CARDIOMYOPATHY AND ALCOHOL

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SUMMARY: Sixteen cases are described who had evidence of primary myocardial disease in which alcohol was considered to be of aetiological significance.

The majority of those presenting with cardiovascular symptoms were of the thiamine responsive type.

These patients had a lower alcohol consumption and shorter duration of symptoms than cases described in recent British literature and explanatory features of this are noted.

One case of sudden death was considered to be due to alcoholic myocardiopathy.

Introduction

The part played by alcohol in the aetiology of cardiomyopathy has been the subject of discussion in several papers in recent years. (Brigden 1957, Evans 1964, Brigden and Robinson 1964). This paper reports sixteen cases in a military hospital with evidence of myocardial damage, associated with alcohol.

Present series

All the patients had been referred to the British Military Hospital, Singapore in the period January 1965 to October 1967, and were divided into two groups.

Group I—Twelve presenting with features of myocardial disease.

Group II—Four who presented primarily with disease in other systems, but with a history of or evidence of cardiomyopathy.

Group I

Tables, I, II, III and IV summarise clinical histories, dietary features, clinical findings, electrocardiographic features and the results of laboratory investigations. Seven men were Army personnel, three were Royal Naval personnel, and one other was a Royal Fleet Auxiliary Officer. The only female patient was the wife of a Royal Air Force sergeant. Age range was from 27 to 49 with a mean age of 35.75 years.

These patients included examples of the three clinical groups described by Brigden and Robinson (1964). These were thiamine responsive heart failure (seven cases), non-thiamine responsive heart failure (two cases), and predominant arrhythmia (two cases). There was one case of sudden death.

Illustrative cases are described below.

Thiamine responsive type

Case 5. A 33 year old petty officer was admitted with a two week history of swelling of his legs to above the knee and dyspnoea accompanied by a sense of pressure in his chest. He had not eaten breakfast for many years, but his appetite was otherwise good. He admitted to the daily consumption of five or six pints of beer plus occasional spirits.

Examination showed evidence of heart failure with cardiomegaly and small bilateral pleural effusions.

Table I
Group I—History and dietary features

Case	Age (years)	Duration of Symptoms	Cough	Dyspnoea	Oedema	Others	Admitted daily alcohol intake	Diet	Comment
1	48	2 weeks	+	+	+	Preceding febrile illness	Beer—3 to 4 cans*	Poor	
2	38	1 week	O	O	+	Tired	Spirits—3 large tots	Poor	Referring doctor stated he suspected alcohol intake was "rather high"
3	27	2 weeks	O	O	+	Weakness	Beer—8 or more cans	Poor	
4	30	2 weeks	±	±	O	O	Beer—4 or more pints	Normal	
5	33	2 weeks	O	+	+	Tight chest	Beer—5 to 6 pints, plus spirits	Normal	Two weeks anorexia rarely ate breakfast
6	30	2 months	O	+	+	O	Beer—5 to 6 pints	Poor	
7	28	4 days	+	O	+	Anorexia, nausea ache in calves	Beer—2 or 3 cans Spirits—2 or 3 rums*	Little meat	Gurkha
8	38	3 days	O	O	+	Anorexia, nausea	Beer—4 to 6 pints	Poor	"Used to drink much more"
9	36	Sudden	O	O	O	Palpitations and malaise	Beer—* Spirits—5 to 6 tots Champagne—2 bottles	Good	Seen 15 days after onset of arrhythmia
10	49	4 years	+	+	+	Palpitations anorexia, nausea and vomiting	Beer—2 or 3 cans* Spirits—2 or 3 brandies	Poor	Referring doctor reported she is frequently drunk
11	39	3 or 4 months	+	+	+	Anorexia, tiredness, paraesthesiae of legs	Spirits— $\frac{1}{2}$ bottle	Good	Sweats readily
12	33	?	O	O	O	Headache, malaise jaundice	"Heavy"	?	Collapsed and died shortly after admission

* Particularly reluctant to discuss consumption.

NOTE: A tot varies from:—1 to 2 ounces. A can contains approximately:—11.5 ounces.

Table II
Group I—Clinical findings

Case	Pulse/ minute	Habitus	Heart sounds and murmurs	Liver signs	Neuropathy	Skin	Others	Chest X-ray Cardiothoracic ratio %	e.c.g. abnormality
1	120	?	Normal	Hepatomegaly	+	?	O	50	+
2	95	?	Triple rhythm Apical systolic	Hepatic tenderness	?	?	O	49 lines present	O
3	80	Obese	Normal	Hepatic tenderness	+	Sweating	Tremulous	Normal	+
4	120	Normal	Gallop rhythm Apical systolic	O	+	Sweating	O	54	+
5	130	Normal	Left parasternal systolic	Hepatomegaly	O	Normal	Restless	55 Pleural effusion present	+
6	80	"Flabby"	Apical systolic and diastolic	Hepatomegaly	O	Normal	O	Normal	+
7	102	Normal	Normal	Icterus	+	Normal	O	50	O
8	92	Normal	Normal	Spider naevi	+	Normal	O	Normal	+
9	72	Obese	Normal	O	O	Normal	O	50	+
10	140—170	Thin	Normal	O	+	Normal	O	54	+
11	94	Obese	Normal	O	O	Normal	Tremulous	Normal	+
12	Rapid!	Obese	? Normal	Hepatomegaly and icterus	?	?	?	Not taken	Not taken

Table III
Group I—Electrocardiographic features

Case	Electrocardiographic findings	
	Initial	Subsequent
1	Sinus tachycardia	No record
3	T inversion SIII Flat T in V1 and V6	Less inversion of T in SIII T in V1 and V6 became upright
4	PR 0.22 secs T waves generally flat	PR 0.20 secs T waves upright
5	Generally small complexes	T inversion SI ST elevation V1-4 and biphasic T V5-6
6	7 March '66: RBBB with T inversion over right ventricular chest leads 18 March '66: QRS 0.12 secs with less depression of T waves Double peaked P waves	19 June '67: Inverted T in SIII and V3. Biphasic T in aVR and aVF. Cloven T in V1 and ST elevation in V3. Q of 3mm in V4 and V5 P inverted in SIII. QRS 0.10 secs Ventricular extra systoles present. 24 Sept '68: Small P waves throughout with inverted P in SIII QRS 0.10 secs. Flat T in S1 aVR, V4-5-6. Biphasic T in SII, aVF. V1-2-3. T inversion in SIII
8	Slurred ST segments with flat T waves	Not repeated
9	Bifid P waves 2.5 mm broad	Not repeated
10	Atrial flutter (300/minute) with 2:1 block	Intermittent atrial tachycardia. A bout of atrial fibrillation occurred
11	PR 0.22 secs Flat T in limb leads Biphasic T in V5-6	T waves improving in all leads

From the second day in hospital thiamine 100 mg was given intramuscularly for five days. His weight fell from 173 lb to 154 lb on the seventh day, associated with a brisk diuresis.

Two weeks after admission he felt fit and well and was discharged.

Non-thiamine responsive types

Case 6. A 30 year old lance-corporal was admitted with a two month history of a dyspnoea and ankle swellings. He had been admitted to the British Military Hospital, Hong Kong, in 1964 with heart failure in which tricuspid incompetence was noted. He drank five or six pints of beer daily plus more on pay days and weekends, and ate poorly. Examination showed no evidence of cardiac failure, but a pansystolic murmur and a rumbling mid-diastolic murmur were heard at the apex of the heart. While he was in hospital, the latter disappeared and the former became fainter.

He was evacuated to the United Kingdom for further treatment, and was seen again at Cambridge Military Hospital in July 1968. He still complained of dyspnoea, together with tiredness and anorexia and had continued to drink five or six pints of beer daily. A soft systolic murmur was heard at the left sternal edge of the heart but there was no other clinical abnormality.

Table IV
Group I—Laboratory investigations

Case	Hb %	E.S.R. mm	Pyruvate mg %	Alb g %	Glob g %	SGOT KU	SGPT KU	Others
1	107	4	3.5	3.3	2.9	236	276	Liver biopsy Fatty change
2	80	—	0.65	2.8	1.5	18	33	—
3	119	1	—	4.1	3.0	12	16	—
4	121	2	1.25	4.1	2.4	45	34	—
5*	99	5	1.0	—	—	100 28+	130 31+	Bilirubin 2.25 mg % 1.0 mg % +
6	87	9	—	—	—	—	—	—
7	113	6	2.9	3.4	3.6	—	56	—
8	102	7	1.75	3.8	3.0	32	30	—
9	99	2	—	—	—	—	—	—
10	93	34	1.65*	3.7	2.7	19	148	Bilirubin 1.75 mg %
11	103	22	2.1	3.6	2.6	—	35	Liver biopsy Fatty change
12	—	—	—	—	—	—	62	Bilirubin 2.1 mg %

* Three days after admission + Five days later

The electrocardiogram remained abnormal (Table III).

Case 11. A 39 year old Royal Fleet Auxiliary officer was admitted for investigation of lassitude and ankle swelling of three or four months duration. He gave a history of a bout of paroxysmal nocturnal dyspnoea three years earlier, since when he had slept with four pillows. His only other symptom was a "smoker's cough" which he readily attributed to a consumption of 60 cigarettes daily. He was less willing to discuss his alcohol intake, but finally conceded half a bottle of spirits daily. He ate well.

He was overweight, tremulous and had ankle oedema, but there was no other clinical abnormality.

Thiamine did not produce a diuresis and thiazides were used to control the oedema.

Cases presenting primarily with arrhythmia

Case 9. A 36 year old Royal Naval officer was admitted for investigation of palpitation.

Fifteen days before admission he had awakened in the night with palpitations and his medical officer noted atrial fibrillation to be present. His symptoms subsided spontaneously after several hours, but two further bouts occurred during the ensuing week. He felt well on his return to Singapore where the only notable finding was a broad bifid P wave on his electrocardiogram.

He had been on a visit to a commonwealth port and for several days before the onset of symptoms had consumed beer steadily throughout the forenoon followed by five or six glasses of spirits at lunch, and in the evening from one to three bottles of champagne and an uncertain amount of spirits.

Case 10. A 49 year old woman was admitted with a six week history of dyspnoea and palpitations. A poor appetite was worsened by nausea and vomiting and latterly her fingers and ankles had begun to swell. She had a complicated past history including right nephrectomy following persistent pyelitis in pregnancy, a cordotomy for severe backache, and facial neuralgia and depression treated by electroplexy. She had received digoxin for three years to control palpitations, but had taken none since her arrival in Singapore seven months earlier. A consumption of 2 or 3 beers daily and occasional "medicinal" brandy was reluctantly admitted, but reliable evidence from other sources indicated that she drank considerably.

The clinical findings and investigations are noted in Tables I, II, III and IV.

She responded to digoxin, thiazides, and aneurine therapy, but was seen again seven months later when there was intermittent atrial tachycardia and bouts of atrial fibrillation. It was known that she had continued to drink alcohol.

Sudden death

Case 12. A 33 year old chief petty officer was referred with a diagnosis of pneumonia. The admitting medical officer noted jaundice, hepatomegaly and tachycardia, and obtained a history of "heavy drinking". Shortly after admission he collapsed and died despite intensive efforts at resuscitation.

At autopsy the heart was enlarged (500 g) with pale flabby myocardium and both ventricles were dilated with blood.

There was considerable excess of serous pericardial fluid and scattered petechiae on the pericardium. Slight atheroma only was present and the coronary arteries were patent.

Histological examination showed marked interstitial oedema and slight connective tissue proliferation with vacuolation and cloudy swelling of some muscle fibres.

Other findings were bilateral pleural effusions and enlarged liver (2000 g), the latter showing fatty changes, connective tissue proliferation and peri-portal round cell infiltration.

Group II

The clinical findings in this group are summarised in Table V. Cases A and D were Royal Naval personnel and B and C were Army personnel, their mean age being 40 years.

Case C showed no cardiac abnormality although he gave a definite history of beriberi associated with alcohol ten years earlier.

A more critical appraisal of case D, prior to his injuries might have led to his inclusion in Group I.

Table V
Group II—Table of presenting and cardiomyopathic features

Case	Age (years)	Presenting features	Cardiomyopathy features
A	45	10 days jaundice and dark urine. Hepatomegaly, spider naevi. History of 'shakes' and jaundice. Alcohol 10-15 pints daily, latterly whisky also. Diet: No breakfast, small lunch, sandwich supper. Bilirubin 4.7 mg% SGPT 34 KU Pyruvate 3.5 mg%	History of 'cardiac rheumatism', while POW (Europe). Cardio-thoracic ratio 49% PR 0.2 QRS 0.12 T waves average height but improved after 9 days thiamine.
B	37	Presented with gastro-enteritis. Noted to have polyneuritis. Pyruvate 3.0 mg%. 'Heavy' drinking until 6 months earlier when anorexia caused him to reduce to 4 bottles of stout daily.	Chest X-ray. Normal e.c.g. 1. Rate 120-150. Sinus rhythm. Flat T III ST elevation V2-3. 2. Rate 60. TI flat, T III upright T aVL inverted V2-3 unchanged. (10 days thiamine between 1. and 2.)
C	40	Presented with vomiting, staggering gait, diplopia. Found to have bilateral sixth nerve paresis, cerebellar ataxia and gross nystagmus, papilloedema. Symptoms and signs rapidly improved. Subsequently c.s.f. was normal. Alcohol: 4 pints daily. Recently more while unaccompanied in East Malaysia.	Beriberi 10 years earlier when he was drinking a pint of spirits daily. Currently normal chest X-ray.
D	38	Admitted with chest pain, dyspnoea and cough. Crepitations at left base diagnosed as pneumonia. A 'known' heavy drinker—amount was not discovered. He became tremulous and auditory hallucinations led him to jump from second floor balcony in the belief that his captain had ordered him to abandon ship. He survived multiple fractures of pelvis and limbs.	e.c.g. 1. 4 days after injury. Biphasic T in I, aVL and all chest leads. Flat T in II, III, aVR and aVF. 2. 4 weeks after admission Inverted TIII. Upright T waves in chest leads.

Discussion

Brigden (1957) suggested that cardiomyopathy was more common in Britain than was generally realised and classified 13 of his 50 cases as "Alcoholic Cardiomyopathy". Evans (1964) described 20 cases of alcoholic cardiomyopathy and was of the view that it is a common condition. He stated that the heart is affected in two ways by alcohol. A high alcohol intake with inadequate food may lead to thiamine deficiency and precipitate beriberi. Alternatively, excessive spirit drinking over many years may cause myocardial injury (myocardiopathy). The two states may appear coincidentally but are usually distinct.

Brigden and Robinson (1964) reported 50 cases collected over nine years in a London teaching hospital and reviewed the literature on the subject.

They confirmed the two types of patient described by Evans, and added a third group who present primarily with an arrhythmia.

Others have not found alcohol to be a feature in their series. Goodwin, Gordon, Hollman, and Bishop (1961) did not describe alcoholic cardiomyopathy in their series of 66 cases, although two had hepatic cirrhosis.

In this series alcohol was considered to be an aetiological factor, and it is proposed to emphasise features of significance in Service practice in relation to this.

Age and status

The average age of the group was 36.8 years, which is above that which one would expect in a Service hospital. With the exception of one patient all the servicemen were non-commissioned officers.

Symptomatology

In a disciplined community under regular medical surveillance, illness tends to be noted early, and such was the case here. In patients presenting with thiamine responsive disease the longest duration of symptoms was two weeks, although the "conditioning" symptom of anorexia had been present for a year in Case 8.

Cases 6 and 11 are considered to have an alcoholic myocardiopathy and both had longer duration of symptoms. Case 11 may be considered to have a three year history, dating from his attack of nocturnal dyspnoea, which is the longest in the series.

All cases in Group I had symptoms suggesting cardiovascular disease with the exception of Case 12. Additional symptoms are indicated in Table I, but could not be considered helpful.

Diet and alcohol consumption

These are inter-related. A general impression of the daily diet is recorded in Table I. Only two patients appeared to eat a good diet. The remainder tended to miss meals, especially breakfast, or existed on snacks and sandwiches. The prolonged omission of breakfast prior to the onset of symptoms was considered to be significant.

Evans (1964) and Brigden and Robinson (1964) record difficulty in establishing the actual quantity of alcohol consumed. The admitted intake in this series is recorded at Table I. Some degree of reluctance to disclose this information was generally found.

The admitted amounts of alcohol consumed by these patients do not approach the high levels reported elsewhere, and it may be that Service life with its discipline and surveillance is responsible for this feature.

Nevertheless it is suggested that these relatively small amounts of alcohol may be associated with heart failure, particularly among troops who for various reasons are not eating an adequate diet. During the period under review only one other case of primary myocardial disease, other than rheumatic fever, was seen in a European serviceman; this was a case of virus myocarditis.

Patients 6 and 11 had the type of myocardiopathy which does not respond to thiamine. In the first of these, a beer drinker, this is unusual. Case 11 is more typical. He was a ship's catering officer who ate well and who was seen at an early stage of his disease.

An increased risk of alcoholic heart disease is found in certain occupations, such as the brewery trade, where there is ready access to free or cheap alcohol. Servicemen are potentially at risk, especially overseas, and particularly Naval personnel. Marjot (1967) suggested that the Royal Navy has three times the rate of alcoholic casualties of the Army in Singapore. He estimated the Far East Fleet strength as one-third that of

the Army. This small series, however, does not show an unduly high proportion of Naval personnel. It would appear that the "at risk" group includes senior ranks, and especially those with good tolerance for alcohol (Case B, for example, was referred with the comment that he drank heavily, but was never seen to be drunk).

Physical findings

There were no cardiovascular features which distinguished this group from other cases of heart failure. Sweating, tremor, and restlessness have been described as suggestive, but did not occur with such regularity as to be helpful. However, some evidence of peripheral neuropathy was noted in six of ten cases where the findings were recorded. Two patients were icteric on admission and significant hepatomegaly was present in four patients.

Investigations

Cardiomegaly was demonstrated radiographically in seven of eleven patients. Both patients with chronic myocardiopathy had normal sized hearts. Case 6 is known to have had no cardiomegaly in September, 1968. Heart size returned to normal in four or five patients who had repeat radiograms, and Kerley B lines (Case 2) and small pleural effusions (Case 5) cleared completely.

Electrocardiograms were obtained in eleven patients and were abnormal in nine. Details are noted in Table III. Changes in the electrocardiogram have been discussed in detail by Evans (1959) and by Brigden and Robinson (1965). Evans notes that a normal electrocardiogram in the presence of heart failure is suggestive of beriberi. However, if all 12 leads are recorded, and repeated tracings taken, a higher incidence of abnormalities will be found; indeed, abnormalities may appear during clinical recovery. In this series only Cases 2 and 7 had strictly normal cardiograms and both responded quickly to treatment.

Biochemical findings are recorded in Table IV. Elevated serum pyruvate levels were found in only three of seven patients in whom the estimation was made within forty-eight hours of admission, but it is considered that this estimation would have to be initiated promptly on admission to be of value. Abnormal transaminase levels were also recorded in some cases, but, generally, bio-chemistry is of little help in diagnosis.

Progress

All seven patients with short histories recovered quickly. Cases 4, 5, and 7 were treated with thiamine only. Case 2 had chlorothiazide in addition, Cases 3 and 8 received parenterovite, while Case 1 received a therapeutic cocktail of digoxin, chlorothiazide and parenterovite. The majority of patients in this group would be expected to respond to thiamine only.

Cases 6 and 11 showed no marked response to thiamine. The former remains unwell but not in failure. He continues to drink beer (December 1968) but his electrocardiogram has improved.

Prognosis

The initial prognosis for acute cases appears to be good. It is noteworthy that Case C showed no evidence of a cardiac lesion despite continued alcohol consumption

following beriberi ten years earlier. It is unfortunate that an electrocardiogram was not obtained.

The progress of Case 6 is in keeping with the view that abstention is essential for recovery.

Brigden (1957) stated that sudden death did not apparently occur in alcoholic heart disease. It was considered that Case 12 died of an acute myocardial lesion and, from the available history, alcohol was considered a significant factor. The post mortem findings are similar to those described by Brigden and Robinson (1964).

Conclusion

Alcohol should be considered as a possible factor in the aetiology of obscure heart disease.

Servicemen and particularly senior ranks are at risk, especially those with good tolerance for alcohol.

Disinclination to discuss alcohol consumption is generally found, but when suspicion is aroused, tactful but diligent inquiry is important.

Most servicemen will have the thiamine responsive type with a good prognosis rather than a true alcoholic myocardiopathy. The recognition of early cases, however, may be of vital importance.

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