

Materials and Methods

For this retrospective cross-sectional study, we analyzed all pathology records of standard excisions of primary BCCs performed by a GP, dermatologist, or plastic surgeon in the area of Southwest Netherlands between 2008 and 2014. Pathology records were extracted from PATHAN. PATHAN is a regional pathology laboratory that serves GPs and secondary care hospitals in the area of Southwest Netherlands. To identify all records of excisions of primary BCCs in PATHAN, an algorithm was used with a filter on the diagnosis according to the Systematized Nomenclature of Medicine (SNOMED) classification implemented in the Dutch Pathology Database system (PALGA). Pathology records were included from December 31, 2014, and consecutively backwards until enough cases per specialty were included. The length of the inclusion period differed per specialty, due to the different excision frequencies per year per specialty. The different lengths of inclusion period per specialty were accepted because the Dutch BCC guidelines did not change during the entire study period. Pathology records were excluded if they concerned surgical techniques other than standard excision (e.g., shave excision or Mohs micrographic surgery) or if the data of interest were missing (see the studied variables below).

The following variables were extracted from the pathology records: physician (i.e., GP, dermatologist, plastic surgeon), histological conclusion on tumor-free margins (complete or incomplete BCC excision), tumor site (i.e., head and neck, trunk, limbs), histological subtype (i.e., nodular, superficial, infiltrative, including micronodular), nonaggressive mixed subtypes (i.e., mixed nodular and superficial subtypes), aggressive mixed subtypes (i.e., nodular and/or superficial mixed with infiltrative subtypes), and specimen size (i.e., \leq or >2.5 cm in shortest dimension). Specimen size was used as a proxy of tumor size because the tumor size was missing in the majority of records. To correct for the assumed surgical excision margin and tumor shrinkage, specimen size was categorized in \leq or >2.5 cm in the shortest dimension as a proxy of small (≤ 2 cm) and large (>2 cm) BCCs [4].

Study Outcomes

The primary outcome of this study was the proportion and the likelihood of complete excisions by GPs, dermatologists, and plastic surgeons. The secondary outcome was the proportion of complete excisions per specialty, per site, and per histological subtype.

Histological Assessment

All specimens were assessed postoperatively by pathologists for tumor-free margins using the breadloaf technique after histochemical staining with hematoxylin and eosin. Because of the retrospective design of this study, pathologists were not blinded for the operating physician.

Statistical Analysis

The power calculation showed that 974 BCC excisions per specialty were needed to assess whether there was a difference between GPs, dermatologists, and plastic surgeons in proportions of complete BCC excisions. One-way ANOVA, Pearson's χ^2 and Fisher's exact tests were used to determine whether there were differences between the specialties in patient and tumor characteristics. The significance level was 0.0125 (Bonferroni correction for multiple testing, power 80%). Comparison of the risk of an incomplete BCC excision between GPs, dermatologists, and plastic

surgeons was assessed with univariable and multivariable logistic regression models adjusted for patient age, sex, tumor site, tumor size, and histological subtype.

The sample size was calculated with the statistical program R, version 3.1.1. (<http://R-project.org>), and the statistical analyses were performed with SPSS for Windows, version 21 (SPSS, Chicago, IL, USA). The study was conducted and reported according to the STROBE guidelines for cross-sectional studies. The Medical Ethical Committee of the Erasmus MC Rotterdam approved the study protocol (reference No. NL52923.078.15).