**Materials and Methods**

More than 1,140 lung and 1,120 heart transplantations have been performed at the transplantation centre, and approximately half of these patients are followed up at the centre. All heart and lung transplant recipients are instructed by their transplant physician to undergo regular dermatological surveillance by a dermatologist, either at the Dermatology Outpatient Clinic within the same hospital or elsewhere. Participants aged 18 years or more were recruited between March and December 2016 during routine attendance for outpatient dermatological follow-up with no specified exclusion criteria. Further follow-up was determined by clinical need.

Baseline demographic features were obtained from the participants’ medical records. All participants were administered a questionnaire on risk factors for skin cancer. A history of histologically demonstrated acute cellular rejection was identified from the participants’ medical records. The Dermatology Life Quality Index (DLQI) was administered to determine the impact of skin disease on participants’ quality of life (QOL).

Full skin examination was performed (excluding anogenital regions unless concern was expressed for this area), and any diagnosed dermatological diseases were recorded. There were no defined criteria for non-malignant dermatological diagnoses. Diagnoses omitted from data collection due to their relative lack of clinical significance included skin tag, seborrhoeic keratosis, benign naevus, and hidrocystoma. Classification of skin diseases was adapted from the system utilised by Wisgerhof et al. [1], 2010.

For pre-malignant and malignant skin lesions, a clinical diagnosis of actinic keratosis, superficial basal cell carcinoma (BCC) and Bowen’s disease were accepted, although most skin cancers were confirmed histologically. Skin cancer subtypes and the presence of perineural or lymphovascular invasion were identified from histological reports. BCCs were classified in order from least to most aggressive, as superficial, nodular, micronodular, or infiltrative, and mixed BCCs were classified according to the most aggressive subtype. Vital status for all participants at completion of the study period was determined from the hospital transplant database.

The overall DLQI scores were separated into the following five ordinal categories as the response variable for analysis: no effect (DLQI = 0–1), small effect (DLQI = 2–5), moderate effect (DLQI = 6–10), very large effect (DLQI = 11–20), or extremely large effect (DLQI = 21–30) on QOL [2].

Only the first study visit was considered in the analysis of risk factors for skin cancer. The outcome of interest was the presence of skin cancer as a binary variable. Skin cancer includes Bowen’s disease, squamous cell carcinoma, BCC, or any other malignant skin lesion. Variables studied as predictors of skin cancer included gender, transplanted organ, age at time of transplantation, time since transplantation, skin phenotype grouped into Fitzpatrick skin types 1–2 and 3–6 [3], degree of lifetime ultraviolet radiation exposure represented as a sun score (based on several factors), history of allograft rejection defined as International Society for Heart and Lung Transplantation Grade A2 or greater for lung transplant recipients and Grade 2R or greater for heart transplant recipients [4, 5], history of smoking, history of ≥5 post-transplant skin cancers, history of skin cancer prior to transplantation, history of voriconazole use for ≥3 months, current acitretin use, previous arsenic exposure, other solid organ transplants, history of azathioprine use, and current use of mTOR inhibitor, azathioprine, cyclosporine, or tacrolimus. Univariate logistic regression linking each of these predictors to the response variable was first conducted to examine the relationship between specific variables and skin cancer. Results are reported with odds ratios and their associated 95% confidence intervals. Statistical analyses were conducted at a 2-sided significance level of 0.05. Statistically significant predictors (*p* < 0.05) and those predictors with a *p* value <0.10 in the univariate analyses were subsequently included in a multivariate logistic regression analysis.

**References**

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