CHAPTER 1

The Epidemiology of Basal Cell and Squamous Cell Carcinoma

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Abstract

Basal cell and squamous cell carcinoma (nonmelanoma skin cancer = NMSC) are now the most common type of cancer in the Caucasian population, and the incidence of skin cancer has reached epidemic proportions. The highest incidence rates (IR) were reported from population-based studies in Australia with an IR of more than 2% for basal cell carcinoma (BCC) in males (females 1.1%), and 1.3% for squamous cell carcinoma (SCC) (females 0.7%). In this chapter, current epidemiologic data concerning the incidence and its worldwide trends, risk factors, like UV-radiation, ionizing radiation, predisposing host conditions, ageing, smoking, alcohol, diet, medical conditions, occupation, chemical carcinogens, as well as important aspects of prevention will be discussed.

Incidence of Nonmelanoma Skin Cancer (NMSC)

Nonmelanoma skin cancer (NMSC) represents two types of malignant tumors of the skin: basal cell carcinoma (BCC) and squamous cell carcinoma (SCC). They belong to the most common cancers in the world. Both arise from the epidermal tissue of the skin: SCC from epidermal keratinocytes, and BCC from the basal cells of the epidermis. BCC is more common with a ratio of 4:1 to SCC. Although BCC and SCC can be lethal, they are not associated with significant mortality; nevertheless the associated morbidity and therapeutic costs are an increasing burden to the health care system. Of the top-10 health priorities in the U.S.A. for this decade, NMSC ranks as number eight.

Because of its relatively low mortality, NMSC is not registered in most cancer surveillance systems. The way of reporting to most tumor registries is also not consistent, therefore actual incidence rates are not always easy to estimate from these registries and can more accurately be obtained by population-based studies and surveys. Such studies have mainly been performed in Australia and the U.S.A. Table 1 clearly shows the relatively high incidence rates of NMSC; except for Singapore. These incidence rates are reported from countries or regions which have predominantly a white population. Countries that are closer to the Equator have much higher incidence rates, while incidence rates in males are consistently higher than in females. In all these, mostly white, populations BCC is more common.

The highest rates are reported from Australia, with about twice as many BCC’s compared to SCC’s. Annual incidences of NMSC in north Queensland reach more than 2000 BCC’s per 100,000 for men and more than 1100 BCC’s per 100,000 for women. For SCC’s the rates for
men in north Queensland are more than 1300 for men and more than 700 for women per 100,000. Also the U.S.A. has high incidence rates, with considerably more BCC's. Like in Australia, rates are much higher in areas that are closer to the equator. The incidence rate of NMSC, i.e., BCC and SCC combined, in the U.S.A. is estimated to be almost similar to the incidence of all other cancers combined. From the table it becomes clear that the rates in a number of European countries or regions, which tend to be at a higher latitude than Australia and the U.S.A., are substantially lower. However, it might also be possible that the incidence rate of nonmelanoma skin cancer is underestimated in Europe. Two regions in Germany\(^{10}\) and the nearby Netherlands\(^{10}\) have per 100,000 an incidence rate of BCC in the order of 43—63 for men, and 32—58 for women. Rates for SCC are in Germany about 11 for men, and about 5 for women. It is interesting to note that the two areas in Switzerland\(^{11,12}\) and the nearby Trentino region in northern Italy\(^{13}\) have higher rates than Germany and the Netherlands, probably because these Swiss and Italian regions are further south, i.e., have more sunlight. Incidence rates in Slovakia seem to be relatively low compared to the other European regions.\(^{14}\) Singapore has a predominantly Chinese, i.e., nonwhite, population, which may explain the low incidence rates.\(^{15}\)

Differences in notification or detection of cases may account for some of the variability in the incidence rates. Another source of variability may be the different standard populations that were used for the age-standardisation: the US uses its own US standard population, the Netherlands the European standard, while the other studies use the worlds standard population. It is unlikely that these age adjustments account for major differences.