TORSADE DE POINTES

A Diagnostic Pitfall

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Torsade de pointes is an unusual arrhythmia which is found in certain well-defined clinical situations. We present 2 cases of Torsade de pointes which were admitted on two consecutive days, where the diagnosis was not immediately appreciated. It is important that one should become familiar with the E.C.G. appearance and be aware of the possible aetiology so that appropriate treatment be initiated.

CASE I: Mrs. F.C.

A 77 year-old woman was admitted with a one-month history of progressive dyspnoea as well as three brief episodes of loss of consciousness associated with chest discomfort; these occurred within the 24 hours prior to admission. She was on no medication. Whilst in the Emergency Department, she developed multiple runs of 'ventricular tachycardia' superimposed on complete heartblock; she was treated with DC Cardioversion 200J repeatedly and Lignocaine 50 mg IV. Subsequently E.C.G. tracings showed complete heartblock; she was admitted to C.C.U. Isoprenaline infusion was started.

The following investigations were carried out:-
CPK - 27 u/l; Hb - 13.7 gm/dl; WBC - 13.8 x 10 /1
Na - 136 mmol/l; K - 3.8 mmol/l; C1 - 106 mmol/l
Urea - 5.5 mmol/l. Haemoglukotest charting was normal.

Overnight, she sustained four episodes of 'ventricular tachycardia; two of which, were documented as lasting 10 seconds and 29 seconds respectively. Review of the E.C.G. tracings showed typical Torsade de pointes with multiple sequences of 'sinusoidal ventricular tachycardia'; often preceded by a 'short-long-short' series which is known to trigger off Torsade de pointes (Figure 1). The baseline heart rate was 40/minute with a QT interval of 0.56 seconds. At this heartrate, the maximum permitted QT interval in women is 0.5 seconds. The diagnosis was, therefore, one of Torsade de pointes precipitated by complete heartblock. A temporary pacemaker was inserted and this resulted in a normal rhythm; subsequently a permanent pacemaker was fitted and since then, she has remained well.

CASE II: Mr. M.S.

A 69 year-old pensioner was admitted with an acute inferior Q wave myocardial infarction, associated with a variable type II heartblock and intermittent bradycardia. In the Emergency Department, he had an episode of ventricular tachycardia which responded to DC Cardioversion and Lignocaine infusion.

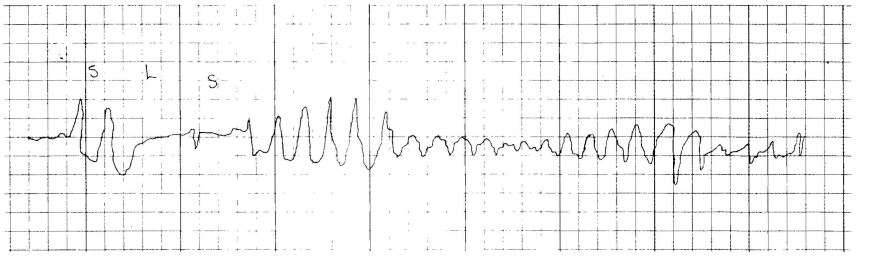

Figure 1 - Mrs F.C. - 12.04.90
Torsade de pointes preceded by typical 'short-long-short; sequence which is often noted to precipitate the arrhythmia.(1) Note the sinusoidal appearance of the tachycardia, from which its name is derived.

Torsade = twisted fringe (French)
Points = Points
i.e., twisting/turning of points.

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Investigations were as follows:-

Na - 140 mmol/l; K - 3.6 mmol/l; C1 - 107 mmol/l; Urea - 5 mmol/l; Glucose - 10.2 mmol/l; Hb - 16.2 gm/dl; WBC - 14,000 mm- 3; CPK - (I) 67 u/l; (II) 220 u/l; (III) 750 u/l; SGOT - (I) 103 u/l; (II) 292 u/l.

The E.C.G. tracings were reviewed (figures 2 - 4); these showed polymorphic ventricular tachycardia with a variably prolonged QT interval (i.e. Torsade de pointes). In between bouts of tachycardia, the QT interval was noted to be 0.38 seconds as opposed to an expected duration of 0.3 seconds (Figure 2). Subsequently, the patient improved and was discharged 12 days later.

The final diagnosis was of an acute inferior Q wave myocardial infarction, complicated by Torsade de pointes.

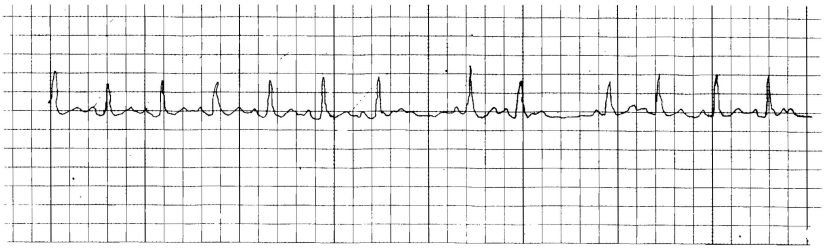

Figure 2 - Mr M/S. - 16.04.90
Note the QT interval of 0.38 seconds with an appropriate HR of 120 min -1. The expected QT interval is of 0.30 seconds (from corrective tables).

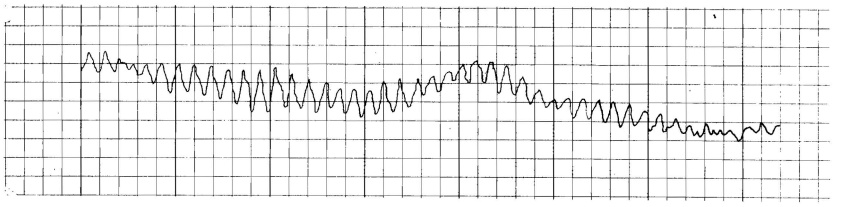

Figure 3 - Mr M.S. - 13.04.90
Torsade de pointes: typical sinusoidal tracing. This particular episode lasted 32 seconds.

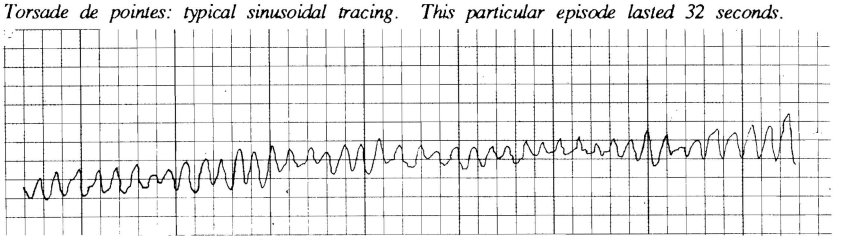

Figure 4 - Mr M.S. - 13.04.90
Typical sinusoidal run of Torsade de pointes.

DISCUSSION

Torsade de pointes may be caused by any factor prolonging the QT interval; it may be acquired or congenital (See Table 1), and is frequently multifactorial. The incidence is unknown but appears to be rare; no precise figures are available.

TABLE 1 CAUSES OF TORSADE DE POINTES

A.	ACQUIRED	
1.	DRUGS:	Quinidine, (2). Disopyramide (most common offenders).
	CLASS III:	Amiodarone, Bretylium, Sotalol, (3). Procainamide.
		Tricyclic Antidepressants Phenothiazines Erythromycin Insecticides
	METABOLIC:	Electrolyte disturbances: Hypokalaemia Hypomagnesaemia Hypocalcaemia
		Liquid Protein Diets
	CARDIAC ABNORMALITIES:	Acute Ischaemia Myocarditis Significant Bradycardia with AV block Mitral valve prolapse (rare) Sick sinus syndrome
	CNS ABNORMALITIES	Intracranial lesions Subarachnoid haemorrhage

TABLE I

B. CONGENITAL

QT PROLONGATION SYNDROME

1.	Romano - Ward:	Autosomal dominant
2.	Jervell - Lange - Nielsen:	Autosomal recessive associated with deafness

There is often a family history of sudden death in infancy; patients complain of 'fainting' and dizzy spells and epilepsy may be wrongly diagnosed. The cause is thought to be deranged autonomic cardiac innervation, and the QT interval is frequently greater than 550m sec.

Its importance lies in that it may progress to ventricular fibrillation and that its management differs from its main differential diagnosis, ventricular tachycardia. The rate is 200 - 250 beat/ minute, with a typical sinusoidal appearance; it is often self limiting and repetitive and may be initiated by a specific 'short-long-short'- sequence following ventricular bigeminy or when ventricular premature beats are associated with sinus bradycardia (see Figure 1).(1)

Finally, a baseline QT interval which is prolonged is frequently but not invariably present; this measurement can be relatively difficult to make as the terminal part of the T wave is often imprecise and varies with the heart rate. The QTc is the Qt interval corrected for heart rate and may be calculated using Basett's formula namely:

QTc = measured QT interval
R - R interval

when the QTc should not exceed 440 ms. However, it is generally more convenient to use corrective table, Basett's formula may have an inherent weakness in bradycardias and is unreliable in this situation. As regards the management, during runs of Torsade de pointes, DC cardioversion in necessary to correct the arrhythmia, followed by Class I B antiarrhythmics, such as lignocaine an mexiletine, which have been used with relative safety (4)

Insertion of a temporary pacemaker should be considered; this would preferably be an overdrive atrial pacemaker which will be necessary for 24 - 48 hours depending on he cause. In a condition which is likely to be self-limiting, temporary pacing will suffice as in Case 2, where the cause was an acute ischaemic insult. Permanent pacing will be necessary in complete atrioventricular heartblock as in Case I. Consideration of other causes such as hypokalaemia and avoidance of aggravating factors is important.

In order to reduce the chances of precipitating Torsade de pointes, patients should be regularly monitored especially those on drugs which prolong the QT interval or alter electrolyte balance.

In the final analysis, the most important point is the differentation from ventricular tachycardia and the initiation of appropriate treatment.

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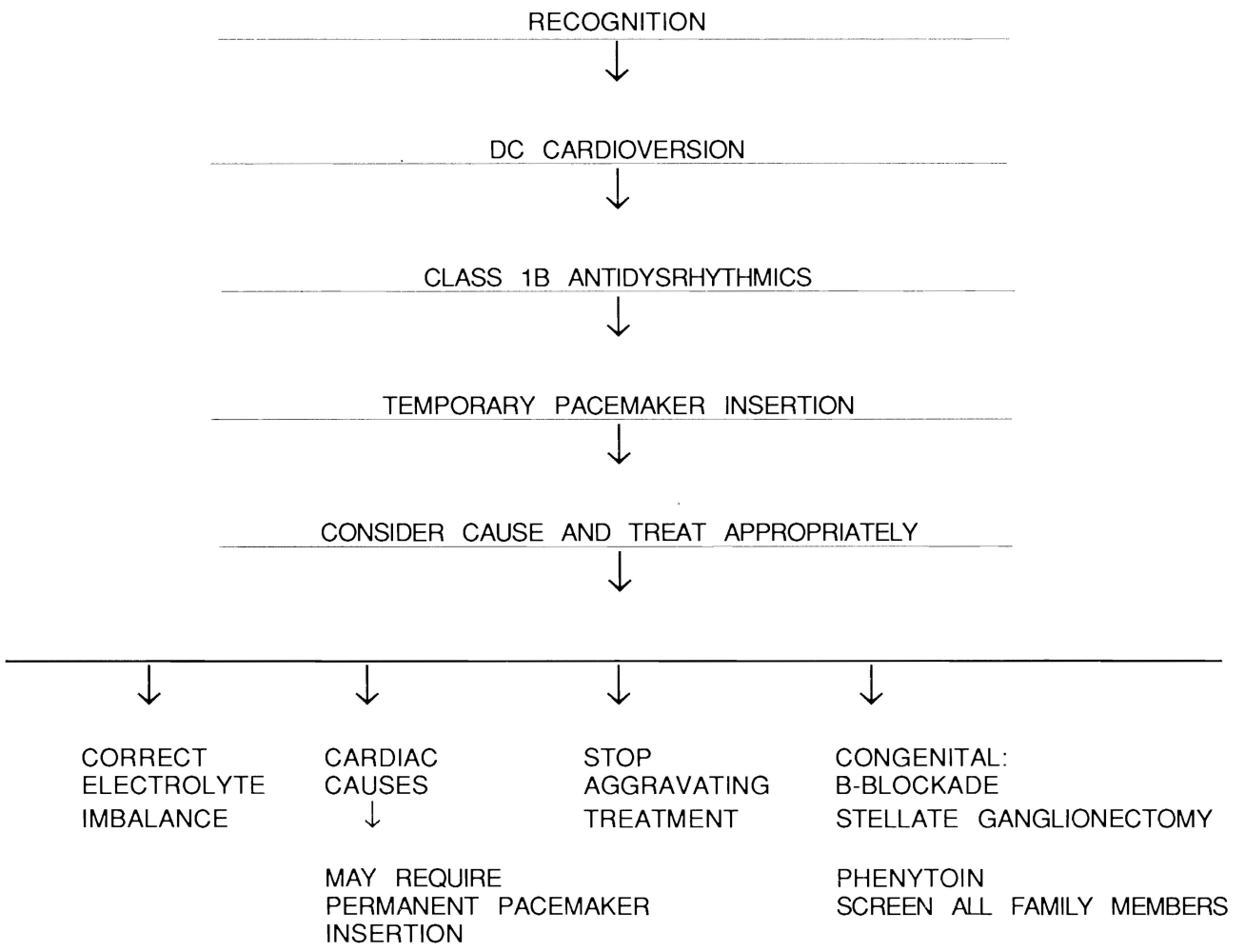
MANAGEMENT OF TORSADE DE POINTES



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