REPETITIVE TACHYCARDIA IN NORMAL INDIVIDUALS

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SYNOPSIS

Repetitive tachycardia in normal individuals with no underlying heart disease is rare and by 1967, only 40 cases have been documented. We describe 4 cases seen over a 3 year period. The ages of the subjects ranged from 5 to 16 years. Repetitive tachycardia of the atrial and ventricular variety were seen in 2 subjects each. The response of the arrhythmia to physiological manoeuvers and to various pharmacological agent was assessed. Despite an ominous looking electrocardiogram and its usual persistence for many years the benign nature of the arrhythmia is stressed.

INTRODUCTION

In 1889, the term "la tachycardie essentielle paroxystique" was coined by Bouveret (1889) to describe classical paroxysmal tachycardia. This common condition may be defined as paroxysmal attacks of tachycardia of abrupt onset and termination usually lasting from a few minutes to several hours. The diagnosis of classical paroxysmal tachycardia is often difficult to confirm, because the electrocardiogram (ECG) is frequently normal, unless recorded during an episode of tachycardia itself.

In 1927, Gallavardin described an atypical form of paroxysmal tachycardia. He insisted on distinguishing classical paroxysmal tachycardia from this variant which he called "tachycardie en salves". In 1947, Parkinson and Papp introduced the name "Repetitive paroxysmal tachycardia" to describe this unique and rare arrhythmia.

Repetitive tachycardia is characterised by short salvoes of tachycardia of either atrial, junctional or ventricular origin which persist for months or years. The hallmark of this arrhythmia is that unlike the classical variety, repetitive tachycardia is continuously present and the runs of tachycardia are separated by only a few normal sinus beats. Because of

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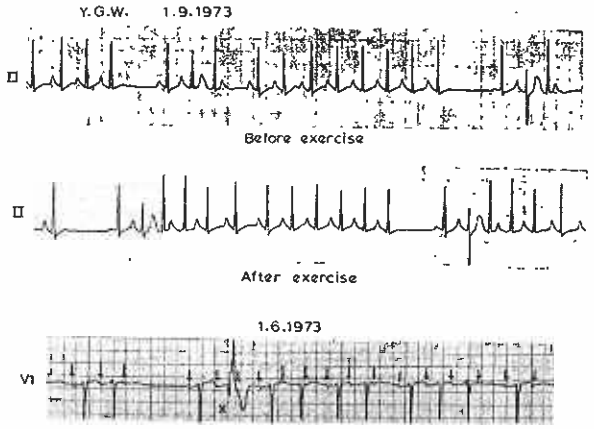

Fig. 1. ECG of Case 1 showing repetitive atrial tachycardia on 1.9.1973. Exercise had no effect on the arrhythmia. The ECG recorded on 1.6.1973 shows repetitive atrial tachycardia with a Wenckebach atrioventricular block. The arrows refer to P waves. The ventricular complex marked X is an aberrantly conducted beat (see text).

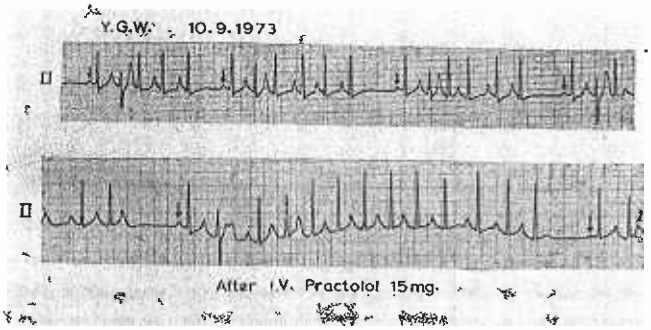

Fig. 2. ECG of Case 1 showing that 15 mg of intravenous Practolol had no effect on the arrhythmia (see text).

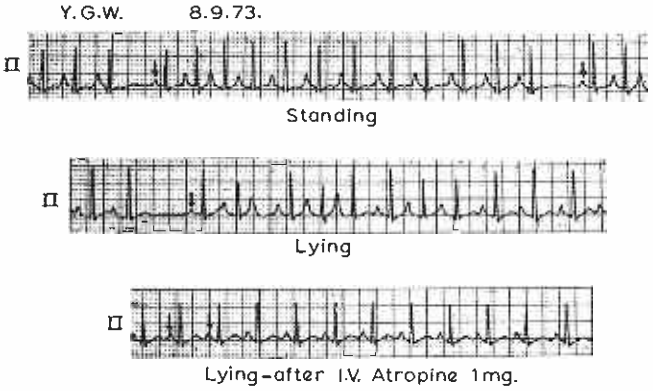

Fig. 3. ECG of Case 1 showing that the standing and lying posture did not alter the arrhythmia, which was however abolished by an intravenous injection of 1 mg Atropine (see text).

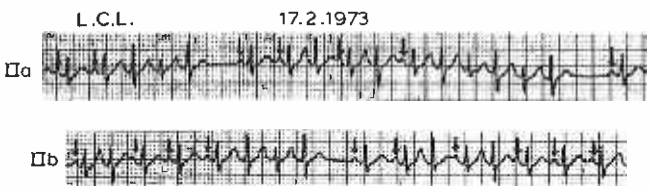

Fig. 4. ECG of Case 2 showing repetitive atrial tachycardia. Arrows refer to sinus P waves.

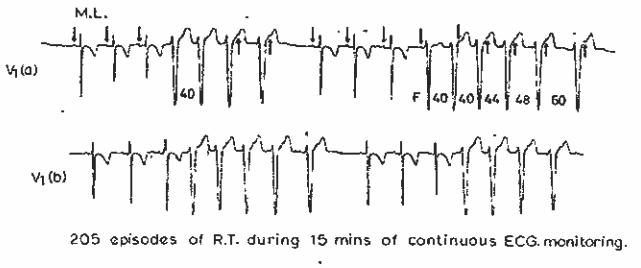

Fig. 5. ECG of Case 3 showing repetitive ventricular tachycardia. VI (a) and VI (b) are continuous ECG strips. The ventricular complex marked F is a fusion beat (see text).

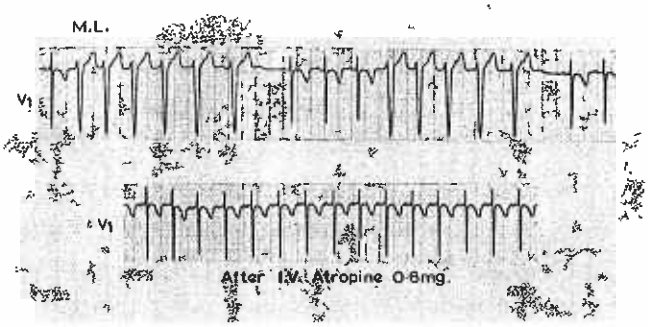

Fig. 6. ECG of Case 3 showing that the arrhythmia is completely abolished with atropine.

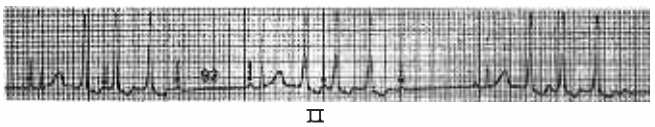

Fig. 7. ECG of Case 4 showing repetitive ventricular tachycardia. Arrows refer to sinus P waves.

this, it is impossible to obtain a normal electrocardiographic tracing, no matter when the recording is taken.

Although rare, it is important to recognise this syndrome because firstly the outlook is generally benign despite a bizzare and ominous looking ECG and secondly because there is usually no underlying organic heart disease. Furthermore, repetitive tachycardia is commonly refractory to therapy.

Up to 1967, Cass could collect only 40 cases with no demonstrable heart disease in the medical literature. Nadas and co-workers in 1972 reported 9 cases—all children with no underlying heart disease from the Children's Hospital, Boston, collected over a 28 year period from 1943 to 1971. In this paper, we present our observations on 4 patients seen over a 3 year period.

MATERIAL AND RESULTS

All the 4 cases were Chinese and there were 3 male and 1 female patients. The ages at which

TABLE I—Repetitive Tachycardia
Physiological Response

Case No.	Type	Posture	Exercise	Carotid sinus Massage
1.	Atrial	Neg.	Neg.	Neg.
2.	Atrial	Neg.	Neg.	Neg.
3.	Ventricular	Neg.	Neg.	Neg.
4.	Ventricular	Neg.	Neg.	Neg.

TABLE II—Repetitive Tachycardia
Pharmacological Response

Case No.	Type	I.V. Atropine	I.V. Practolol	I.V. Lignocaine	Oral Propranolol
1.	Atrial	Neg.	Neg.	0	0
2.	Atrial	Pos.	Neg.	0	Neg.
3.	Ventricular	Pos.	0	Pos.	0
4.	Ventricular	Pos.	0	0	0

TABLE III—Repetitive Tachycardia
Follow-Up

Case No.	Time Followed-up	Total No. of Occasions ECG Recorded	Outcome
1.	30 Months	10	S.R.— 8 Months
2.	26 Months	14	S.R.—24 Months
3.	36 Months	15	R.T.
4.	16 Months	6	R.T.

S.R. = Sinus rhythm
R.T. = Repetitive tachycardia

they presented to us varied from 5 to 16 years. Despite the presence of continuous tachycardia, only 1 patient complained of mild palpitation. Repeated clinical examination and electrocardiograms revealed no abnormalities except for a grossly irregular cardiac rhythm seen on every occasion. Repetitive tachycardia of the atrial and ventricular variety were seen in 2 cases each. In the literature, most of the cases are of the atrial variety.

Extensive laboratory investigations were carried out in an attempt to elucidate an aetiological cause, but these were all normal. The tests included chest X-ray, blood urea and serum electrolytes, erythrocyte sedimentation rate, haemoglobin, total white count, radioiodine thyroid function tests, antistreptolysin 0 titres, serum glutamic oxaloacetic transaminase, serum creatinine phosphokinase, serum lactic dehydrogenase and urine examination. Because of these negative findings and also the young age of our patients, we concluded that none of them had underlying organic heart disease.

The following cases will be described to illustrate the profile of the arrhythmia.

This ECG (Fig. 1) belongs to a 16 year old asymptomatic boy who was referred because of irregular pulse and was recorded on 1.9.73. It shows episodic runs of repetitive atrial tachycardia. Exercise had no effect on the arrhythmia. At an earlier date (1.6.73) the ECG showed atrial tachycardia with Wenckebach atrio-ventricular block. The ventricular complex marked X is an aberrantly conducted beat. Fig. 2 shows that 15 mg of IV. Practolol had no effect on the arrhythmia. The effect of posture was also studied and was found to be negative (Fig. 3). However after 1 mg of IV Atropine, the arrhythmia was completely abolished (Fig. 3). This patient was monitored for 3 days, during which time repetitive tachycardia was continuously present.

Fig. 4 is the ECG of a 14 year old Chinese boy and it shows the classical pattern of repetitive atrial tachycardia.

Fig. 5 is the ECG recorded from an asymptomatic 6 year old girl. During a continuous 15 minute

ECG monitoring, 205 episodes of repetitive ventricular tachycardia were recorded. The two ECG strips marked VI (a) and VI (b) are continuous and shows that each salvo consists of about 4 to 6 ventricular beats with a distinctive pattern in the sense that the tachycardia becomes slower as it progresses, the numbers here representing time intervals between consecutive ventricular complexes measured in hundredths of seconds. The downward pointing arrows refer to sinus P waves whilst the upward pointing arrows refer to retrograde P waves. The complex marked F is a fusion beat. The ECG (Fig. 6) shows that the arrhythmia was again completely abolished by IV Atropine.

This ECG (Fig. 7) belongs to an asymptomatic 5 year old Chinese boy, and shows repetitive ventricular tachycardia. The arrows refer to sinus P waves.

Posture, exercise and carotid sinus stimulation had no effect on all the 4 cases (Table I). In the literature, some cases of repetitive tachycardia are improved by the standing position and exercise. IV Atropine successfully abolished the arrhythmia transiently in 3 out of the 4 patients. In the 2 cases of repetitive atrial tachycardia, IV Practolol up to 15 mg had no effect. IV Lignocaine abolished the arrhythmia in 1 case of ventricular repetitive tachcardia. In 1 patient who was given long-term oral Propranolol up to a maximal of 400 mg/day, the drug was found to be ineffective (Table II).

Table III summarises the long-term follow up of our patients which varied from 16 to 30 months. In 2 patients the rhythm reverted spontaneously to normal 8 and 24 months after the repetitive tachycardia was first discovered, but in the remaining 2 patients the arrhythmia has persisted after 16 and 36 months. However, all 4 patients are alive and well.

CONCLUSION

Although rare instances of sudden death and congestive heart failure have been reported in cases of repetitive tachycardia with no underlying heart disease, the outlook by and large is excellent despite the fact that the arrhythmia may persist for years as is shown in this study.

ACKNOWLEDGEMENT

We would like to thank Prof. P.K. Wong for encouragement and permission to publish this paper.

REFERENCES

1. Bouveret, L.: De la tachycardie essentielle paroxystique. Rev. Med., Paris, 9, 753-837, 1889.
2. Gallavardin, L.: Contribution a l'etude des tachycardies en salves. Arch. Mal. Coeur, 87-92, 1924.
3. Parkinson, J. and Papp, C.: Repetitive paroxysmal tachycardia. Brit. Heart J., 9, 241-256, 1947.
4. Cass, R.M.: Repetitive tachycardia. Amer. J. Cardiol, 19, 597-602, 1967.
5. Keane, J.F., Planth, W.H. and Nadas, A.: Chronic ectopic tachycardia of infancy and childhood. Amer. Heart J., 84, 748-747, 1972.