Singapore Med J 1998; Vol 39(1):38-41

What You Need To Know: Detecting Alcohol Problems in General Medical Practice

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ABSTRACT

In the US, about 11% to 20% of patients presenting to general medical clinics are diagnosed as suffering from alcohol abuse or dependence. Alcohol screening in primary care settings, whether in the US or Singapore, can utilise various strategies for the early detection of alcohol problems. This paper briefly reviews several self-reports and screening procedures to assist general practitioners in identifying problem drinkers.

The use of CAGE questionnaire, MAST, and its variation, SAAST and the AUDIT, are discussed and evaluated. Likewise, useful biochemical markers of excessive alcohol consumption like the liver enzymes (AST, ALT, GGT), MCV, CDT are described. They can be combined with each other to improve validity or used in conjunction with self-report screening tests for more accurate detection of problem drinkers.

In particular, use of the AUDIT for routine screening of alcohol problems in primary care settings is recommended. Selective administration to those with at least two drinks per setting can overcome time constraints. Alternatively, sequential screening utilising the TRAUMA questionnaire with frequency and quantity questions administered to higher frequency drinkers can circumvent concerns about direct questioning. Use of self-reports and when possible, biochemical screening for alcohol problems should be a standard part of primary care practice.

Keywords: Alcohol screening, CAGE; MAST; SAAST; AUDIT; TRAUMA questionnaires, AST; ALT; GGT; MCV; CDT, problem drinkers, general medical practice, primary care settings

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INTRODUCTION

Although problem drinkers rarely volunteer for alcohol treatment, they tend to use general medical services at rates exceeding those of other patients. This is probably not surprising since misuse of alcohol is associated with increased risk for a variety of health problems including liver disease, gastro-intestinal difficulties, certain types of cancer, cardiomyopathy, neurologic and psychiatric symptoms, and trauma[1]. In fact, in the United States, 11% to 20% of patients presenting to general medical clinics are diagnosable as abusers of or dependent on alcohol[2]. A study conducted in orthopaedic, surgical and medical wards of the General Hospital in Kuala Lumpur found that approximately 10% of the patients satisfied diagnostic criteria for alcohol abuse or dependence[3].

General practitioners can serve as an important focal point for detecting alcohol problems. Further, in many instances they can successfully treat these difficulties, at least in early stages, without the need for referral to more intensive, alcohol-specific clinics and rehabilitation programs. Techniques for medically-based brief intervention and results of research studies on the strategy are summarised by Bien and colleagues[4]. Promising new medications such as naltrexone and acamprosate have also extended the range of alcohol treatment options available to general practitioners. In instances when patients fail to respond to these approaches or if the level of alcohol dependence is severe, staff may also make appropriate referrals to specialised alcoholism treatment services.

In this paper, we briefly review several self-reports and laboratory screening procedures that can assist primary care providers in identifying alcohol problems in their patients.

CAGE

"CAGE" is a mnemonic to aid physicians in remembering the key words for the four items comprising the scale. While the items may be asked in isolation, they are typically embedded in the context of a patient's interview:

i) Have you ever felt you should **cut down** on your drinking?
ii) Have people **annoyed** you by criticising your drinking?
iii) Have you ever felt bad or **guilty** about your drinking?
iv) Have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover? ("**eye opener**")

The CAGE[5] is one of the oldest alcoholism screening tests and due to its ease of administration, is likely the most commonly employed. Typically, the cut-off score is 2 affirmative answers, although some commentators and researchers recommend a cut-off of only 1. The test demonstrates generally moderate to high sensitivity (60% to 95%) and specificity (40% to 95%) against a criterion of alcohol dependence. ("Sensitivity" refers to the

percentage of true positive cases that the test detects. "Specificity" refers to the percentage of true negatives that the test identifies)

Despite its brevity and overall validity, the CAGE has been criticised for not distinguishing current from past drinking problems, failing to ascertain frequency and level of drinking, and attending too heavily to psychological reactions to drinking. The emotional terms in CAGE questions may also cause ambiguities and difficulties in translation from English to other languages and cultural differences in this regard, may compromise validity and reliability[3]. Interestingly, several variants of the CAGE have been devised, such as the T-ACE and the TWEAK. These alternative versions include an item on tolerance to alcohol effects. Early evidence suggests that they may perform better than CAGE, particularly in screening for alcohol problems among pregnant women[6].

Michigan Alcoholism Screening Test (MAST)

As with the CAGE, the Michigan Alcoholism Screening Test (MAST)[7] has been available for a considerable amount of time and has been intensively researched. The MAST consists of 25 questions dealing primarily with alcohol-related disabilities, help seeking behaviour and recognition of a drinking problem[8]. The usual cut-off for the test is 5 and the median sensitivity and specificity in medical patients appear to be 86% and 84% respectively[9]. Several studies have suggested that the MAST is somewhat more valid than the CAGE, likely due to its greater length and more comprehensive coverage of alcoholism symptoms. Similar to those in the CAGE, MAST questions imply lifetime occurrence, even if the problem has now been resolved. Several derivative scales of the MAST exist to include the Brief MAST, the Malmo-modification of the MAST, and the Short MAST. While these versions have fewer items than the original scale, their validities tend to be lower. The Veterans Administration Screening Test (VAST)[10] improves on the MAST and its variants by asking the time period on which endorsement of the item is based.

Perhaps the most improved revision of the MAST is the Self-Administered Alcoholism Screening Test (SAAST)[11]. The SAAST is slightly longer than its parent instrument and requires around 10 minutes for administration and scoring. It appears to offer three significant advantages over the MAST. It asks about additional alcoholism symptoms and may be self-administered. Finally, it credits equal unit weights to all items while MAST questions have varying weights. (Such differential weighting may be idiosyncratic to the sample from which the MAST was derived. Due to the MAST weighting scheme also, a large number of points may be accorded for a single incident, such as being injured in an automobile accident while driving intoxicated and subsequently being detained by the police). Interestingly, spouses of alcoholics can vicariously respond to the SAAST for their partners and provide results approximately as revealing of a problem as if the alcoholic personally completed the test[12].

Alcohol Use Disorder Identification Test (AUDIT)

The Alcohol Use Disorders Identification Test (AUDIT) was developed by the World Health Organization in an international multi-site trial[13]. The authors gave particular attention to selecting items generalisable across cultures, genders and ages. Items were also chosen to elicit responses that could serve as the basis for brief motivational intervention should an alcohol problem be present. While not definitive, several studies suggest that these goals were largely achieved. Although most alcohol screening tests have been designed to identify chronic drinking problems, the AUDIT attempts to detect earlier stages of drinking which place the patient at risk for eventually suffering severe difficulties. Questions on the AUDIT tap the three domains of consumption, alcohol dependence and adverse consequences of drinking.

The AUDIT requires about two minutes for administration and scoring. It can be given orally, in writing, or via computer terminal and is often administered within the context of a general health risk appraisal questionnaire (a copy of which is obtainable from the authors). Most of the AUDIT questions inquire about the previous year rather than ever in the patient's lifetime, thereby decreasing errors of mislabelling individuals who have already resolved earlier problems with alcohol. At a cut-off value of 8 of the possible 40 points on the test, sensitivity and specificity coefficients tend to average in at least the 80's.

Among the strengths of the AUDIT are a high degree of validity, ease of administration, focus on alcohol problems at more treatable stages, and appropriateness for patients with widely varying demographic characteristics. Although no weaknesses of the AUDIT have yet to be demonstrated, more research is clearly needed to fully establish its appropriateness for other cultures, especially for Orientals since no Asian country was included in the WHO study or in any published validational study. It did, however, appear to perform well in a recent emergency room study in Thailand[14]. Further, while AUDIT results correspond well with diagnoses of alcohol problems based on time-intensive, structured diagnostic interviews, it must be borne in mind that at least some of this relationship may be due to sharing quite similar items. Finally, relationships between AUDIT findings and results from biochemical tests or other self-report alcohol screening methods are mixed. In several projects, results from the alternative measures are in close agreement, whereas in a number of other investigations, they are somewhat discrepant. Notwithstanding the above concerns, current research suggests that the AUDIT would prove especially helpful in the general medical practice in Singapore.

Liver enzymes

Chronic heavy alcohol consumption is often reflected by serum elevation of several liver enzymes, including gamma glutamyl transpeptidase (GGT), aspartate aminotransferase (AST) (also known as glutamic oxaloacetic transaminase), and alanine aminotransferase (ALT) (or glutamic pyruvic

transaminase). Of these, the most widely used for clinical purposes is GGT. Increased synthesis of GGT by liver cells and/or leakage of GGT from liver cells damaged or destroyed by chronic alcohol intake have been posited as possible bases for alcohol-induced elevations in GGT. Although relationships between amount, duration, and history of drinking and GGT level have not been well characterised, it appears that daily consumption of more than 40g of alcohol (slightly three or four standard drinks) significantly elevates serum GGT in chronic alcoholics. Interestingly, acute drinking episodes do not seem to raise GGT in non-alcoholics. For example, Salmela et al[15] reported no increase in GGT in healthy male social drinkers following three weeks of drinking 60g of alcohol per day. Thus, GGT appears to be primarily an indicator of alcohol problems in individuals who have consumed heavily over a long period of time. After drinking has ceased, it usually returns to normal levels in four or five weeks. The half-life of GGT is between 14 and 26 days.

Sensitivity of GGT is extremely variable. It generally displays modest to high sensitivity in distinguishing chronic heavy drinkers from teetotalers or very light social drinkers[16]. Sensitivity, however, drops dramatically when a heterogeneous, non-alcoholism treatment population is being screened. Perhaps, even more problematic is specificity of GGT. A host of factors other than drinking can elevate GGT levels and produce false positive results. These include non-alcoholic liver disease, biliary tract disease, inflammation, blood-clotting disorders, several heart and kidney diseases, severe trauma, hyperthyroidism, obesity and use of barbiturates or other anti-epileptic medications.

AST and ALT suffer many of the same problems as GGT and in fact, may even be less sensitive than GGT[16]. Since AST is also present in skeletal muscles and heart cells, it may be elevated during myocardial infarctions and muscular disorders. Curiously, the two enzymes may respond differentially to alcohol-induced and non-alcohol-induced liver diseases with the ratio of AST/ALT being higher for alcohol-related liver disease[17,18].

Mean Corpuscular Volume (MCV)

Macrocytosis (increased size of red blood cells) may also be employed as a marker of chronic heavy drinking. Its measurement is expressed as the average size of red blood cells and is known as "mean corpuscular volume" (MCV). The mechanism underlying the effect of alcohol on red blood cell size remains unclear. Several possible explanations have been proposed, including a direct toxic effect of alcohol on red blood cells, folic acid deficiency caused by alcoholism and advanced liver disease.

Sensitivity of MCV is generally inferior to that of GGT[16]. Although specificity of MCV may surpass that of GGT, a variety of conditions, besides heavy drinking, can elevate MCV. These include folic acid deficiency, B_{12} deficiency, hypothyroidism, non-alcoholic liver disease, reticulocytosis, use of anti-epileptic drugs, increased age and smoking.

Unfortunately, red blood cell size may not return to normal values for several months following onset of abstinence, thus limiting the potential value of MCV as a screen for current heavy drinking.

Carbohydrate-deficient Transferrin (CDT)

Over the past decade, carbohydrate-deficient transferrin (CDT) has emerged as a particularly promising and practicable marker of alcohol consumption[19]. Transferrin is a blood glycoprotein that transports iron throughout the body. With heavy drinking, the carbohydrate content of transferrin may decrease, thus the name "carbohydrate-deficient transferrin." Recent studies suggest that enzymes responsible for adding carbohydrate groups to the transferrin protein, glycosyltransferases, as well as those involved in removing carbohydrate groups (eg, sialidase) are altered by heavy alcohol consumption.

The precise amount and duration of drinking needed to elevate serum CDT levels have yet to be delineated. It has been reported that 50-80g of alcohol per day (four to seven drinks per day) for at least one week can produce abnormal increases in CDT in alcoholics[20]. However, it has also been observed that when non-alcoholics consume up to 80g of alcohol per day for three consecutive weeks, CDT levels do not exceed normal cut-off values[15,21]. Thus, formation of CDT may occur more readily in individuals with a long-term history of heavy drinking than in social drinkers or individuals who have drunk in excess for a shorter period of time. Finally, after cessation of drinking, CDT usually returns to normal levels within a few weeks. CDT has a half-life of approximately 15 days[20].

CDT appears to produce the highest overall validity of any of the markers previously cited. Although sensitivity of CDT appears similar to that of GGT, its overall specificity is far greater. With the exceptions of primary biliary cirrhosis, chronic active hepatitis, hepatic malignancy, and some rare genetic conditions[20,22]. CDT elevation appears to reflect heavy drinking. As with more conventional markers, it is most sensitive when used in alcohol treatment centers, particularly in distinguishing chronic heavy drinkers from teetotalers and light social drinkers[19]. It is less sensitive in a general population in which the goal is to differentiate heavy drinkers from those consuming at moderate or low levels. Unfortunately, testing for CDT is currently more expensive than testing of traditional liver enzymes and MCV, which are often included in a standard blood profile.

Each of the current biological markers of alcohol consumption is at least somewhat deficient in validity. One strategy to enhance validity is to employ two or more tests and require that only one test be positive to label the case positive. Recent investigations have suggested that combining CDT with a traditional marker significantly improves accuracy. For example, at least 8 studies have now shown that adherence to the simple decision rule that if either CDT or GGT is above cut-off, the case is classified as positive markedly improves sensitivity with little loss of specificity. Studies continue to be needed to develop more effective combinations of alcohol screens,

particularly joint consideration of biological markers and self-report screens.

Considerations for alcohol screening in primary care settings

The alcoholism research and treatment practice literature offer several suggestions to enhance validity and utility of alcohol screening. Most importantly, if screening involves a self-report measure, the patient should be interviewed in a totally sober state, questions should be clear and rapport established. Some commentators have further recommended that alcohol-related items should be embedded in a general health risk appraisal interview which includes items related to smoking, exercise, diet, etc.

Use of a non-threatening "pre-screen" has also been advocated. In a recent study contrasting the efficacy of brief intervention for alcohol problems versus that of simple advice in primary care practice, patients were pre-screened based on their responses to five items related to history of trauma[23]. Only those who responded affirmatively to at least two of the items were subsequently asked about usual frequency and quantity of alcohol consumed. Finally, only remaining subjects who reported consuming 36 or more drinks during a 30-day period or had 5 or more drinks or at least 4 days during the time frame were administered the CAGE. The authors estimated that adherence to this sequential screening strategy still resulted in correct identification of about 70% of problem drinkers.

While a very large scale epidemiological study demonstrated that direct questions about average daily consumption or frequency of heavy consumption were less sensitive than standard self-report screening tests such as those described earlier, restricting use of self-report screening tests to individuals who report customarily consuming at least two drinks per setting would retain over 90% of the alcohol dependent while eliminating over a fourth of subjects in the original, unselected screening pool.

CONCLUSION

In light of several studies cited earlier, we would recommend that the AUDIT be routinely employed to screen for alcohol problems in primary care settings. Should time limit universal application of the AUDIT, it could be selectively administered only to those individuals who report typically consuming at least two drinks at one setting. The AUDIT might also be included in a health risk appraisal questionnaire.

The biochemical markers, especially CDT and GGT, while less valid than self-report measures, can also assist in identifying alcoholics. Further, providing the patient information based on biochemical status may be more potent in eliciting motivation for changing drinking behavior than results on the self-report screening tests.

Granted the prevalence of alcohol-related problems in primary care patients, the adverse consequences of heavy drinking and the low cost of screening for alcohol problems, use of self-report and when possible, biochemical screening for alcohol problems should become a standard part of primary care practice.

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