ADA CE Program ARTICLE 2

Implications of medical screenings of patients arriving for dental treatment

The results of a comprehensive laboratory screening

Craig S. Miller, DMD, MS; Philip M. Westgate, PhD

ABSTRACT

Background. The authors conducted medical laboratory screenings in a dental setting to determine the relationships between the laboratory test results and self-reported medical health findings.

Methods. The authors collected serum, urine and medical histories from 171 patients (116 [68 percent] women; mean age, 43.4 years) who arrived for dental treatment as a component of a clinical trial and performed complete blood cell counts, standard blood chemistry panels and urinalysis on the samples.

Results. The authors found 414 abnormal laboratory test results (an average of 2.42 per patient). Eighty-three percent of participants had one or more abnormal test results, 83 percent had abnormal test results and did not indicate a relevant disease in their medical history, and 18 percent had laboratory test results outside the 99 percent reference range (that is, > three standard deviations from the mean). Abnormal test results were significantly associated with sex, age, race and medical history ($P < .05$). Abnormal test results associated with kidney disease were related to patients with cardiovascular disease and diabetes, as well as those who tended to be on average older than 50 years.

Conclusions. The high frequency of significant abnormal laboratory test results detected in this study suggests that many patients may be unaware of their medical statuses.

Practical Implications. Abnormal laboratory test results are detected frequently in the serum and urine of patients arriving for dental treatment, which could indicate undiagnosed disease and less than optimal medical management.

Key Words. Mass screening; clinical laboratory techniques; laboratory screening; medical history taking; blood; serum; urine.

JADA 2014;145(10):1027-1035. ClinicalTrials.gov identifier NCT01308424.

doi:10.14219/jada.2014.69

Patients can have various medical conditions that may affect their dental treatment. These medical conditions may be recognized or may be unrecognized and may or may not be medically controlled by physicians. Accordingly, the contemporary medical screening process includes completion of a medical questionnaire and dialogue history as part of the risk assessment process.[1,2] However, greater insight into the patient's overall health can be gained by obtaining and analyzing biological fluids (for example, serum, saliva, urine). Yet, general dentists seldom obtain biological fluids despite the fact that the results of a 2012 study showed that patients are supportive of chairside medical screening in the dental office,[3] dentists appear willing to incorporate medical screening tests into their dental practice,[4-7] and undiagnosed conditions can be identified by conducting screenings in the dental setting.[8]

Although the authors of a few studies have evaluated screening for diabetes in the dental office setting,[6-8] there are a limited number of studies in which investigators have examined the use of multiple medical laboratory tests in the screening of patients who arrive for care in the dental office setting. We identified only one study in the literature that was conducted by Thompson and colleagues[9] who reported abnormal blood and blood chemistry test results in 39 consecutive dental patients. The results of their study showed that many patients were unaware of their medical statuses when they arrived for dental treatment. The results of this small sample–sized study, along with the fact that people are living longer and experiencing more complex medical conditions,[10,11] suggests that additional studies of the medical statuses of dental patients are needed. Thus, we conducted a study to examine the health statuses of a large group of people who arrived for dental treatment in an outpatient dental clinic setting on the basis of their medical histories and laboratory screening test results.

Dr. Miller is a professor of oral medicine, Department of Oral Health Practice, Center for Oral Health Research, Oral Medicine Section, MN 324, College of Dentistry, University of Kentucky, 800 Rose St., Lexington, Ky. 40536-0297, e-mail cmiller@uky.edu. Address correspondence to Dr. Miller. **Dr. Westgate** is an assistant professor, Department of Biostatistics, College of Public Health, University of Kentucky, Lexington.

METHODS

Participants. Our investigation was a substudy of a prospective, randomized, placebo-controlled clinical trial that was performed in an outpatient dental clinic setting. Four sites participated: the College of Dentistry, University of Kentucky; School of Dental Medicine, University at Buffalo, The State University of New York; the School of Dental Medicine, University of Pittsburgh; and a private family dentistry practice in Norwich, N.Y. The study protocol was standardized across the four sites. We recruited from the four sites participants who had a history of recurrent herpes labialis and were due to undergo a routine dental procedure. We enrolled only participants who had a history of recurrent herpes labialis (who averaged > two outbreaks of herpes labialis per year), who experienced prodromal symptoms during at least 75 percent of previous herpes labialis episodes, who had a history of at least one-half of herpes labialis episodes producing classical lesions, and who needed to undergo a routine dental procedure. Our inclusion criteria were that participants had to be able to provide written informed consent and be asymptomatic, immunocompetent and herpes simplex virus (HSV) seropositive. The dental procedure that needed to be performed had to be a general dentistry procedure that might induce herpes labialis, such as routine and invasive periodontal procedures (that is, prophylaxis, root scaling or surgery); the initial placement of orthodontic bands, brackets or wires; a restorative procedure involving the placement of a rubber dam clamp; or oral surgical procedures (for example, tooth extraction, implant placement, biopsy, bony resection, cosmetic surgery). The dental procedure had to be performed at an appointment subsequent to the medical screening appointment.

The study population was composed of men and women who volunteered, reported having good general health and were at least 18 years old. We excluded people if they weighed less than 100 pounds; were immunosuppressed or taking immunosuppressant medication; regularly developed other types of oral lesions (that is, aphthous stomatitis); were HSV seronegative; had clinical evidence of an active oral HSV lesion at the beginning of the study; had used antiviral therapy (topical or oral) within one week before study enrollment; had participated in an investigational clinical trial in the preceding three months; were pregnant or breastfeeding or were not taking oral contraceptives and were of childbearing age and had not used two concurrent different forms of contraception for two months before the start of the trial; or were allergic to study medication (to be given after dental treatment) as determined from information recorded on a standardized medical history form, followed by dialogue history obtained by clinicians whose techniques were calibrated at each site. We obtained informed consent from each participant before he or she participated in the study, and all participants were financially compensated for their time. The institutional review board of each site approved the study, which was conducted between Jan. 1, 2011, and Oct. 30, 2012.

Sample analysis. At the screening appointment, we collected venous blood and urine by using standard methods. We processed serum and urine samples and sent them to University of Rochester Medical Center laboratory (Rochester, N.Y.), where they underwent complete blood cell counts, standard blood chemistry panels and urinalyses (n = 35 tests per patient) (Table 1). The University of Rochester Medical Center laboratory has received a Clinical Laboratory Improvement Amendments certificate, is accredited by the College of American Pathologists and has standardized adherence to quality assurance. We advised participants if they had any abnormal laboratory values and advised them to contact their physicians regarding any necessary intervention.

Data analysis. Most of our statistical analyses focused on categorical associations. Owing to small percentages that were observed in multiple analyses, we conducted two-sided Fisher exact tests. We conducted two-sample *t* tests to compare mean ages for participants with and without abnormal laboratory test results. For analyses in which the mean number of abnormal test result values was predicted by means of sex and medical history, we performed *t* tests from linear regression models with robust standard errors. We performed analyses by using statistical software (SAS Version 9.3, SAS Institute, Cary, N.C.). All tests were two-sided with a 5 percent significance level. As this was an exploratory study in which multiple statistical tests were conducted, we report both *P* values (*P*) and adjusted *P* values (*P*a), which we adjusted based on a 0.05 false discovery rate by using Benjamini and Hochberg's method.[12]

RESULTS

Patient characteristics. The study population consisted of 171 participants: five from Family Dentistry (Norwich, N.Y.), 92 from the University at Buffalo, 47 from the University of Kentucky and 27 from the University of Pittsburgh. Sixty-eight percent were women, 42 percent were dental patients of record at the dental facilities, and all received dental treatment. Ages ranged from 19 to 77 (mean 43.4) years. Twenty-seven percent were younger than 30 years, 13 percent were aged between 30 and 40 years, 22 percent were aged 41 to 50 years, 27 percent were aged 51 to 60 years, and 12 percent were aged 61 to 77 years. Most participants identified their race as white (79.5 percent), 17.5 percent as African American and 3 percent as Asian. The mean (standard deviation [SD])

ABBREVIATION KEY. **ALP:** Alkaline phosphatase. **AST:** Aspartate aminotransferase. **CVD:** Cardiovascular disease. **F:** Female. **GI:** Gastrointestinal. **HCT:** Hematocrit. **HGB:** Hemoglobin. **HSV:** Herpes simplex virus. **M:** Male. **RBC:** Red blood cell. **WBC:** White blood cell.