Special Supplement

Rethinking Dry Eye Disease: A Perspective on Clinical Implications

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ABSTRACT Publication of the DEWS report in 2007 established the state of the science of dry eye disease (DED). Since that time, new evidence suggests that a rethinking of traditional concepts of dry eye disease is in order. Specifically, new evidence on the epidemiology of the disease, as well as strategies for diagnosis, have changed the understanding of DED, which is a heterogeneous disease associated with considerable variability in presentation. These advances, along with implications for clinical care, are summarized herein. The most widely used signs of DED are poorly correlated with each other and with symptoms. While symptoms are thought to be characteristic of DED, recent studies have shown that less than 60% of subjects with other objective evidence of DED are symptomatic. Thus the use of symptoms alone in diagnosis will likely result in missing a significant percentage of DED patients, particularly with early/mild disease. This could have considerable impact in patients undergoing cataract or refractive surgery as patients with DED have less than optimal visual results. The most widely used objective signs for diagnosing DED all show greater variability between eyes and in the same eye over time compared with normal subjects. This variability is thought to be a manifestation of tear film instability which results in rapid breakup of the tearfilm between blinks and is an identifier of patients with DED. This feature emphasizes the bilateral nature of the disease in most subjects not suffering from unilateral lid or other unilateral destabilizing surface disorders. Instability of the composition of the tears also occurs in dry eye disease and shows the same variance between eyes. Finally, elevated tear osmolarity has been reported to be a global marker (present in both subtypes of the disease- aqueous-deficient dry eye and evaporative dry eye). Clinically, osmolarity has been shown to be the best single metric for diagnosis of DED and is directly related to increasing severity of disease. Clinical examination and other assessments differentiate which subtype of disease is present. With effective treatment, the tear osmolarity returns to normal, and its variability between eyes and with time disappears. Other promising markers include objective measures of visual deficits, proinflammatory molecular markers and other molecular markers, specific to each disease subtype, and panels of tear proteins. As yet, however, no single protein or panel of markers has been shown to discriminate between the major forms of DED. With the advent of new tests and technology, improved endpoints for clinical trials may be established, which in turn may allow new therapeutic agents to emerge in the foreseeable future. Accurate recognition of disease is now possible and successful management of DED appears to be within our grasp, for a majority of our patients.

KEY WORDS dry eye disease, osmolarity, inflammation, point-of-care testing, meibomian gland dysfunction, aqueous-deficient dry eye disease

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OUTLINE

I. INTRODUCTION

A. Overview

In 2007, the report of the International Dry Eye Workshop (DEWS) served as a comprehensive review of dry eye disease (DED), its pathogenesis, natural history, and methods used to diagnose the condition.[1-6] Although this report represented the state of the art in 2007, a number of important research and clinical developments have transpired since then. Accordingly, there is a need to reassess some aspects of the DEWS conclusions and recommendations in light of recent advances in diagnosis.

B. Objectives of This Publication

This report is not intended to be as comprehensive as the DEWS report but rather, aims to provide an update on dry eye for the practicing clinician. At the time of the DEWS report, many advances were imminent, and a further aim of this paper is to demonstrate their importance. One concept retained from the DEWS report and emphasized here is that of the lacrimal functional unit (LFU) maintains ocular surface homeostatis by regulating tear flow, thus conserving the tear film and corneal transparency. The LFU consists of the cornea, conjunctiva, lacrimal and meibomian glands and the lacrimal drainage system, connected reflexly by a neural network. Its failure to respond adequately to dessicating stress is a key initator of dry eye.[7]

One of the major challenges in the dry eye field is in the proper assessment of DED, a multifactorial condition. An important objective is to review recent advances in diagnosis and in grading severity and to consider their implications for patient selection criteria for clinical trials. Articles on inflammation in DED have continued to extend our knowledge of this important subject. In addition, since publication of the DEWS Report in 2007, over 140 articles on tear osmolarity have appeared in the peer-reviewed literature, making it the