

COMPLETE HEART BLOCK COMPLICATING ACUTE MYOCARDIAL INFARCTION: A SIX-YEAR REVIEW

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SUMMARY

The clinical course of 68 patients who had temporary transvenous pacing for complete heart block in acute myocardial infarction is reviewed. There were 59 male and 9 female patients, of which 32 were Indians, 20 were Malays and 16 Chinese. 48 patients had inferior infarct, 16 patients developed anterior infarct and 4 patients presented with combined anterior-inferior infarction. The overall mortality for complete heart block in this study is 44%. The mortality pattern is 25% for inferior infarct; 87% for anterior infarct and 100% for combined anterior and inferior infarct.

INTRODUCTION

The concept of pacing the heart by means of electrical stimuli was initially proposed by Hymans in the 1930s and, subsequently, Zoll¹ demonstrated the crude but feasible technique of external chest wall stimulation. However, the present practice of pacing developed after the first transvenous cardiac pacing was performed by Furman.² Since then, technologic advances have resulted in the

evolution of temporary cardiac pacing to a very sophisticated level. Furthermore, the application of temporary cardiac pacing has extended from the therapeutic to include prophylactic pacing for bradyarrhythmias, particularly in the setting of acute myocardial infarction.

This paper highlights some aspects of our six years' experience with temporary transvenous pacing for complete heart block in acute myocardial infarction at the Universiti Kebangsaan Malaysia.

MATERIALS AND METHODS

The clinical spectrum of complete heart block in acute myocardial infarction as seen in 68 patients, studied at the Universiti Kebangsaan Malaysia, Kuala Lumpur from 1980 to 1985, is reviewed. All patients with documented acute myocardial infarction were admitted to the coronary care unit and when complete heart block was observed, temporary transvenous pacing was performed, if indicated. All temporary pacing was performed under local anaesthesia, in the "pacing room", within the coronary care unit. Bipolar electrode catheters (USCI; 5F & 6F) were used and the pacemakers were operated in the demand mode. The catheter tip was positioned in the right ventricular apex under fluoroscopic control with the Philips image intensifier. The patients were thereafter monitored in the coronary care unit.

RESULTS

68 patients were reviewed. There were 59 male (87%) and nine female (13%) patients. The racial distribution comprised of 32 Indians

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(47%), 20 Malays (29%) and 16 Chinese (24%). The ages ranged from 37 to 75 years with a mean age of 57 years.

The commonest site of infarction with complete heart block was inferior infarct with 48 patients (70%) followed by 16 anterior infarct (24%), and 4 anterior and inferior infarct (6%).

Table I shows the clinical presentation of the patients on admission to the coronary care unit. All patients had chest pain and the majority had evidence of congestive cardiac failure. Of these, 15 patients had inferior infarct, 15 had anterior infarct, and 4 anterior and inferior infarct. 25 patients had cardiogenic shock. The majority of patients with anterior or a combined anterior-inferior infarction presented with cardiac failure with or without cardiogenic shock.

The transvenous pacing was performed via the subclavian route in 53 patients using an infra clavicular subclavian vein puncture. Only 15 patients were paced via the antecubital vein. Table II shows the duration of pacing in our patients. The majority of these patients were paced for not more than seven days.

Complications related to temporary pacing in our patients are illustrated in Table III. Dislodgement of the pacing wire occurred in 13 patients. There were 30 deaths; 25 of these had cardiogenic shock. One patient who had anterior-inferior infarct developed a myocardial perforation from the 6 French temporary pacing wire. The mortality rate of the complete heart block despite temporary pacing was 25% in inferior infarct; 87%

TABLE I
COMPLETE HEART BLOCK IN MYOCARDIAL INFARCTION: CLINICAL PRESENTATION

	Inferior MI No. of pts.	Anterior MI No. of pts.	Ant-Inf MI No. of pts.
Chest pain	48 (100)	16 (100)	4 (100)
Dizziness	1 (2)	7 (44)	4 (100)
Syncope	—	1 (6)	2 (50)
Seizures	—	—	2 (50)
Cardiac failure	15 (31)	15 (94)	4 (100)
Cardiogenic shock	8 (17)	13 (81)	4 (100)

Note: Figures in parenthesis are percentages.

TABLE II
DURATION OF TEMPORARY PACING

No. of days	Number of patients			Total
	Inferior MI	Anterior MI	Ant-Inf MI	
0 — 7	40 (83%)	10 (63%)	4 (100%)	54
8 — 14	8 (17%)	4 (25%)	—	12
15 — 21	0	2 (12%)	—	2
Total	48	16	4	68

TABLE III
COMPLETE HEART BLOCK IN MYOCARDIAL INFARCTION : COMPLICATIONS

Complications	Number of patients			Total
	Inf MI	Ant MI	Ant & Inf MI	
VT/VF	2	8	4	14
Asystole	1	8	4	13
Ventricular extrasystoles	1	6	2	9
Dislodgement of pacing wire	10	3	—	13
Myocardial perforation	—	—	1	1
Death	12	14	4	30

in anterior infarct and 100% in patients with combined anterior and inferior infarct.

DISCUSSION

This review shows a male preponderance among the subjects, who are mainly middle-aged. Indians form approximately half the subjects in our study.

Conduction disturbances are common in inferior infarction.^{10,11} Norris *et. al.*, reported that second-degree heart block occurs in about 17% of cases and third-degree block in 11%.¹² Characteristically, the conduction disturbances start about the second day after the onset as a long PR interval which progresses to a second degree and then to a third degree block. The period of complete heart block may last between one and three days and then conduction gradually improves back to second degree and then first degree block, the whole time course of conduction disturbance averaging three days to a week.¹³⁻¹⁵ This is borne out in our observation in the duration of pacing

for patients with inferior infarct where 40 of the 48 patients reverted to normal sinus rhythm within a week.

In patients with complete heart block and inferior infarct, the idioventricular rate ranges from 40 to 70/min., which is usually sufficient to maintain an effective circulation for a patient who is resting in bed. Stokes-Adams occur infrequently, as seen in our series, and return to normal atrioventricular conduction is almost invariable in patients who survive.¹⁶⁻¹⁹

The AV node and bundle are supplied in 90% of individuals by the right coronary artery, occlusion of which causes inferior infarction. The blood supply to the interventricular septum and conducting system was described by James and Burch.²⁰

Heart block in anteroseptal infarction has a very different clinical course from that of conduction disturbances due to inferior infarction.²¹⁻²⁴ Complete heart block is less common and reported as 5% by Norris *et. al.*²⁵ The complete heart block in anterior infarction is preceded by bundle branch block, usually right bundle branch block.²⁶ The prognosis of complete heart block in anterior myocardial infarction is far worse than that seen in inferior infarction. We have noted a 25% mortality in our patients with inferior infarction as opposed to 87% in the anterior infarction and 100% patients with both anterior and inferior infarct. Comparable mortality was noted in other reviews.^{6,13,28-30}

Although temporary endocardial pacing can be accomplished by several venous routes, a rational decision about the optional route requires thorough understanding of the complications and results associated with each. Our experience with antecubital vein cutdown shows a higher incidence of infection and dislodgement to the pacing catheter. This has been earlier reported by the author^{31,32} and other investigators.³³⁻³⁹

CONCLUSION

Variables such as location of the myocardial infarction, heart failure, cardiogenic shock, advanced heart block adversely influence the prognosis with acute myocardial infarction.¹⁸

In spite of transvenous pacing therapy, the overall mortality from infarction remains high if it is complicated by advanced heart block. Norris reported a general mortality of 45%, with 19% (5/26) mortality occurring with inferior and 75% (6/8) with anterior myocardial infarction.⁴⁰ Our review shows a comparable overall mortality of 44%, 25% (12/48) with inferior infarct, 87% (14/16) for anterior infarct.

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