Reviewer's report

Title: Eyebrow hairs contained the highest number of cutaneous human papillomaviruses from actinic keratosis patients

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Reviewer: Katja Seme

Reviewer's report:

The authors compared the presence of 28 cutaneous HPV types in eyebrow hairs, normal skin and actinic keratosis (AK) lesions of 75 AK patients with the aim to find a non-invasive surrogate marker for studying cutaneous HPV types in AK. Considering the design and all results the study as a matter of fact assessed the prevalence and distribution of cutaneous HPV types in different specimens obtained from AK patients. A different title would better indicate the actual content. The results regarding prevalence and distribution of cutaneous HPV types in tissue samples of normal skin are of particular value since this kind of specimens are very rarely obtained and tested. On the other hand an important aspect was unfortunately not addressed.

Major Compulsory Revisions

Several previous studies have shown that cutaneous HPV types are highly prevalent in eyebrow hairs of healthy individuals (without EV, AK or cutaneous SCC). Thus, it would be crucial to include in this study a control group of age- and sex-matched healthy individuals, test their eyebrow hairs for the presence of cutaneous HPV types and get an idea about »background« prevalence and distribution of cutaneous HPV types in eyebrow hairs of healthy individuals. Only direct comparison of the presence and distribution of HPV genotypes in eyebrow hairs from healthy individuals with the presence of HPV genotypes in eyebrow hairs from patients with AK would then enable grounded conclusions.

I don’t agree with the conclusion that eyebrow hairs are an appropriate indicator of cutaneous HPV in AK patients and are useful non-invasive marker. The prevalence of HPV types in eyebrow hairs was almost two times higher than in AK lesions and the presence of more than one HPV type was found in more than three quarters of eyebrow hairs. Thus despite the fact that at least one HPV type in common was found in 91% of patients with HPV-positive AK lesions and eyebrow hairs it is not possible to predict which of the HPV types from eyebrow hairs is also present in AK lesion.

Minor Essential Revisions

A table listing all patients and HPV types detected in each of the sampling sites would be very helpful and perhaps more informative than figures 3 and 4.
It would be interesting to know if a particular combination of HPV types was linked to AK lesions.

I suggest to use »the presence of cutaneous HPV types« instead of »infections of cutaneous HPV types in eyebrow hairs« and the presence of a single HPV type instead of single infections at least where suitable (e.g. abstract background line 29; abstract results; results line 159).

Try to avoid the expression »overlapping infections« and instead use at least one HPV type in common or concordant HPV types,

Abstract, results: What is meant as »the highest number of HPV infections« and the highest number of multiple infections of HPV positive specimens? Either define the highest or rewrite the results.

The first sentence of the Results (page 6) should be rewritten. Better would be: A significant higher number of cutaneous HPV infections (betaPV and gammaPV) were detected in eyebrow hairs (63/75; 84%) compared to AK lesions (35/75; 47%) and normal skin (28/75; 37%) (p<0.001), respectively (Fig. 1).

Lines 168 and 201 consider adding different to HPV types.

Figure 2, correct the title of y axis: No. of HPV positive samples instead of Total number of infections

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests