Medical underwriters may be significantly underestimating the underwriting significance and screening value of a glycosylated hemoglobin (GHb) assay in the presence of a normal glucose finding. A recent study (1) by one of the authors (DLW) found that adding GHb to an initial screening blood profile detected 20% more cases than screening with glucose alone. These cases (high GHb, normal glucose) had a high (86%) correlation with clinical abnormalities.

In this study, 557 consecutive community hospital admissions were studied, excluding obstetrics and pediatrics. Patients were considered to have evidence of abnormal glucose tolerance if they had a fasting glucose greater than 140 mg/dl, random glucose greater than 200 mg/dl (2) or glycosylated hemoglobin above 10% (normal values 6.4%-9.6%). Using these three criteria, 107 patients were identified. The results are shown in Graph A.

If glycosylated hemoglobin was added to the initial case finding profile, 21 additional cases are found. Of these 21 (19% of the 107 potential suspicious cases), 18 were associated with a clinical correlate: Known diabetes, 7; drug-induced intolerance, 6; disease-induced intolerance, 5 (see Graph B). Seven of 49 of the diabetic patients would have been discovered only by measuring GHb. Six of the 20 drug-induced intolerance patients may have been identified as being higher insurance risks if urine had been tested for antihypertensive drugs. However, according to at least one author (3), thiazide diabetes is “most likely to occur in patients predisposed to diabetes.”
Importance of Detecting Diabetes

In terms of mortality and morbidity in America, few diseases are as important as diabetes. Over 500,000 people have Type I; over 12 million people have Type II. About 600,000 new diagnoses of these diseases are made every year, yet perhaps 5 million cases will go undiagnosed. About 5 percent of Americans have diabetes of one form or another. It is probably the number two cause of death in the U.S. today. Diabetes is thought to decrease life expectancy by approximately one third (4).

However, we believe that screening for diabetes may not be vigorous enough. One study (5) showed that the majority of insurance companies use blood profiles as routine tests, required at age/amount thresholds. Yet very few use glycosylated hemoglobins in mandatory screening, though the majority use them to investigate histories and will reduce a diabetic rating when GHb is normal. One proposal (6) advocates rating applicants primarily on the basis of levels of HbA1c and duration of illness.

Glycosylated Hemoglobin

The glycosylated hemoglobin assay has been shown to be effective as a retrospective index of glucose control over time with diabetes (7-9). The assay has been demonstrated to correlate with mean plasma glucose levels (10-12), 24-hour urinary glucose concentrations (13-14), and has been useful as a clinical assay (15). In conjunction with fasting glucose levels, GHb has been used as an insurance underwriting criterion (16). However, in insurance usage, GHb's are not performed on all specimens, only on those in which an abnormal glucose is detected. Furthermore, if the glucose is abnormal and the GHb is normal, the elevated glucose is generally disregarded, the assumption being that the test was probably not drawn on a fasting basis.

Cost Analysis

The addition of GHb to the screen needs to be analyzed on a benefit versus cost basis. Analysis of cost can be complex. Additionally, the cost per sample is strongly dependent on the number of samples analyzed and the frequency with which the analysis is performed.

At present, laboratory fees for a GHb are approximately $15, compared to $17 for a complete blood profile. Over 500 companies perform blood profiles on almost 17,000 applicants per month. Of these blood profiles, approximately nine percent have an abnormal glucose level, triggering lab performance of GHb levels (17).

Discussion

In our study, 10% of case findings would not have been found without using GHb. Using glucose alone, the case finding rate was 15.4% (86 out of 557). Adding GHb increased the yield from 15.4% to 19.2% or an increase of 25%. In the insurance population, approximately 9% have an abnormal glucose level. One might speculate that by adding GHb the yield would be increased 25% to 11.2%. That is, an additional 2.2% of the entire insurance population might be found to have an impairment which should be underwritten.

Of course, the results obtained on hospitalized patients are not necessarily representative of those observed on insurance applicants. The incidence of laboratory abnormalities is obviously higher in a hospitalized population. There is an absolute higher number of "positives," both for glucose and for GHb. However, there may be a fixed relationship between "positive glucose" and "positive GHb." That is, it may be that GHb gives a relative increase in screening value which is more or less constant. In fact, our sample of hospitalized patients had several factors which would minimize the number of abnormal GHb values. Hospitalized patients have a higher incidence of anemia and tend to have erythrocytes with shortened lives, both factors known to decrease GHb levels. The potential of GHb as a screening tool cannot be ignored.

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References


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