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## ORIGINAL ARTICLE

# Bacterial resistance in acne? A meta-analysis of the controversy<sup>☆</sup>



Mariana Alvarez-Sánchez<sup>a,\*</sup>, Ernesto Rodríguez-Ayala<sup>a</sup>,  
Rosa María Ponce-Olivera<sup>b</sup>, Andrés Tirado-Sánchez<sup>b</sup>,  
María Ivonne Arellano-Mendoza<sup>b</sup>

<sup>a</sup> Facultad de Ciencias de la Salud, Universidad Anáhuac México Norte, Huixquilucan, Mexico

<sup>b</sup> Servicio de Dermatología, Hospital General de México, México, D.F., Mexico

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### KEYWORDS

*Acne vulgaris*;  
Bacterial resistance;  
*Propionibacterium acnes*;  
Meta-analysis

### Abstract

**Background:** Acne is one of the dermatological pathologies with the highest incidence around the world. It is a multifactorial disease and its treatment can be complex. *Propionibacterium acnes* play a key role in the inflammation of this dermatosis. Topical antibiotics, including mainly erythromycin and clindamycin, have been used, but there is controversy over their use due to the widely documented bacterial resistance. For this reason a meta-analysis of the publications over the past 10 years is presented in order to confirm this hypothesis.

**Material and methods:** A search was made of the publications over the past 10 years that included the results of antibiograms of patients with acne. MeSH type searches were performed with the terms "*acne vulgaris*", "*Propionibacterium acnes*", "topical administration", "treatment", "erythromycin", "clindamycin", "nadifloxacin", "antibacterial agent", "bacterial drug resistance" in PubMed, Ovid, EBSCO, Cochrane, ScienceDirect and ClinicalKey meta-searches.

**Results:** A total of 13 articles were found that met the inclusion criteria. The mean odds ratio (OR 1.24, 95% CI) of the articles showed a slight tendency towards resistance of *P. acnes*.

**Conclusions:** An increase in bacterial resistance to topical erythromycin and clindamycin can be confirmed, thus the use of these antibiotics is recommended in selective cases for short periods, and in combination with benzoyl peroxide for the best clinical outcome in patients with acne vulgaris.

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\* Corresponding autor at: Av. Universidad Anáhuac 46, Col. Lomas Anáhuac, C.P. 52786, Huixquilucan, Mexico. Tel.: +52 55 5627 0210.  
E-mail address: [mariana.alvasa@gmail.com](mailto:mariana.alvasa@gmail.com) (M. Alvarez-Sánchez).

**PALABRAS CLAVE**

*Acne vulgaris*;  
Resistencia  
bacteriana;  
*Propionibacterium  
acnes*;  
Metaanálisis

**¿Resistencia en el acné? Un metaanálisis a propósito de la controversia****Resumen**

**Antecedentes:** El acné es una de las afecciones dermatológicas con mayor incidencia a nivel mundial; su origen es multifactorial y, por lo tanto, su tratamiento puede ser complejo. *Propionibacterium acnes* tiene un papel primordial en la inflamación de esta dermatosis y para su tratamiento se usan antibióticos tópicos; entre los principales se encuentran eritromicina y clindamicina, en los que se ha documentado una amplia resistencia bacteriana, lo que genera controversia respecto a su uso. Por este motivo se presenta un metaanálisis de las publicaciones de los últimos 10 años para confirmar esta hipótesis.

**Material y métodos:** En la literatura de los últimos 10 años se buscaron artículos sobre resultados de cultivos con antibiograma de pacientes con acné. Se realizaron búsquedas tipo MeSH con los términos «*acne vulgaris*», «*Propionibacterium acnes*», «topical administration», «treatment», «erythromycin», «clindamycin», «nadifloxacin», «antibacterial agent», «bacterial drug resistance», en los metabuscadores PubMed, Ovid, EBSCO, Cochrane, ScienceDirect y ClinicalKey.

**Resultados:** Se encontraron 13 artículos que cumplieron con los criterios de inclusión. La razón de momios promedio (OR 1.24, IC 95%) de los artículos demostró una ligera tendencia hacia la resistencia de *Propionibacterium acnes*.

**Conclusiones:** Se confirma el aumento en la resistencia bacteriana de *Propionibacterium acnes* a eritromicina y clindamicina tópica, por lo que recomendamos el uso de estos antibióticos combinados en casos selectos por periodos cortos y en combinación con peróxido de benzoilo, para obtener el mejor resultado clínico en los pacientes con *Acne vulgaris*.

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**Background**

Acne is the second major cause for dermatology consultation, therefore it is important to know how to treat it appropriately.<sup>1</sup> The treatment guidelines for *acne vulgaris* establish as their criteria: (a) the clinical variety of acne, classified as comedonal, papulo-postular, nodulocystic and (b) severity.<sup>2</sup> The most frequently used treatment for acne, and especially for papulo-postular acne, are topical antibiotics.<sup>2,3</sup> Because they have been used indiscriminately, an increased resistance to topical antibiotics<sup>4</sup> has been confirmed in *Propionibacterium acnes* (*P. acnes*), by means of cultures and antibiograms.<sup>5</sup>

In order to evaluate whether there is sufficient evidence to consider *P. acnes* resistant to topical antibiotics, we performed a meta-analysis of the articles published on the subject, and our research covered the last 10 years (2004–2013).

**Material and methods****Search strategy**

The literature published from 1 January to 31 December 2013 on the topical treatment was reviewed. The metasearch engines we used were PubMed, Ovid, EBSCO, Cochrane, ScienceDirect and ClinicalKey.

Searches were made using the following MeSH terms: “*acne vulgaris*”, “*Propionibacterium acnes*”, “topical administration”, “treatment”, “erythromycin”, “clindamycin”, “nadifloxacin”, “antibacterial agent”, “bacterial drug resistance”.

**Selection of studies**

Studies published from 1 January 2004 until 31 December 2013 (10 years) and written in English and/or Spanish were chosen. Two authors (Alvarez-Sánchez and Arellano-Mendoza) independently reviewed, assessed and chose the studies for analysis.

**Microbiological analysis**

Data relating to the method of handling samples, transport, cultures, isolation and identification of *P. acnes* were gathered and the antibiogram results of the antibiotics that are available for topical administration (clindamycin, erythromycin and nadifloxacin). They were assessed with results for: sensitivity and resistance, cut-off points of minimum inhibitory concentration or *E-strip* based on the standards of the European Committee on Antimicrobial Susceptibility Testing and the Clinical and Laboratory Standards Institute.<sup>6</sup>

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