

OBSERVATIONS

Glucose-6-Phosphate Dehydrogenase Deficiency and Type 2 Diabetes

Glucose-6-phosphate dehydrogenase (G6PD) deficiency is a common X-linked human enzyme defect (1). There are a few reports that link G6PD deficiency to diabetes (2–4).

We undertook a cross-sectional study at Maccabi Healthcare Services, an Israeli HMO serving two million members. All interactions and information are captured on an electronic medical record. Our study population included all male members aged ≥ 25 years who were tested for G6PD between 2003 and 2010 and were found positive (a quantitative G6PD < 7 U/g Hb). The testing was undertaken on a Trinity Olympus 2700 in the same central laboratory. All results from 2003 to 2010 were included. Patients with diabetes were drawn from our validated computerized registries (5). Our analysis was of the whole male Maccabi population stratified by age-group, presence in the diabetes register (yes/no), and G6PD deficiency (yes/no). The data were statistically analyzed by a standard statistical package (SPSS 15.0, Chicago, IL).

Among 940,085 individuals, 52,371 had G6PD deficiency. We found a significantly higher proportion of patients with G6PD deficiency among the diabetic population aged 45–64 years ($P = 0.002$; odds ratio 1.44 [95% CI: 1.145–1.815]) than would be expected by chance. We did not find a significant difference in HbA_{1c} levels between the groups with and without G6PD deficiency.

These results showed a significantly increased association between prevalence of diabetes in the 45–65-year-old age-group among patients with G6PD deficiency when compared with the general population. This association may in fact be an underestimate in view of the fact that many individuals with G6PD deficiency in the general population have not undergone G6PD testing in our HMO or will have undergone testing before 2003 and therefore will have been misclassified. This study provides further evidence of a link between G6PD deficiency and diabetes.

ANTHONY D. HEYMANN, MB, BS, MHA^{1,2}
 YOSSI COHEN, MD¹
 GABRIEL CHODICK, PHD, MHA^{1,2}

From the ¹Maccabi Healthcare Services, Tel Aviv, Israel; and the ²Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel.

Corresponding author: Anthony D. Heymann, tonyheyman@gmail.com.

DOI: 10.2337/dc11-2527

© 2012 by the American Diabetes Association. Readers may use this article as long as the work is properly cited, the use is educational and not for

profit, and the work is not altered. See <http://creativecommons.org/licenses/by-nc-nd/3.0/> for details.

Acknowledgments—No potential conflicts of interest relevant to this article were reported.

G.C. and Y.C. reviewed and edited the manuscript. A.D.H. researched data and wrote the manuscript. G.C. was responsible for the statistics. A.D.H. is the guarantor of this work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

References

1. Nkhoma ET, Poole C, Vannappagari V, Hall SA, Beutler E. The global prevalence of glucose-6-phosphate dehydrogenase deficiency: a systematic review and meta-analysis. *Blood Cells Mol Dis* 2009;42:267–278
2. Cappai G, Songini M, Doria A, Cavallerano JD, Lorenzi M. Increased prevalence of proliferative retinopathy in patients with type 1 diabetes who are deficient in glucose-6-phosphate dehydrogenase. *Diabetologia* 2011;54:1539–1542
3. Gaskin RS, Estwick D, Peddi R. G6PD deficiency: its role in the high prevalence of hypertension and diabetes mellitus. *Ethn Dis* 2001;11:749–754
4. Lee JW, Choi AH, Ham M, et al. G6PD up-regulation promotes pancreatic beta-cell dysfunction. *Endocrinology* 2011;152:793–803
5. Heymann AD, Chodick G, Halkin H, et al. The implementation of managed care for diabetes using medical informatics in a large Preferred Provider Organization. *Diabetes Res Clin Pract* 2006;71:290–298