patient’s home, according to the choice of the patient. Close links should be established between the transplant centre, local physician and dermatologist for the management of transplant patients postoperatively.”
The European Skin Care in Organ Transplant Recipients (OTRs) Network and the International Transplant Skin Cancer Collaborative recommend a comprehensive baseline skin examination, education on photoprotection and self-examination of the skin, and follow-up at appropriate time intervals determined by the individual’s risk for skin cancer development.

In accordance with these recommendations, we set up a dedicated dermatology clinic for RTRs and now report on our first 5 years’ experience.

The aims of this observational study were to assess the:

- Proportion of RTRs being seen within a target of less than 6 months after transplant,
- Range of lesions and the time to treatment of skin malignancies, and
- Factors associated with skin cancer in this population.

Patients and Methods

A dedicated clinic for RTRs, the first of its type in New Zealand, was set up in the Dermatology Department, Christchurch Hospital in October 2006. The service was developed by a dermatologist with a special interest in skin cancers in RTRs and a CNS in dermatology.

The CNS has had 10 years’ experience in dermatology and has assisted in both multidisciplinary team clinics for skin cancer and “one-stop” skin lesion clinics. Prior to her involvement with the dedicated dermatology clinic for RTRs she underwent a peer review of skin examination by the consultant dermatologist.

All adult patients transplanted at Christchurch Hospital between 26 April 2006 and 14 January 2011 were included in the study. The immunosuppressive protocol used for all patients was prednisone, mycophenolate mofetil and either cyclosporin or tacrolimus.

Referrals to the clinic were made on discharge following transplantation. The proportion seen within the target 6 months of transplantation was calculated. We collected patient demographic details and skin cancer risk factors. All RTRs received a baseline full skin examination (FSE) and education on photoprotection and recognition of skin cancer. The type and site of skin cancers were recorded. All were treated surgically and confirmed histologically. SCC-in-situ was excluded. Primary consultations were performed by the CNS. Patients with possible skin cancer were also seen by the dermatologist.

Follow-up appointments with the dermatologist were offered to patients deemed to be at higher risk of skin cancer and a FSE was carried out every time. Patients have direct self-referral clinic access should they develop any suspicious skin lesions. Data were entered prospectively into the joint nephrology-dermatology database (Proton™ Clinical Computing Ltd, Sydney, Australia).

Patients with and without skin cancers were compared using descriptive statistics, t-tests for continuous variables and Chi-squared tests for categorical variables. Where continuous variables were highly skewed, medians and interquartile ranges (IQR) were compared using Mann-Whitney U tests. All statistical calculations were performed using SAS v9.1.3 software (Cary, NC, USA).

Results

Of the 99 patients transplanted during the study period, 13 were not seen for a baseline dermatology check for reasons including death, loss of graft within 3 months, distance from home to clinic and failure to attend clinic.

Median time between transplant and baseline dermatology assessment was 5.6 months (IQR 4.3 to 8.2). Fifty-six patients (65%) were seen within 6 months and 75 patients (87%) within 12 months of transplantation.
The main reason for not being seen within 6 months was delay in referral to the dermatology clinic. This improved during the course of the study with 91% and 100% seen within 6 and 12 months respectively in the second half of the cohort. There was no difference in the proportion of patients with skin cancer in those whose review was delayed beyond 6 months after transplantation (21% vs 16% of those seen within 6 months, p = 0.8).

### Table 1. Demographic and clinical data, collected at baseline dermatology assessment, by skin cancer

<table>
<thead>
<tr>
<th>Variables</th>
<th>Skin cancer, n=17 (19%)</th>
<th>No skin cancer, n=69 (81%)</th>
<th>P†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years (mean±SD)</td>
<td>61.9±7.7</td>
<td>50.5±12.0</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Male, n (%)</td>
<td>11 (65)</td>
<td>42 (61)</td>
<td>1.0</td>
</tr>
<tr>
<td>Retransplant, n (%)</td>
<td>1 (6)</td>
<td>3 (4)</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Immunosuppression‡</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyclosporine n(%)</td>
<td>13 (76)</td>
<td>42 (61)</td>
<td>0.3</td>
</tr>
<tr>
<td>Tacrolimus, n(%)</td>
<td>4 (24)</td>
<td>27 (39)</td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>17 (100)</td>
<td>52 (75)</td>
<td>0.08</td>
</tr>
<tr>
<td>Māori/Pacific Island</td>
<td>0</td>
<td>11 (16)</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0</td>
<td>6 (9)</td>
<td></td>
</tr>
<tr>
<td>Outdoor work, years (median [IQR])</td>
<td>8 (0–20)</td>
<td>0 (0–10)</td>
<td>0.2</td>
</tr>
<tr>
<td>Ever sunburn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤16 yrs, n (%)</td>
<td>13 (76)</td>
<td>39 (58)</td>
<td>0.3</td>
</tr>
<tr>
<td>&gt;16 yrs, n (%)</td>
<td>12 (71)</td>
<td>37 (55)</td>
<td>0.3</td>
</tr>
<tr>
<td>Ever sunbed, n (%)</td>
<td>4 (24)</td>
<td>12 (18)</td>
<td>0.7</td>
</tr>
<tr>
<td>Ever phototherapy, n (%)</td>
<td>0</td>
<td>3 (5)</td>
<td>1.0</td>
</tr>
<tr>
<td>Any warts, n(%)</td>
<td>6 (35)</td>
<td>12 (18)</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>Skin phototype§</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I-II</td>
<td>12 (71)</td>
<td>22 (31)</td>
<td>0.02</td>
</tr>
<tr>
<td>III-IV</td>
<td>5 (29)</td>
<td>40 (58)</td>
<td></td>
</tr>
<tr>
<td>V-VI</td>
<td>0</td>
<td>7 (10)</td>
<td></td>
</tr>
<tr>
<td>Ever smoked, n (%)</td>
<td>6 (35)</td>
<td>32 (48)</td>
<td>0.4</td>
</tr>
<tr>
<td>Blue/grey eyes, n(%)</td>
<td>10 (59)</td>
<td>30 (45)</td>
<td>0.4</td>
</tr>
</tbody>
</table>

† T-tests, Mann Whitney U tests or Fisher’s exact tests as appropriate.
‡ All patients also taking mycophenolate mofetil and prednisone.
§ Fitzpatrick phototypes: I always burns, never tans; II usually burns, sometimes tans; III sometimes burns, usually tans; IV never burns, always tans; V moderate constitutive pigmentation; VI marked constitutive pigmentation.

Seventy-one skin cancers (45 SCC, 25 BCC, 1 melanoma) were found in 17 patients. Demographic and clinical data for patients with and without skin cancer are given in Table 1.
Twenty-seven of the 71 skin cancers occurred in two patients (16 and 11 respectively). Eighteen (3 SCC, 15 BCC) were found in seven patients at the baseline assessment. These were an incidental finding on examination: the patients had not complained of, or been referred for, these lesions. Forty-four (35 SCC, 9 BCC) were found in 13 patients during the period of follow-up in the dedicated dermatology clinic. Seven (6 SCC, one melanoma) were found in five patients in other clinics (GP, nephrology, head and neck surgery). Two cancers (1 SCC, 1 BCC) in two patients were found by the patient, one of whom self-referred to the dermatology clinic and the other consulted his GP. Figure 1 summarises the location of detection of skin cancer by histology.

Figure 1. Numbers of skin cancers detected at baseline assessment, in dermatology follow-up clinics and in other clinics

![Figure 1](image)

Thirty-one of the 71 skin cancers were on sites other than the face, neck or hands.
To assess the efficiency of the clinic process, the time from initial observation to definitive treatment was calculated for the 62 skin cancers that were found in either the dermatology baseline or follow-up clinics.
Thirteen of these skin cancers (SCCs) developed sequentially over the lower legs of one patient and were removed in stages by the surgical team, so it was not possible to calculate the time interval for each individual lesion. SCCs (n=25) and BCCs (n=24) received definitive treatment in a median of 26 (IQR 0 to 56) and 38 (IQR 10 to 83) days respectively. One patient presented to her nephrologist with a nodular melanoma 2 months after her transplant and this was excised by the plastic surgeons after 26 days (Breslow thickness 4.1mm).
A brief analysis was performed to assess the cost-effectiveness of the dedicated clinic. The CNS detected 18 skin cancers in seven patients at the baseline assessment. Our CNS’s 4-hour session costs 41% of the amount for a senior dermatologist, so this is clearly a cost-effective way of detecting skin cancers in this cohort of patients.

Early diagnosis of skin cancer in the specialist clinic also allowed a greater proportion of these to receive surgical treatment as an out-patient procedure within the dermatology department, as compared to an out-patient procedure in plastic surgery which would be required for larger more advanced lesions. At the time of writing, the cost for the former is 22% of the amount for the latter. Early diagnosis of skin cancer will also reduce the likelihood of subsequent more expensive procedures, such as major surgery or radiotherapy, but this is difficult to quantify.

**Discussion**

Skin malignancy after organ transplantation is a significant cause of morbidity and mortality. In 2000, only 21% of UK centres provided skin cancer surveillance for RTRs. Although this had increased to 66% in 2006, the UK data compared poorly with Australian data, where 97% of centres provided skin surveillance. In this study we assessed the performance of a dedicated dermatology clinic at diagnosing and treating skin cancer in a cohort of RTRs. Prior to establishing this clinic, there was no routine dermatological assessment of RTRs in Christchurch Hospital. Patients were only referred to the Dermatology Department once they had developed skin cancer.

We aimed to see RTRs within 6 months of their transplant. A case could be made for screening patients pre-transplant. It is possible that the patient with the incidentally noted melanoma had this prior to her transplant and it would therefore have been diagnosed at that stage by a FSE. However, this is difficult to organise in patients who are transplanted at short notice when a cadaveric kidney becomes available and we believe that seeing all patients within 6 months of their transplant is an acceptable compromise. The proportion of our patients seen within the aimed 6 months of transplant increased during the study period.

Forty-four percent of skin cancers in our series were on covered body sites, confirming the importance of a FSE in all RTRs. Nurse practitioners can be trained to identify and triage suspicious skin lesions and to educate patients on photoprotection and self-examination.

The finding of 18 pre-existing skin cancers (of which both the patient and the referring nephrologist were unaware) in seven of our patients at the baseline assessment indicates the importance of this exercise. The preponderance of BCCs over SCCs at the baseline check and the converse at follow-up examinations is consistent with the observation that, while BCCs are commoner than SCCs in the normal population, the opposite is true in the immunosuppressed.

Of the patients who used the direct-dial phone number to contact the CNS, one had skin cancer, the remainder had benign lesions requiring reassurance only. The large majority of skin cancers developing after the baseline check were found incidentally at follow-up examinations, reinforcing the need for patients to self-examine the skin regularly and to use the dedicated phone number for any lesions of concern.
Although most skin cancers in this series were managed in a satisfactory time frame, the patient with melanoma waited 26 days for treatment. A multidisciplinary review of this case resulted in a fast-track plastic surgery service for RTRs with suspected skin cancer being established.

The other key function of the clinic was patient education. All Christchurch patients receive verbal and written information about skin cancer risk from the nephrology nurse pre-transplant. Although retention of information was not assessed in this study, others have demonstrated that this is poor for advice given in this way, with only 54% of 202 RTRs recalling advice and only 30% knowing why RTRs need to photoprotect. The authors recommended that RTRs should be seen by a dermatologist 6 months post-transplantation for a skin examination and advice on sun protection. According to one study, skin cancer awareness and compliance with photoprotective measures were higher in RTRs who had attended a specialist dermatology clinic than in those who had not.

There is as yet no direct evidence that specialist clinics offering intensive education reduce the risk of skin cancer in RTRs, but this is likely to be the case in view of the fact that regular application of sunscreens has been shown to reduce the incidence of actinic keratoses (generally accepted as precursors of SCC) and SCCs.

Long-term data collected from clinics such as this will help to determine whether intensive education on sun protection and skin self-examination will reduce the incidence of skin cancer in RTRs.

Competing interests: Nil.

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References: