EDITORIAL

Burning mouth and precision medicine

Burning mouth syndrome (BMS) or burning mouth disorder (BMD), depending upon semantics and preference, can be considered a rather enigmatic condition. To date, there is a lack of agreement among various organizations as to a unified and universally standardized definition and diagnostic criteria for this entity.[1,2] This lack of consensus creates a confusing landscape for both the practitioner (medical and dental) and the patient experiencing its signs and symptoms. Practitioners often encounter a diagnostic quandary while the patient struggles with an often-unexplained oral burning sensation. To date, there are a lack of optimally effective management strategies. An interesting model to advance our understanding and management strategies for BMS may be to follow the concepts of "precision medicine."

Precision medicine is an emerging approach to health care that recognizes differences between individuals with the aims to identify which interventions are likely to be of the greatest benefit to which patients, based on characteristics of the individual and their disease or to what seems like the same disease. The goal is to create a personalized or tailored approach to diagnosis and management specifically designed for and meeting the needs of that individual patient. Another important component is the recognition of individual disease phenotypes uncovered through analytic cluster analysis.[3] This approach will lead to improved patient outcomes through a refinement of diagnosis and management principles.

Precision medicine is defined as the clinical application of the tools and strategies of systems medicine to quantify wellness and demystify disease for the wellbeing of the individual utilizing a P4 (prediction, prevention, personalization, and participation) approach.[4] The aim is to assist practitioners in predicting who will develop disease, thus providing an opportunity to prevent disease in order to maintain health and wellness. In the event of disease development, a personalized approach to diagnosis and management of individuals will optimize outcomes. As technology is constantly advancing, patient participation in their own wellness becomes an integral part of the P4 approach, from screening for disease, to monitoring and organizing their management online, as well as using social media, telemedicine, and peer self-help groups to improve care.[3]

Predicting who has BMS needs to start with a universally accepted definition and diagnostic criteria that must undergo field testing. Additionally, developing and designing a validated questionnaire for screening BMS with representative cut-off scores would be of great value. A future source of information to predict who has BMS would involve genetic testing. Currently, studies utilizing blood samples, proteomics analyzing saliva, and neuromarkers involving brain imaging are advancing toward predictive identification. Furthermore, although still in its infancy, P4 medicine is working towards predicting who will benefit from a particular form of therapy and to predict response to that therapy.

Overall, prevention is concerned with preventing the onset of disease, preventing an asymptomatic disease from progressing to symptomatic disease, and reducing the complications caused by symptomatic disease. To accomplish this, phenotypic characterization of BMS using clinical and molecular data is required to understand the heterogeneity of disease trajectory as well as to develop rational preventative approaches. Notwithstanding, longitudinal studies following a large cohort of individuals to first determine who develops BMS and deciphering risk factors for its manifestation are first necessary.

Currently, BMS is mainly defined and managed according to a single metric that is a disease of exclusion determined by subjective reporting. Personalizing BMS needs to consider individual differences for diagnostic purposes involving genetics to environmental exposures to clinical presentation and its effects on pathways to disease. Furthermore, it must embrace the idea that individuals with different characteristics will be managed in different ways. Instead of following a "one size fits all trial and error" approach, a customized tailormade individual approach should be the management strategy of choice.

The participatory aspect of P4 medicine encourages the patient to actively manage their own wellness. It transforms the role of the "traditional" practitioner from a provider of expert advice to one of educator to empower the patient to engage in

the use of technology. The patient, with the use of mobile devices, can engage in monitoring their health, collect their own data, and manage their response to interventional strategies.

The transition to P4 medicine in BMS may appear to be somewhat naïve; however, embracing this innovative approach may prove to be greatly beneficial. Clearly, additional studies are needed to assess whether various clinical subgroups exist and whether subgroups have different clinical consequences, and response to different interventions. Novel approaches to determine physiologic phenotyping remain investigational. Various biomarkers need to be identified and analyzed in a systemic manner to predict, prevent, and personalize this condition, and be tested with properly designed validation procedures. By following this approach, practitioners will be in a much better position to diagnose and manage their patients and arrest their frustrations.

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