

Comment on: use of blood biomarkers to screen for obstructive sleep apnea

Burton Abrams

Zeger-Abrams Inc., Elkins Park, PA,
USA

Dear editor

The recently published paper in *Nature and Science of Sleep*¹ describes a combination of blood biomarkers for obstructive sleep apnea (OSA) screening which is shown to have better sensitivity and selectivity than any one individually. The combination comprises elevated levels of glycated hemoglobin (HbA1c), C-reactive protein, and erythropoietin. The combination algorithm alluded to in the paper requires a sufficiently elevated level above a threshold of the combination of the three constituents for further diagnostic testing to be recommended. Of course, OSA would have to have been present long enough for the elevated levels to occur in order for the proposed biomarker to indicate its likely presence. My comment on this paper questions not whether this screening tool is valid, but whether it is valid early enough in the development of OSA to initiate diagnosis and treatment before some irreversible life-threatening consequence of OSA develops.

In particular, I focus on HbA1c, which when elevated above 5.7% indicates prediabetes or diabetes, a recognized common consequence of OSA which risks the quality and length of life. The meta-analyses in^{2,3} conclude that overcoming OSA does not generally reduce HbA1c, although it may improve insulin sensitivity. Insulin insufficiency from beta cell dysfunction and mass reduction remains to keep HbA1c elevated, and diabetes is still a threat.

There is another biomarker, although not a blood biomarker, which appears earlier in the development of OSA. It is the formation of monosodium urate crystals on patellar, biceps, or quadriceps tendons, where they are detectable by ultrasonic means.⁴ The intermittent hypoxemia which results from OSA causes three effects which quickly elevate the concentration of serum uric acid, often leading to the precipitation of monosodium urate crystals: 1) intermittent cell catabolism which culminates irreversibly in the generation of excess uric acid fed into the blood; 2) concurrent intermittent serum acidosis and hypercapnia which reduces the solubility of uric acid in the blood; and 3) gradual reduction of the kidneys' glomerular filtration rate which slows removal of serum uric acid. Once formed, the crystals dissolve very slowly, which allows for their detection at any time convenient for OSA screening.

Correspondence: Burton Abrams
221 Linden Drive, Elkins Park, PA 19027,
USA
Email burtabrams@hotmail.com

Disclosure

The author reports no conflicts of interest in this communication.

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Authors' reply

Wesley Elon Fleming¹
 Jon-Erik C Holty²
 Richard K Bogan³
 Dennis Hwang⁴
 Aliya S Ferouz-Colborn⁴
 Rohit Budhiraja⁵
 Susan Redline⁵
 Edith Mensah-Osman⁶
 Nadir Ishag Osman⁶
 Qing Li⁷
 Armaghan Azad¹
 Susann Podolak¹
 Michael K Samoszuk⁸
 Amabelle B Cruz⁸
 Yang Bai⁸
 Jiuliu Lu⁸
 John S Riley⁸
 Paula C Southwick⁸

¹Sleep Center Orange County, Irvine, CA, USA; ²Stanford Medical School, VA Palo Alto Health Care System, Pulmonary, Critical Care and Sleep Medicine Section, Palo Alto, CA, USA; ³SleepMed Inc., Bogan Sleep Consultants, LLC, Columbia, SC, USA; ⁴Sleep Medicine Department, Southern California Permanente Medical Group, Kaiser Permanente, Fontana Medical Center, Fontana, CA, USA; ⁵Division of Sleep Medicine, Harvard Medical School, Brigham and Women's Hospital, Boston, MA, USA; ⁶EENA Comprehensive Neurology and Sleep Center, Boynton Beach, FL, USA; ⁷South Bend Medical Foundation, New Technology and Test Development, South Bend, IN, USA; ⁸Clinical Research Department, Beckman Coulter, Inc., Brea, CA, USA

Correspondence: Wesley Elon Fleming
 Sleep Center Orange County, 4980 Barranca Pkwy, Ste 170, Irvine, CA 92604, USA
 Tel +1 949 679 5510
 Fax +1 949 679 1080
 Email flemingwesley@gmail.com

Dear editor

We would like to thank Burton Abrams, MS, for the letter in response to our recently published article.

Mr Abrams questions whether our new screening tool is valid early enough in the development of OSA to initiate diagnosis and treatment before irreversible life-threatening consequences of OSA develop. We would like to reiterate that the algorithm score derived from a combination of three biomarkers correlated with severity of disease (none, mild, moderate, severe), allowing sleep centers to identify and triage lower- to higher-risk patients for sleep study testing and treatment. In addition, the combination of biomarkers performed significantly better than current screening methods. Given that up to 90% of individuals with obstructive sleep apnea (OSA) remain undiagnosed and untreated, this new screening tool represents a substantial improvement in early identification of OSA.

Mr Abrams' work on ultrasonic detection of monosodium urate is interesting, and we commend any effort to improve upon the early detection of OSA.

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Disclosure

Drs Samoszuk, Riley, and Southwick, as well as Ms Cruz, Mr Bai, and Mr Lu are employed by Beckman Coulter. The authors report no other conflicts of interest in this communication.

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