Should subjects who used psoralen suntan activators be screened for melanoma?

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Summary

Background: Psoralens are potent tanning activators that have been introduced in France and in Belgium in some tanning lotions and sunscreens. It was shown that poor tanners who ever used psoralen tanning activators display a four-fold increase in melanoma risk when compared to poor tanners using regular sunscreens. Although psoralens have now been banned from suntan lotions, it is likely that the increase in melanoma risk linked to their previous use will persist for several years.

Methods: The melanoma risk attributable to psoralens use was calculated to evaluate the population at risk in France and Belgium.

Results: Melanoma incidence for the year 1995 was estimated to be of 10.2 per 100,000 in France and of 10.0 per 100,000 in Belgium, representing 5,900 and 1,000 melanoma cases. From the melanoma incidence among poor tanner who ever used psoralens (52 per 100,000) and an estimation of the percentage of psoralen users among poor tanners, it can be derived that, for the year 1995, 267 melanoma cases could be attributed to psoralen tanning activators.

Conclusions: Subjects who used psoralen suntan activators should be informed of their increased melanoma risk and be encouraged to participate in clinical programmes for early detection of melanoma, more especially when they are poor tanners and display a high naevi count. Such an action could save a significant number of lives.

Key words: attributable risk, early detection, melanoma, psoralens

Introduction

For decades, government agencies and anticancer leagues have recommended the use of high sun protection factor (SPF) sunscreens for the prevention of skin cancer. And indeed, there is some recent evidence that the use of high SPF sunscreens may prevent ultraviolet-induced skin lesions such as solar keratoses; hence it is likely that sunscreen use may prevent squamous cell carcinoma of the skin [1, 2]. However, two recent European case-control studies failed to demonstrate any protective effect of sunscreen use against the risk of cutaneous melanoma; actually, in these studies sunscreen use even appeared as a slight melanoma risk factor [3, 4]. The reason for this lack of protection of sunscreen use against melanoma is not known, but it is likely that this is an indirect effect and this should not create unnecessary concern among sunscreen users. However, this does not apply to psoralen containing tanning activators, and careful analysis tended to demonstrate that the extra melanoma risk conveyed by the use of psoralen containing tanning activators is a direct one [3].

Psoralens are medically used photosensitizers and potent tanning activators that have been introduced in Europe in some tanning lotions and sunscreens, either as bergamot oil or as purified 5-methoxypsoralen. However, following the demonstration of the photocarcinogenic potential of 5-methoxypsoralen [5, 6], it was questioned whether it was sensible to allow general population exposure to a carcinogenic agent for a purely cosmetic benefit. In countries such as Switzerland, a ban was imposed on psoralen-containing sunscreens as early as 1987, but was loosely enforced for several years. For more than 10 years, psoralen sunscreens remained the focus of debate [5, 7]. Developments of sunscreens combining 5-methoxypsoralen and UVB filters were followed by campaigns to convince the scientific community and regulatory authorities that these products were not only safe, but could even provide a better protection against sunlight than usual sunscreens and hence were especially recommended to poor tanners seeking a suntan [8]. Psoralen tanning lotions were authorised for general public use only in France, Belgium and Greece. In 1995, the first epidemiological study that examined the relationship between psoralen sunscreen use and melanoma was published [3], and demonstrated that poor tanners (i.e., subjects of skin phototypes I–II) who ever used psoralens displayed a four-fold increase in melanoma risk when compared to poor tanners who used regular sunscreens. In May 1995, the European Commission imposed a ban on suntan
lotions containing more than 1 ppm psoralen (a concentration thought to be devoid of biological impact). However, this ban was effective from July 1st 1996, and due to the latency between the exposure to a risk factor and the onset of the disease, it is likely that the increase in melanoma risk linked to the use of psoralen containing tanning activators will persist for several years. We therefore tried to evaluate the population at risk, in order to discuss the possibility of an intervention to reduce the morbidity and lethality of melanomas linked to previous use of psoralen tanning activators.

**Melanoma risk attributable to psoralen use**

The melanoma risk in France and Belgium attributable to psoralen use (AR) is defined as the difference between the incidence rates in the exposed ($I_e$) and non exposed ($I_o$) groups and can be calculated as $AR = I_e - I_o$ [9].

From data reported by cancer registries of seven French Départements [10] and of the Netherlands [11], we estimated melanoma incidence for the year 1995 to be of 10.2 per 100,000 in France and of 10.0 per 100,000 in Belgium, which represents a total of 5,900 melanoma cases in France, and of 1,000 in Belgium. For France, our estimate closely agrees with results from a survey that measured melanoma incidence in Ile de France (greater Paris area) for the year 1994 [12]. Considering that melanoma risk is 1.5 times higher in poor tanners than among good tanners, and 4.7 times higher among poor tanners who ever used psoralen sunscreens than among all other poor tanners [3], the 1995 melanoma incidence among poor tanners who ever used psoralen sunscreens can be estimated as being of 52/100,000. Poor tanners represent 30% and 40% of the French and Belgian populations, respectively, and, from our data in controls, it can be estimated that 3% of the French and Belgian poor tanners ever used psoralen sunscreens [3]. It might then be derived that in both countries, for the year 1995, 334 melanoma cases occurred in poor tanners who had ever used psoralen sunscreens, 80% of which (i.e., 267) could be attributed to psoralen sunscreens.

These figures might even be greater, since in France, Belgium and Greece, it is not compulsory to mention the exact composition of a cosmetic product, and since no warning was displayed on the package of psoralen sunscreens. Consequently, consumers or tourists originating from other countries could buy them during their vacation. It is worthy of note that 50% of the psoralen sunscreen users were below the age of 40, as compared to only 35% of regular sunscreen users ($P < 0.05$) [3]. Furthermore, an on-going epidemiological study in several European countries is currently demonstrating that some parents have also applied psoralen sunscreens to children less than six years of age (Autier et al., unpublished results).

**Prevention of psoralen induced melanomas**

The effect of psoralen containing tanning activators will likely be visible for several years after their ban, and since there is no reason that psoralen enhanced melanomas should be different in terms of clinical presentation and prognosis from other spontaneous melanomas (e.g., 85% five-year survival), it turns out that in the near future there still will be a significant number of melanomas arising in individuals who knowingly used psoralen suntan activators, and that some of these patients may die from their melanoma in the absence of appropriate action to reduce unnecessary lethality among these individuals.

There is no scientific evidence at present that screening for melanoma will reduce mortality but the large differences in survival between thin and thick tumours suggest this could be effective. In our opinion, subjects who used psoralen suntan activators should be informed of their increased melanoma risk, and should be encouraged to participate in organised clinical surveillance programmes for early detection of melanoma, more especially when they are poor tanners displaying a high naevi count.

Of course, care should be taken to clearly differentiate the cosmetic use of psoralens and their therapeutic use, and not to cast unwarranted doubt on the use of psoralens in the treatment of skin disorders for which it may be very effective. But we strongly think that such an action be undertaken, a significant number of lives would be saved.

**Acknowledgements**

This study was supported by grants from the Europe against Cancer Programme of the Commission of the European Communities (contract no. 91 CVV01177-0), from the Œuvre Beige du Cancer (Belgium) and from the Conseil Général du Rhône (France).

**References**


Received 28 March 1997; accepted 2 April 1997.

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