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Red and Black Types of Pepper and Acne Vulgaris: A Case-control Study

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ABSTRACT

Association between dietary habits and development or exacerbation of acne vulgaris has been an interesting topic for many years. The goal of the present study was to investigate possible association between pepper (red and black pepper, separately) consumption and changes in acne lesions. A total of 45 volunteers with mild-to-moderate acne vulgaris were recruited from a private clinic and enrolled in this case-control, clinical trial. Patients were randomized in three equal age and sex-matched groups, receiving 8 mg of either red or black pepper powder mixed with their food at lunch for 30 consecutive days (cases); or no additive to food was added (controls). In red pepper group there were 11 males (73.3%) and 4 females (26.7%) with a mean age of 17.8 ± 5.1 years (range: 12-27). In black pepper group there were 6 males (40%) and 9 females (60%) with a mean age of 17.9 ± 6.3 years (range: 12-29). In control group there were 10 males (66.7%) and 5 females (33.3%) with a mean age of 16.6 ± 5.2 years (range: 12-27). The three groups were comparable for sex ($p = 0.14$) and age ($p = 0.78$). Changes in the mean number of noninflamed, inflamed or total lesions within the study period did not differ significantly between three study groups ($p = 0.22$, 0.54 and 0.46 , respectively). In patients receiving red pepper, mild amelioration of acne lesions was documented. According to the findings of this study, neither black pepper, nor red pepper is associated with exacerbation of acne lesions. Red pepper even may have mild ameliorating effect on acne lesions.

Key words: Acne vulgaris, red pepper, black pepper, facial lesion

INTRODUCTION

The role of diet in acne vulgaris is a matter of hot debate in the literature. While some investigators deny any significant association between diet and acne lesions, others have suggested that this relationship is present (Reich *et al.*, 2007; Spencer *et al.*, 2009; Bowe *et al.*, 2010; Davidovici and Wolf, 2010).

The notion of the second group is almost in line with the public general belief and many patients' perceptions of factors that may aggravate acne vulgaris (Tan *et al.*, 2001; Tallab, 2004; Rigopoulos *et al.*, 2007), among which spices have been always suspected (El-Akawi *et al.*, 2006; Fattahi *et al.*, 2011).

It should be noted that acne vulgaris is a very common skin disease, particularly among adolescents and young adults. This high prevalence and consequential effects of acne vulgaris

(White, 1998), despite the presence of many effective medications (Babaeinejad *et al.*, 2011; Fouladi, 2012, 2013; Khodaeiani *et al.*, 2012, 2013; Babaeinejad and Fouladi, 2013), necessitated conducting studies on potential risk factors even if they are only based on the public belief.

For the first time in the English literature, Wuthrich and Much (1978) showed that red pepper may precipitate occurrence of acne lesions in some individuals underwent skin tests for several materials.

This study, for the first time, sought to investigate possible effect of both red and black types of pepper on acne lesions in a case-control setting.

MATERIALS AND METHODS

A total of 45 volunteers with moderate-to-severe acne vulgaris (Burke and Cunliffe, 1984) were enrolled in this double-blind, case-control, randomized clinical trial from a private clinic from April 2013 to March 2014.

The exclusion criteria were secondary acne vulgaris, hypersensitivity to pepper, pregnancy, presence of dermatologic diseases other than acne vulgaris and those on known anti-acne treatment(s) started from the previous 3 months were excluded.

Red and black pepper powders were obtained from the local market and an experienced botanist from a local university approved their purity and quality.

Patients were randomized in three age and sex-matched, 15 case groups, receiving 8 mg of either red pepper or black pepper mixed with their food at lunch (case groups) by a colleague not involved in this study for 30 consecutive days; or no additive to food was added (control group).

The employed amount was determined by averaging the conventional amount of pepper consumption by a group of ordinary people in a local restaurant.

The three groups were labeled as "A", "B" or "C" by the same colleague and the coding was disclosed only after the statistical analyses were performed.

Noninflamed, inflamed and total facial acne lesions were counted at baseline, on week 2 and at the endpoint.

Within the study period the patients were instructed to not use any anti-acne medication and all consumed their prescribed diet only.

All the patients completed this study.

Statistical analysis: Data analysis was performed using the SPSS software version 16.0 (SPSS Inc., IL, USA). The chi-square test, one-way ANOVA, or Repeated Measures Analysis (RMA) were used where appropriate. The p-values ≤ 0.05 were considered as significant.

RESULTS

In red pepper group there were 11 males (73.3%) and 4 females (26.7%) with a mean age of 17.8 ± 5.1 years (range: 12-27). In black pepper there were 6 males (40%) and 9 females (60%) with a mean age of 17.9 ± 6.3 years (range: 12-29). In the control group there were 10 males (66.7%) and 5 females (33.3%) with a mean age of 16.6 ± 5.2 years (range: 12-27). The three groups were comparable for sex ($p = 0.14$) and age ($p = 0.78$). The mean duration of the disease was 3.0 ± 1.6 years (range: 1-7), 3.5 ± 1.8 years (range: 1-6) and 3.1 ± 1.5 years (range: 1-6), respectively ($p = 0.66$). The mean counts of acne lesions on the face of patients in the three groups are summarized in Table 1.

Table 1: Mean facial acne lesions at baseline, on week 2 and at endpoint in three groups receiving red pepper, black pepper and no pepper (controls)

Lesion	Red pepper group (n = 15)	Black pepper group (n = 15)	Control (n = 15)
Noninflamed			
Baseline	21.3±4.9 (15-29)	22.7±3.6 (15-27)	20.5±4.5 (14-29)
Week 2	20.6±5.2 (12-28)	21.8±3.8 (14-28)	18.9±3.9 (12-25)
Endpoint	20.3±5.4 (11-26)	22.8±2.7 (28-27)	20.2±4.8 (11-27)
Inflamed			
Baseline	25.1±5.8 (17-36)	23.9±5.6 (17-36)	23.0±4.9 (17-32)
Week 2	24.9±6.3 (18-36)	23.3±5.6 (19-36)	22.9±4.0 (18-32)
Endpoint	24.7±7.3 (14-36)	23.7±4.5 (18-33)	22.7±5.2 (14-36)
Total			
Baseline	46.5±9.2 (36-65)	46.6±8.1 (36-63)	43.5±7.2 (36-60)
Week 2	45.5±10.1 (30-62)	45.1±7.4 (33-59)	41.9±5.5 (30-51)
Endpoint	45.0±11.8 (25-61)	46.5±6.3 (36-57)	42.9±8.5 (25-61)

Data is presented as Mean±SD

From baseline to the endpoint, changes of the mean count of noninflamed, inflamed and total acne lesions on the face were not significantly different between the three groups ($p = 0.22, 0.54$ and 0.46 , respectively).

No significant complications were reported by the patients in the red and black groups.

DISCUSSION

From a historical viewpoint, the relationship between diet and acne lesion has been always controversial. While old studies, particularly those performed before the 1960s, proposed that some certain foods and additives may exacerbate acne lesions, many of these alleged association were dispelled by subsequent studies (Bowe *et al.*, 2010).

Some connections between diet and acne, however, are remained neglected and need to be clarified scientifically.

In this study, for the first time in the literature, the effect of adding red and black types of pepper to daily diet of patients with mild-to-moderate acne vulgaris was investigated.

According to these findings, neither black nor red pepper had significant effect on the count of acne lesions on the face of the patients in comparison with the controls who were on a regular, pepper-free diet.

For the first time, Wuthrich and Much (1978) suggested a possible effect of pepper on aggravation of acne lesions. They performed intracutaneous allergen tests with 23 different food allergens, among which red pepper showed positive results in 8.3% of patients.

The result of this study is somehow in line with our finding, because allergen test with red pepper was positive only in a minority of their population. This indicated that diet prescription might be possibly useful only in individual cases with acne vulgaris, as concluded by Wuthrich and Much (1978).

In a study by El-Akawi *et al.* (2006) on 166 acne patients, many believed that spices exacerbate their disease.

The results of the present study, at least with regard to red and black types of pepper, correct this misconception among the lay people (Davidovici and Wolf, 2010; Shakeri *et al.*, 2011a, b; Feiz *et al.*, 2012; Tarzarni *et al.*, 2012; Daghighi *et al.*, 2014; Pouriesa *et al.*, 2013).

Since general knowledge about acne vulgaris is limited among young patients, results of such studies like the present survey may be helpful to enhance patients' function against the disease (Reich *et al.*, 2007; Amirnia *et al.*, 2012).

An interesting observation in the present study was that despite expectation, red pepper not only did not aggravate acne lesions in patients with acne vulgaris but also it diminished, albeit insignificantly, the mean number of these lesions.

The beneficial effects of some botanical extract and particular spices in treatment of acne lesions are not new (Reuter *et al.*, 2010; Gupta *et al.*, 2013a, b). To the best of the author's knowledge, however, this is the first study that shows a relative beneficial effect of red pepper in acne vulgaris. This anti-acne effect of red pepper may be explained by the bioactive components present in this spice. It has been reported that some of these components show potent anti-oxidant, anti-inflammatory and anti-microbial activities (Navali *et al.*, 2011; Butt *et al.*, 2013) which are the main features of an anti-acne medication (Fouladi, 2012). This possible anti-acne effect of pepper, however, should be investigated in future studies (Baharivand *et al.*, 2013; Sabeti *et al.*, 2013).

CONCLUSION

According to the findings of this study, red or black types of pepper do not exacerbate acne vulgaris lesions in patients with mild-to-moderate disease. Red pepper, in contrast, may also ameliorate the disease mildly.

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