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Review

Over-diagnosis and over-treatment in Ophthalmology: A review of the literature[☆]

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ABSTRACT

Objective: To determine if the pernicious effects of over-diagnosis and over-treatment have been studied in the most common ocular diseases.

Material and methods: Bibliographic search conducted in PubMed.

Results: The search algorithm used retrieved 29 articles related with the topic. Most of them address the issue tangentially. Only 4 of them address the problem directly. One of them focuses on the problem of over-diagnosis and over-treatment in idiopathic intracranial hypertension. The remaining 3 focus on the problem of over-diagnosis and over-treatment in glaucoma.

Conclusion: The ophthalmology community has thought very little about the detrimental effects of over-diagnosis and over-treatment.

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Sobrediagnóstico y sobretratamiento en Oftalmología: revisión de la literatura

RESUMEN

Objetivo: Determinar si los efectos perniciosos del sobrediagnóstico (*overdiagnosis*) y del sobretratamiento (*overtreatment*) han sido estudiados en las principales enfermedades oftalmológicas.

Material y métodos: Búsqueda bibliográfica en Pubmed.

Resultados: El algoritmo de búsqueda utilizado localizó 29 artículos relacionados con el tema. La mayoría de ellos abordan el tema de forma tangencial. Solo 4 artículos abordan el tema de forma directa. Uno de ellos trata el problema del sobrediagnóstico en la hipertensión

Palabras clave:

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intracraneal idiopática. Los 3 restantes tratan el sobrediagnóstico y el sobretratamiento en glaucoma.

Conclusión: La comunidad oftalmológica ha reflexionado poco sobre los efectos perjudiciales del sobrediagnóstico y el sobretratamiento.

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Introduction

In recent years, the term “overdiagnosis” has been used widely in biomedical literature. In fact, Pubmed comprises over 500 articles containing this term in their titles, most of which have been published in the past 4 years.

Said term is part of a critical current of thought that arose in medicine in recent years. On the basis of the motto “Less Is More”, it aims at reducing the excessive use of some medical actions which are unlikely to benefit the patient and on many occasions cause more damage than good. Overdiagnosis must not be confused with diagnostic errors or false positives. Even though both terms are used as synonyms in routine clinical practice, the fact is that overdiagnosis means the identification of an existing “condition” but which, in case of being left undiagnosed or untreated, would not cause symptoms or lead to the death of the patient.¹ Accordingly, overdiagnosis affects chronic diseases that evolve very slowly and occurs mainly in the context of screening programs. Even without being a diagnostic error, it leads to unnecessary treatments.

Overall concern about said issue in other areas of medicine has increased to the point that since 2013 a conference is held every year titled “Preventing Overdiagnosis” that brings together experts to discuss the problem. In addition, some bestsellers have addressed the topic.² Overdiagnosis constitutes a particularly relevant problem in the screening of breast, prostate and thyroid cancer and probably, although a lesser extent, in melanoma.³ In these tumors, screening has demonstrated to have a very small effect on mortality. It has been estimated that 25% of breast cancer cases detected by mammography, 50% of lung cancer cases detected by sputum/X-ray and up to 60% of prostate cancers detected by the prostate specific antigen (PSA), if left untreated, would not modify the vital prognosis of patients.⁴ In fact, in a recent editorial in the *New York Times*, Richard J. Ablin, the scientist who discovered PSA, referred to PSA-based prostate cancer screening as *the great prostate mistake*, and indicated that he never thought his discovery would lead to a public health disaster of such magnitude.⁵ Accordingly, the US Preventive Services Task Force has recently published a statement against PSA-based prostate cancer screening.⁶

Apart from tumors, some chronic diseases are also affected by overdiagnosis, as is the case of arterial hypertension, diabetes or osteoporosis, where the modification of diagnostic thresholds has caused significant prevalence increases.⁷ In neurology, overdiagnosis is a significant problem in

diseases such as multiple sclerosis,⁸⁻¹⁰ dementia^{10,11} and Lyme’s disease.¹² The geriatric specialty has also been affected by this problem. Some disorders like hyperactivity, hyperbilirubinemia, food allergies or bronchiolitis have multiplied their incidence several times in recent decades without any justification.⁷ In addition, the indiscriminate use of increasingly sensitive images have made the management of incidentaloma a very frequent problem.

Overdiagnosis must be suspected in situations in which, after the beginning of the screening program or diagnostic improvement, the incidence of the disease increases without mortality rates following suit.¹³ The example of melanoma has been studied in depth. Between 1930 and 1980, the incidence of melanoma increased 900%. However, mortality rates did not increase despite such a significant incidence increase. Environmental factors such as the ozone layer destruction have been signaled as culprits for said increase, and it is also true that increased life expectancy could account for a small increase in the incidence of melanoma, but it is highly likely that the application of more sensitive anatomopathological criteria and the systematic analysis of all extracted tissue are the main causes of this epidemic. It is very likely that small melanoma-like tumors regress spontaneously. In addition, human behavior tends to generate bubbles and in the case of melanoma this effect has been caused because the increased incidence of a disease increases social concern about it and produces higher numbers of visits and accordingly of diagnosed cases. This gives rise to a vicious circle that perpetuates incidence increases.¹⁴ An even larger diagnostic bubble has been described in South Korea, where the implementation of thyroid cancer screening increased the incidence of this disease 15 times without any changes in mortality rates attributable to this neoplasia¹⁵ (see Fig. 1).

To illustrate the collateral damages caused by our tendency to early diagnosis and treatment, a recently published Cochrane review about breast cancer screening concluded that, to save one woman from dying of breast cancer, between 2 and 10 women will be overdiagnosed and unnecessarily treated, between 5 and 15 women will be informed that they have breast cancer at an early stage without said precocious diagnostic improving their prognosis, and between 200 and 500 women will suffer the anxiety derived from being asked to repeat breast examinations. Of these, between 50 and 200 will be treated with biopsy.⁴

A number of studies have endeavored to find the cause of overdiagnosis. To a certain extent, the pharmaceutical industry directly promotes overdiagnosis through campaigns to

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