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Contemporary Issues in Clinical Biochemistry

Clinical Biochemistry of Alcoholism

Edited by

Sidney B. Rosalki

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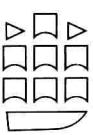

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Clinical Biochemistry of Alcoholism

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Preface

With more than two per cent of the population consuming harmful quantities of alcohol, and alcoholism on the increase, the clinical and biochemical consequences of alcohol abuse are assuming expanding importance in medical practice.

Alcohol excess can damage any organ and can give rise to a vast array of biochemical abnormalities. With this in mind, it seemed timely to bring clinicians and biochemists together, to examine some of the origins and effects of ethanol over-indulgence. This volume commences with a broad view of alcoholism in the community, concentrating on predisposing factors and the recognition of alcohol intake and alcoholism. The effects of alcohol on metabolism and on individual body systems are then considered in detail, paying particular attention to the biochemical consequences.

Each chapter is comprehensive in scope, and combines to give a very full account of the clinical and biochemical features of alcoholism and its major complications.

1984 S.B.R.

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Alcoholism — an overview

INTRODUCTION

Clinical biochemistry requires an understanding of both the clinical features and the biochemical abnormalities associated with disease. In order to set the scene of this volume, this introductory chapter will provide an overview of alcoholism in the community. Alcoholism will be defined, the size of the alcoholism problem indicated, and comment made on its origins, social concomitants and outcome. Additionally, the clinical characteristics of alcoholism and its complications will be described.

DEFINING ALCOHOLISM

There is no universally agreed criterion of what constitutes alcoholism or problem drinking, and the definition of alcoholism has been and continues to be a subject of controversy (Lancet, 1977a). The term alcoholism has been variously related to the quantity of alcohol consumed (De Lint & Schmidt, 1971), the frequency and the drinking pattern (Jellinek, 1960; Keller, 1960), the presence of social, psychological or physical damage from alcohol (Jellinek, 1952), or a serious life problem related to drinking (Schuckit, 1978), or to psychological and physical dependence on alcohol (synonym: alcohol addiction) evidenced by the alcohol dependency syndrome (Jellinek, 1952; Edwards & Gross, 1976; Edwards et al, 1977). This latter is characterised by high alcohol consumption, drink-orientated behaviour, alcohol craving, tolerance to alcohol, continued drinking despite harm and withdrawal symptoms on abstinence.

Excessive use of alcohol is also difficult to define, for it varies with geographic, ethnic, and cultural factors (Lelbach, 1974). Daily intakes of greater than 150 ml of ethanol (120 g) have been considered as excessive (De Lint & Schmidt, 1971; Glatt, 1977) because of the high risk of dependency at this level (Kendell, 1979), others have set lower levels of around 80 g per day (Hetzel, 1975; Spratley & Pollak, 1977) because of the risk of organ damage. Women, however, are more susceptible than men to liver damage from alcohol (Pequignot, 1974), and although daily intakes above 80 g may

be considered excessive for males, for women 60 g ethanol per day would seem a more appropriate figure. Most upper reference limits in biological studies are set to include some 98 per cent of the healthy population, and until recently an intake of 80 g ethanol per day was exceeded by only 2 per cent of the total adult UK population (Kendall, 1979; Spratley & Pollak, 1977). However, if men and women are considered separately, a daily intake of 80 g is now exceeded by 6 per cent of men, but an intake of 60 g by only 1 per cent of women (Wilson, 1980).

Excess alcohol consumption may be considered as synonymous with 'heavy drinking' but should not be equated with 'problem' drinking or alcoholism, though it is important to recognise that heavy drinkers are potential alcoholics and that heavy drinking is a prerequisite of alcoholism. 'Problem drinking' and alcohol dependence ('addiction') are both included in the original (1952) World Health Organisation Definition of Alcoholism (Jellinek, 1952) where alcoholics are defined as 'those excessive drinkers whose dependence on alcohol has attained such a degree that it shows a noticeable mental disturbance or an interference with their bodily and mental health, their interpersonal relations, and their smooth social and economic functioning; or who show the prodromal signs of such development'. Problem drinking and dependence are, however, separated in the World Health Organisation (1977) report's use of the terms 'alcohol-related diability' and 'alcohol dependence syndrome' (Edwards et al, 1977). The definition of alcoholism as 'the repeated (intermittent or continual) ingestion of alcohol leading to dependency, physical disease or other harm' (Davies, 1973; Paton & Saunders, 1981), would include problem drinkers, alcohol 'addicts' and different drinking patterns, and would seem a useful brief definition of the disorder.

HOW MANY ALCOHOLICS?

In the UK, with a population of 55 million, there are now thought to be in excess of three quarters of a million alcoholics (Paton, Potter & Saunders, 1981). There are more than half a million alcoholics in England and Wales alone (Lancet, 1977c; Donnan & Haskey, 1977; Glatt 1977), representing some 2 per cent of the adult population. In some parts of England e.g. the North East, alcoholism is especially prevalent (Lancet, 1977), and in Scotland (British Medical Association News Review, 1979), and Ireland (O'Connor, 1978), the incidence of alcoholism is four times as frequent as in England. For every alcoholic there are at least a similar number of subjects whose drinking is at such a level ('excessive drinkers', 'excessive users', 'problem drinkers') that they are at high risk of alcoholism (Wilkins, 1975; Glatt, 1977) even if not yet completely fulfilling some accepted criterion for its definition.

It is also interesting to examine the contribution of alcoholism to general hospital admissions and attendance. Thus in recent studies in Manchester,

alcoholism was present in 15 per cent of male general medical admissions (Owens, 1977), and was a direct or contributory factor in 27 per cent of all acute general medical hospital admissions (Jariwalla, Adams & Horne, 1979). In Glasgow, 19 per cent of acute admissions to a male general medical unit had illnesses related to alcohol (Quinn & Johnston, 1976). A recent study from a London Teaching Hospital reported 19.5 per cent of hospital patients (medical and orthopaedic in-patients and casualty out-patients) to have an unsuspected drinking problem (Jarman & Kellett, 1979). One third of patients attending hospital accident and emergency departments in the evening hours have blood ethanol levels above 80 mg/dl (Holt et al, 1980).

In the United States of America, there are an estimated 9 million alcoholics, with 10 per cent of the urban population above the age of 20 having an 'alcohol problem', and 4–10 per cent of hospital admissions associated with alcohol (Nolan, 1965; Dolan 1976).

ALCOHOLISM IS ON THE INCREASE

Alcoholism is increasing, as evidenced by the increasing incidence of liver cirrhosis and hospital admissions for treatment of alcoholism, and as reflected by the increasing levels of alcohol consumption, of convictions for drunkenness, convictions for driving under the influence of alcohol, and of road accidents where alcohol is involved. This increase in alcoholism is worldwide (see for example Lancet, 1978a for an account of alcoholism in Australia, and the reviews of Smith, 1982a for Poland; 1982b for the Third World, and 1982c for New Zealand), it may be exemplified by considering the situation in the UK.

Two-thirds of cirrhosis of the liver is now believed to be alcoholic in origin (Hodgson & Thompson, 1976). Deaths from cirrhosis in Britain now approximate to some 2500 per annum or 0.3 per cent of all deaths (Central Statistical Office, 1979). A cirrhosis mortality of 3.7 per 100 000 population was recorded in England and Wales for 1975, having increased by almost 30 per cent in the preceding 10 years (Royal College of Psychiatrists, 1979). For comparison, in France, the leading alcohol consumer in Europe, with a per head annual alcohol consumption of approximately 25 litres of ethanol, cirrhosis mortality is more than ten times that in Britain (Popham, Schmidt & de Lint, 1975).

Alcohol-related psychiatric admissions in England and Wales increased some 120 per cent in the 10 year period up to 1975 (Royal College of Psychiatrists, 1979), to reach 35.5 per 100 000 population over 15 (Lancet, 1978b). There are now some 20 000 such admissions annually in the United Kingdom constituting more than 10 per cent of total psychiatric admissions (Paton, Potter & Saunders, 1981).

Consumption of wine and spirits has doubled during the last decade and beer consumption has increased by one third (Central Statistical Office, 1979). Some 70 million gallons of wine, 35 million gallons of proof spirit,

and 40 million bulk barrels of beer are now consumed annually in Britain. Expenditure on alcoholic beverages occupies some 5 per cent of average total weekly household expenditure and a quarter of the amount spent on food. The average consumption of alcohol per head of the adult population approximates to 20 g ethanol per day or between 7 and 8 kg (9 to 10 litres) of ethanol per year (Levi & Chalmers, 1978) with a 50 per cent increase in the last 10 years (Royal College of Psychiatrists, 1979).

Convictions for drunkenness in Britain doubled in the 25 year period preceding 1975 (Glatt, 1977), increasing in the last six years of this period by 28 per cent in England and Wales but by 91 per cent in Scotland (Kendall, 1979). Such convictions approximate to 300 per 100 000 population over 15, and exceed 100 000 per annum. Similarly, convictions for driving with an excess of alcohol in the blood or urine increased more than sevenfold in the decade preceding 1975 (Glatt, 1977) and now exceed 70 000 per annum. A 1979 review (British Medical Journal, 1979), reported that 38 per cent of drivers and 28 per cent of pedestrians killed in road traffic accidents had blood alcohol levels above the legal limit (80 mg/dl). Similar figures have been reported for road traffic accidents in the USA (Kaye, 1976).

PRONOUNCED INCREASE IN ALCOHOLISM IN WOMEN AND YOUTHS

Patterns of drinking behaviour and of alcoholism have also shown evidence of change, with drinking and cirrhosis and alcoholism showing a more pronounced rate of increase in females and in youths. This pattern has been observed in the USA (Westwood, Cohen & McNamara, 1978) and Canada (Smart, 1980) as well as the UK, but will again be illustrated by numerical data from British studies. Thus convictions for drunkenness under the age of 21 trebled in the 15 years preceding 1974 compared with an overall doubling in the preceding 25 years (Glatt, 1977). In males aged 18–20, convictions increased by 90 per cent in the decade preceding 1975 compared with 400 per cent for females (Donnan & Haskey, 1977). Overall, in the period 1970–1978 convictions for drunkenness in England and Wales rose by 27 per cent in males but by 64 per cent in females, the cirrhosis death rate increased by 36 per cent in males and by 243 per cent in females, and psychiatric hospital admissions for alcoholism increased by 77 per cent in males but by 130 per cent in females (British Medical Journal, 1980a), the increase being fastest in women under 25 (Donnan & Haskey, 1977). The proportion of women joining Alcoholics Annonymous, the drinker's self-help organisation is also steadily rising, with one third of its 1979 membership women, compared with one-fifth in 1972. The average age of members dropped from 47 to 44 during this period (Daily Telegraph, 1979). It has

been claimed that currently 13 per cent of men and 4 per cent of women between the ages of 18 and 24 are regular heavy drinkers (Wilson, 1980).

THE COST OF ALCOHOLISM

This year we may anticipate that the 55 million population of the United Kingdom will spend some £9000 million on alcoholic beverages (Office of Health Economics, 1981). The Government will earn £3500 million of revenue from their sale but at least £1000 million of this will be lost to the nation because of the cost of alcoholism, this latter made up of some £500 million lost to industry in early death, absenteeism and accidents at work, and £500 million in the provision of medical and social services for alcoholics and their families (Tucker, 1977; Lancet 1978b; Holterman & Burchell, 1981). By extrapolation, comparable figures relative to population size and drinking habits (Popham, Schmidt & de Lint, 1975) might be expected in other countries. For example, the annual economic loss from alcoholism in the USA has been estimated as 15–25 billion dollars (Lundberg, 1976). These figures reflect the cost to the nation of alcoholism, but not the disruption and damage to the individual or his family that can result from alcohol excess.

WHO ARE THE ALCOHOLICS?

Currently, alcoholism shows the highest incidence in middle-aged males. It is more frequent in urban than in rural communities, and in the highest (professional and managerial) and the lowest (unskilled) social classes. It is particularly associated with those occupations where alcohol is cheap and and readily available, where heavy alcohol consumption is traditional and uncensured, where there is separation from normal social and sexual relationships, or where the occupation is particularly stressful or hazardous (Mellor, 1967; Smith, 1981c). Thus, it is most frequent in those involved with the manufacture, distribution or retailing of drinks, in merchant seamen, naval and other service personnel, in journalists, commercial travellers, actors, managing directors and those on expense accounts (Plant, 1981). Doctors also have an increased incidence (Murray, 1977). There is the possibility that there may be (unconscious) preselection of such high-risk occupations in potential alcoholics.

In the UK there is a higher incidence of alcoholism in the Scots and Irish than in the English and Welsh. Its prevalence is higher in Catholics than in Protestants, possibly because of a large Irish contribution to the former religion (Mellor, 1967). It is lowest in Jews and Moslems (Clare, 1979). These variations reflect differences in ethnic, religious, social and cultural attitudes to alcohol.

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