

THE WOLFF-PARKINSON-WHITE SYNDROME SIMULATING MYOCARDIAL INFARCTION

By M. B. Ghosh

and

B. L. Chia

The Wolff-Parkinson-White (W-P-W) Syndrome is characterised by a short PR interval measuring 0.10 second or less, a widened QRS complex and a slurring at the upstroke of the R wave, producing the so called delta wave. The frequency of the W-P-W syndrome has been estimated at about approximately 1.5 per 1,000 in an air force study of 122,043 asymptomatic flying personnel (Hiss and Lamb, 1962). About 70% of the W-P-W syndrome occur in young individuals who are normal in every respect cardiologically except for a greater susceptibility to paroxysmal tachycardias (Lepeschkin, 1951). However, since deep Q waves are frequently present in Leads II, III, AVF or Leads I and AVL (Lepeschkin, 1951) myocardial infarction is very closely simulated electrocardiographically. In their experience, the authors have been very impressed by the number of times myocardial infarction has been mis-diagnosed from the electrocardiograms of healthy young individuals who present with the W-P-W syndrome (Ghosh and Chia, 1970). In this paper, 8 patients presenting with the W-P-W syndrome simulating myocardial infarction electrocardiographically, are documented with a plea for a greater awareness of this common pitfall.

PATIENTS AND MATERIALS

Table I summarises the clinical presentation, electrocardiographic findings and diagnosis made of 8 patients presenting with the W-P-W syndrome. All were of the type B variety except Case 7 which was type A. The ages of the patients ranged from 12 to 58 with a mean of 39. There were 5 females and 3 males.

Five patients (Cases 2, 3, 5, 6 and 8) presented with tachycardia of which 3 were recurrent in nature (Cases 3, 5 and 6). Three of these 5 patients had normal hearts clinically, whilst Case 2 was thought to have a ventricular septal defect and aortic stenosis and Case 6, a mild aortic stenosis and incompetence. All these 5 cases showed the W-P-W syndrome type B with deep Q waves in one or more of the following Leads—II, III, AVF, I and AVL (Figs. 1 and 2). Because of these

changes, both Case 2 and 6 were initially thought to have a possible myocardial infarction, (despite the fact that Case 2 was only 12 years old) so closely was this simulated in the electrocardiograms. However in Case 6, an electrocardiogram repeated on 2.7.66 showed a normal conduction and complete disappearance of the deep Q waves present previously in Leads I and AVL.

Case 4 presented with an obstructive jaundice and bradycardia. An electrocardiogram done on 1.9.70 showed classical W-P-W syndrome type B with a Q wave in Lead III, which was initially mis-diagnosed as posterior infarction. Case 7, an asymptomatic 18 year old male, was referred for a murmur in the heart which was found to be due to a small ventricular septal defect. His electrocardiogram showed a W-P-W syndrome (type A) with a deep Q wave in Lead AVL (13.5.70).

In this series, the only patient, who manifested chest pain suggestive of ischaemic heart disease was Case 1. An electrocardiogram done on his first admission (13.11.62) showed a W-P-W syndrome (type B) with deep Q waves in Leads III, and AVF, which were by no means diagnostic of a posterior myocardial infarction. On follow-up, he was found to develop periods of intermittent normal conduction, during which time his electrocardiogram would show inverted T waves, but no Q waves, in Leads II, III and AVF (26.11.62). This patient most probably had ischaemia of the myocardium on the inferior surface of his heart, but this could not be diagnosed with any degree of certainty from the electrocardiogram whilst he manifested the W-P-W syndrome.

DISCUSSION

Lepeschkin (1951) in a frontal analysis of the QRS complex in the W-P-W syndrome, showed that if the delta wave has a left axis deviation of more than minus 30°, it will appear as a negative wave (Q) in Leads II, III and AVF, whilst if it is deviated to more than 90° to the right, a negative wave (Q) will appear in Leads I and AVL. Hence the presence of Q waves in these Leads in no way indicate that myocardial infarction is present as has

CASE NO.

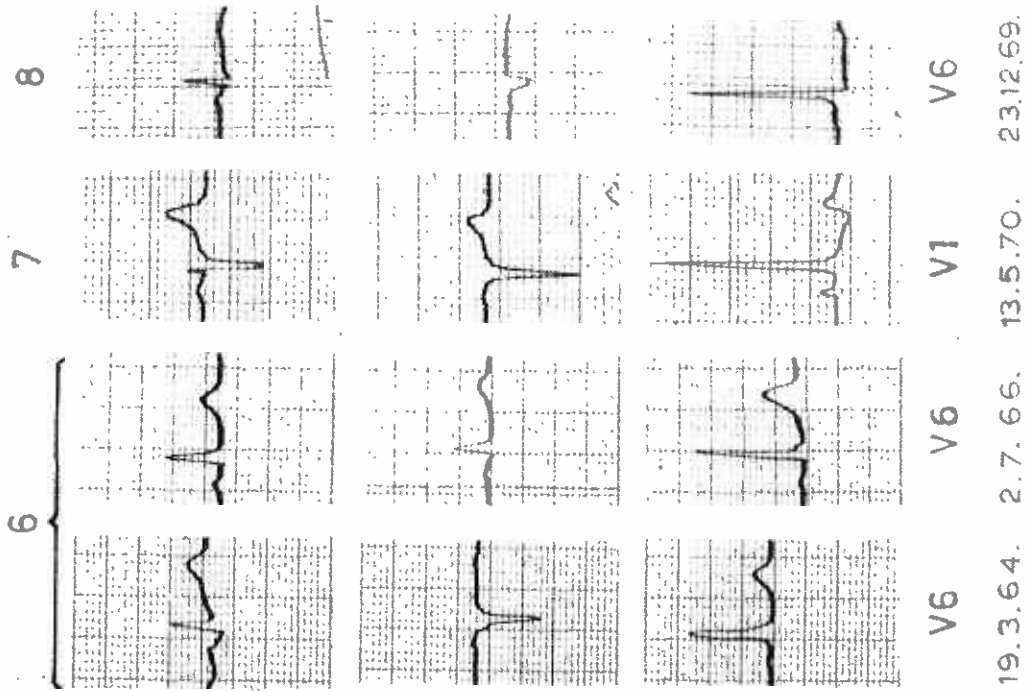


FIG. 2.

CASE NO.

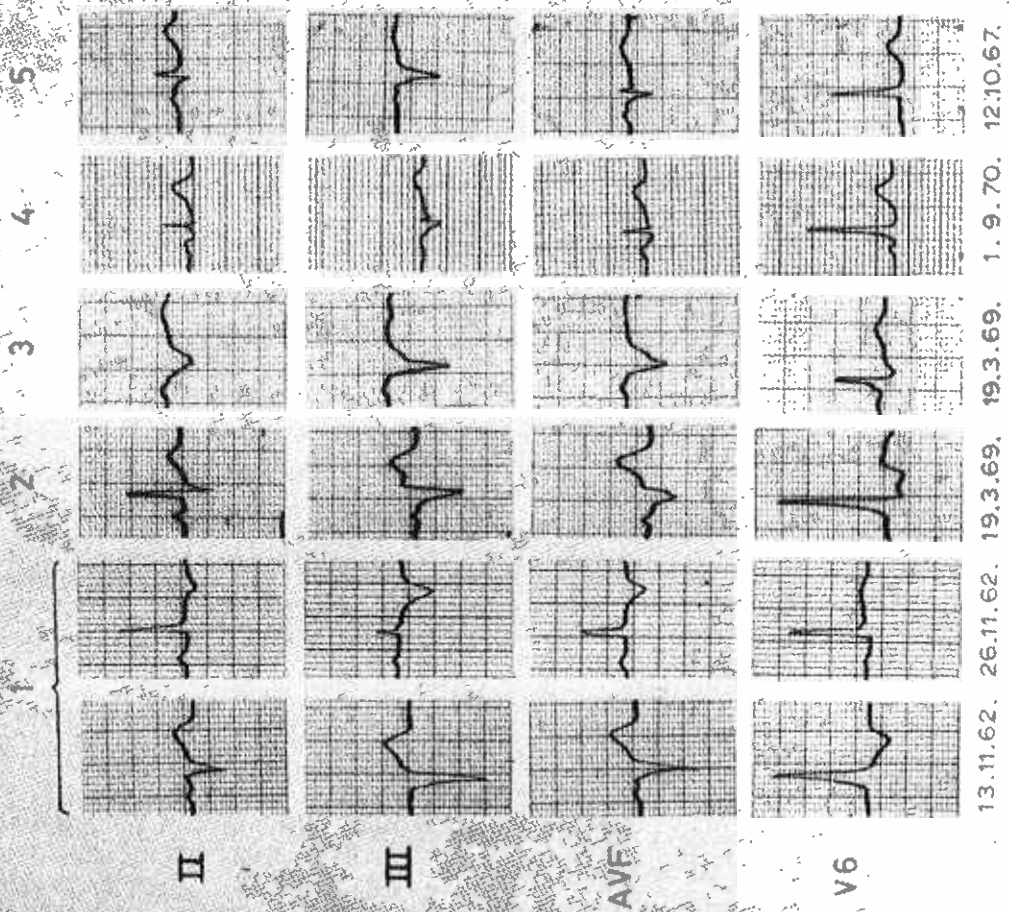


FIG. 1.

TABLE I

Case No.	Age	Sex	Clinical Presentation	E. C. G. Findings	Diagnosis
1.	32	M	Recurrent chest pain	W-P-W type B Q III, AVF (13.11.62) Inverted T II, III AVF (26.11.62)	? Posterior myocardial infarction
2.	12	M	Tachycardia V.S.D. and A.S.	W-P-W type B Q III, AVF (19.3.69)	V.S.D. and A.S. ? Posterior myocardial infarction
3.	55	F	Recurrent tachycardia	W-P-W type B Q II, III, AVF (19.3.69)	W-P-W
4.	58	F	Jaundice	W-P-W type B Q III (1.9.70)	Obstructive jaundice ? Posterior myocardial infarction
5.	24	F	Recurrent tachycardia	W-P-W type B Q II, III, AVF (12.10.67)	W-P-W
6.	53	F	Recurrent tachycardia A.S. and A.I.	W-P-W type B Q I, AVL (19.3.64) Normal I, AVL (2.7.66)	W-P-W A.S., A.I. ? Myocardial infarction
7.	18	M	Small V.S.D.	W-P-W type A Q, AVL (13.5.70)	V.S.D. W-P-W
8.	58	F	Tachycardia	W-P-W type B Q, AVL (23.12.69)	W-P-W

been stressed by Wolff (1959), Levine and Beeson (1941) and Kariv (1958). That this is not widely known is exemplified by the fact that myocardial infarction is frequently mis-diagnosed with all its serious consequences in normal healthy individuals showing these changes in their electrocardiograms.

In this series of 8 cases, only Case 1 presented with recurrent chest pain, and all the rest were thought to be free of ischaemic heart disease clinically and on laboratory findings. Of paramount importance in the diagnosis or exclusion of myocardial infarction in patients with the W-P-W syndrome, is the careful analysis of their electrocardiograms if they revert to normal conduction either spontaneously or induced after exercise, atropine, quinidine or propranolol. This is well demonstrated in Case 6 which showed a complete disappearance of the deep Q waves in Leads I and AVL when the patient reverted to normal conduction. In Case 1, whenever normal conduction intervened, the electrocardiogram showed inverted T waves in Leads II, III and AVF instead of Q waves, due most probably to ischaemia of the myocardium on the inferior surface of the heart.

SUMMARY

In patients with the W-P-W syndrome, deep pathological Q waves are commonly seen in one

of the following Leads—II, III, AVF, I and AVL thus simulating closely in the electrocardiogram myocardial infarction which is frequently mis-diagnosed. Eight cases showing these changes are described and of these only 1 was thought to have co-existent ischaemic heart disease. A plea is made for recognition of this common pitfall.

ACKNOWLEDGEMENT

We would like to thank Professor (Dato) G. A. Ransome, M.D., A.M., F.R.C.P. for permission to publish these cases.

REFERENCES

1. Ghosh, M. B. and Chia, B. L. (1970): Unpublished Observations.
2. Hiss, R. G. and Lamb, L. E. (1962): "Electrocardiographic findings in 122,043 individuals." *Circulation*, 25, 947.
3. Kariv, I. (1958): "Wolff-Parkinson-White Syndrome simulating myocardial infarction." *Amer. Heart. J.* 55, 406.
4. Lepeschkin, E. (1951): "Modern Electrocardiography." The P-Q-R-S-T-U complex, Vol. 1. Baltimore, Williams & Wilkins Co.
5. Levine, S. A. and Beeson, P. B. (1964): "Wolff-Parkinson-White Syndrome, with paroxysms of ventricular tachycardia." *Amer. Heart J.* 22, 401.
6. Wolff, L. (1959): "Diagnostic clues in the Wolff-Parkinson-White Syndrome." *New Engl. J. Med.*, 261, 637.