EARLY DISCHARGE AFTER MYOCARDIAL INFARCTION: A CONTROLLED STUDY

By Winston Oh

SYNOPSIS

95 patients admitted to Medical Unit III, Singapore General Hospital, with uncomplicated acute myocardial infarction were mobilised and discharged after a mean of 11.1 days (range 4—15 days). Their subsequent fate was compared with a control group of 95 patients treated in the same Unit but discharged after a more conventional mean period of 28.9 days (range 20—60 days). The two groups were matched for mean age, sex, site of infarction, occurrence of minor arrythmias and mild left ventricular failure, previous history of infarction and angina, and duration of follow-up.

During the first 2 months after discharge, there were 7 readmissions due to cardiac causes in the Early Discharge Group and 6 in the Late Discharge Group. There were no cardiac deaths in either group during this period. Patients requiring readmission were generally older in both groups (mean 59.4 and 61.4 years) compared with the overall means of 54.7 and 52.2 years, respectively. The findings at 6 months' follow-up were comparable, indicating that early discharge did not prejudice the longer term prognosis either.

Thus early mobilisation and discharge in uncomplicated acute myocardial infarction appears to be justified. This has favourable socio-economic implications, especially in view of the high medical bed occupancy rate in local hospitals.

INTRODUCTION

Acute myocardial infarction has traditionally been treated by prolonged hospitalisation. In the 1930's and 40's, complete bed rest for two to three months was advocated[1, 2]. Up to the late 1960's the trend was for at least four weeks in bed followed by a further period of mobilisation prior to discharge[3, 4]. In the past few years, there have been several reports of progressively earlier mobilisation and discharges[5-11]. Some centres have even been discharging the majority of uncomplicated infarcts in less than ten days[7, 11].

In Singapore, safe, early discharge of uncomplicated infarcts would provide major advantages. The constant short supply of acute medical beds would be relieved significantly. Shorter hospitalisation also facilitates physical and psychological rehabilitation and earlier return to work[5, 6, 11]. This study was undertaken in the hope that favourable results would encourage this trend.

Objective

The object of this study was to compare the subsequent mortality and morbidity of a randomly selected group of uncomplicated infarcts that were mobilised and discharged within two weeks, with a matched control group that were discharged after a minimum of three weeks in hospital.

Patients

276 patients were admitted to Medical Unit 3 of the Singapore General Hospital during a two-year period, with acute myocardial infarction. They satisfied any two of the following three criteria: (1) typical history of chest pain (2) raised cardiac enzymes (3) typical ECG changes of acute infarction.

Eighty-five percent of these patients were admitted within 12 hours of the onset of symptoms of infarction. 72% of the patients were monitored in the intensive care area for 48 to 72 hours before transfer into the general medical ward.

Patients admitted to this medical unit were assigned randomly to the care of four physicians depending on which day of the week the respective physician was on admitting duty. Those patients coming under the care of one physician (W.O.) became the study group (i.e. the Early Discharge Group) while the other patients served as the control group (i.e. the Late Discharge Group).

There were 36 hospital deaths and 23 patients were excluded because of serious complications occurring while in hospital and other contraindications to early mobilisation (Table I and II). The minor complications listed in Table III were not regarded as contraindications to early mobilisation. A further 22 patients were withdrawn from the study because

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TABLE I

COMPLICATIONS AND CONDITIONS RESULTING IN EXCLUSION FROM STUDY

1. Serious arrythmias
2. Acute pulmonary oedema
3. Congestive cardiac failure
4. Cardiomegaly (CTR over 0.55)
5. Cardiogenic shock
6. Persistent angina
7. Coexistent medical conditions that may impair early mobilisation
8. Persistent sinus tachycardia
9. Persistent hypotension

TABLE II

SERIOUS ARRYTHMIAS

1. Ventricular tachycardia
2. Ventricular fibrillation
3. Asystole
4. 2nd or 3rd degree heart block
5. Supraventricular tachycardia
6. Atrial flutter or fibrillation

TABLE III

MINOR COMPLICATIONS

1. sinus bradycardia
2. Transient hypotension
3. 1st degree heart block
4. Conduction disturbances (BBB, hemiblocks)
5. Ventricular extrasystoles
6. mild left ventricular failure

they were discharged between 16 and 19 days after admission. This was in order to separate the two groups more distinctly into those discharged before 2 weeks and those discharged after 3 or more weeks.

At the end of the study, 5 more patients were excluded owing to inadequate follow-up. Thus of 276 acute infarcts, there remained 190 patients who survived their infarcts without serious complications while in hospital, and were adequately followed up during the course of this study. (see Fig. 1). Of these, 95 were discharged after a mean of 11.1 days (range 4 to 15 days), while the other 95 were discharged after a mean of 28.9 days (range 20 to 60 days). (see Fig. 2).

It will be seen in Table IV that the Early Discharge Group of patients was comparable with the Control Group with respect to age, male-female ratio, site of infarction, history of previous infarction, incidence of minor complications, and mean duration of follow-up. Not unexpectedly, there was a slightly greater number of subendocardial infarcts in the Early Discharge Group.

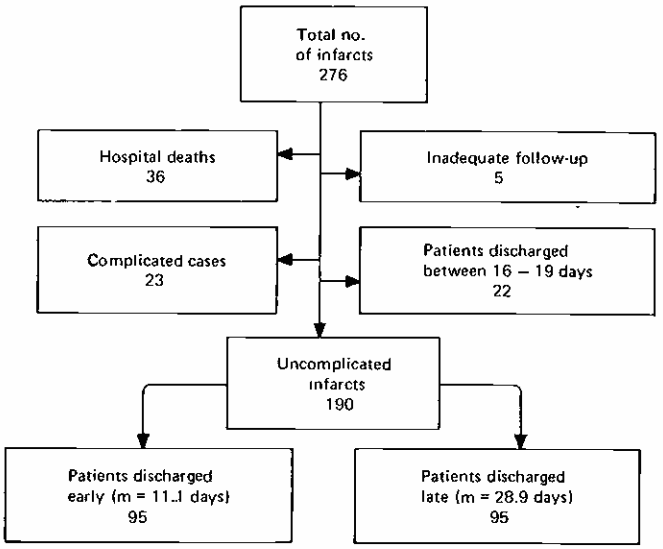

Fig. 1. Patient selection.

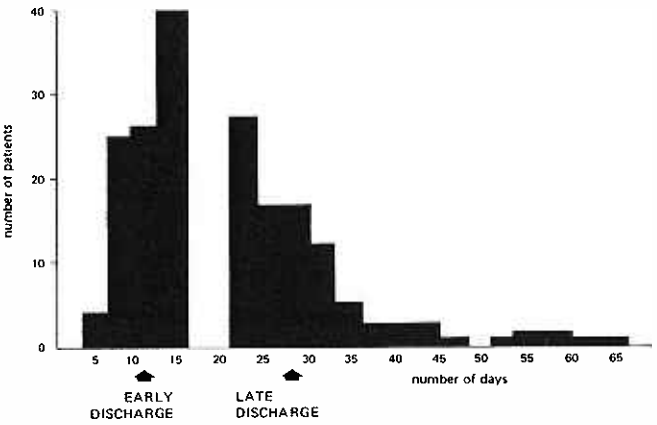

Fig. 2. Distribution of patients in early and late discharge groups.

TABLE IV

COMPARABILITY OF EARLY AND LATE DISCHARGE GROUPS

	Early Discharge	Late Discharge
Total No. of patients	95	95
Male	80	85
Female	15	10
Mean age (years)	54.7	52.2
Site of infarction		
Ant. or Lat.	47	51
Inferior	28	29
Subendocardial	20	15
Previous history		
infarction	14	9
angina	18	19
Signs of mild LVF (clinical & CXR)	29	28
Minor arrythmias and minor complications	18	22
Mean duration of follow-up (months)	7.3	8.2

Early Discharge Group

Patients in the study were assessed for suitability for early mobilisation on the fourth day after admission. Those free of serious complications were allowed to sit out of bed from the fourth day, and to begin walking from about the sixth day onwards, initially only around the bed and to the toilet. They were considered fit for discharge when able to walk at least twice the length of the ward comfortably, without pain or dyspnoea.

At the time of discharge, patients were instructed to remain off work for one month, at the end of which they were to attend for review at the follow-up clinic. They were advised to remain within the confines of their homes and gardens for the first two weeks and to avoid frequent use of the stairs. During the second two weeks, they were encouraged to take short walks and participate in minor household chores or light gardening.

Late Discharge Group

Patients managed in the control group received more traditional care in terms of longer periods of complete rest in bed before mobilisation. Mobilisation was more gradual and patients in this group were not discharged before three weeks from the time of admission.

Patients from both groups were followed up monthly whenever possible for at least the first three months, and were only referred back to the care of the family physician or Government outpatient clinic after six months. None of the patients in the study were routinely anticoagulated, and drug therapy was entirely symptomatic and supportive and did not differ in either group.

RESULTS

Hospital deaths

Of the 36 patients who died while in hospital, 25 died within 4 days of admission and were therefore never considered for the study group. Of the remaining 11 patients who died between 5 and 44 days, nine had serious complications at the time of admission and were therefore automatically not included in the study. The remaining two patients died suddenly on the 8th and 9th day respectively, but both of them were in the Control Group. Therefore none of the deaths in hospital could be attributed to early mobilisation.

Complications from early mobilisation

None of the cases selected randomly at day 4 for early mobilisation developed serious complications subsequently while in hospital. Thus no serious complications could be attributed to early mobilisation.

Follow-up

Patients in the Early Discharge Group were followed up for a mean of 7.3 months (range 3 to 24 months) and those in the Late Discharge Group for a mean of 8.2 months (range 3 to 26 months). Serious complications of a cardiac nature occurring in the first two months after discharge, and also between 3 and 6 months after discharge, are listed in Table V.

Cardiac deaths

There were no cardiac deaths in either group during the first two months after discharge. Between 3 and 6 months there were 1 and 3 deaths respectively in the Early and Late Discharge Groups.

Readmissions

The total number of readmissions attributable to cardiac causes were 7 and 6 respectively in the two groups during the first two months. These were due to re-infarctions, severe angina without infarction, cardiac failure, and serious arrythmias.

TABLE V

SERIOUS CARDIAC COMPLICATIONS OCCURING AFTER DISCHARGE

	Patients discharged early		Patients discharged late	
	0—2 months after discharge	3—6 months after discharge	0—2 months after discharge	3—6 months after discharge
Total readmissions from cardiac causes	7	7	6	11
Cardiac deaths	0	1	0	3
Re-infarctions	2	3	0	7
Severe angina	4*	2	1*	1
Cardiac failure	1**	1	4**	2
Arrythmias	0	0	1	1

*

(** statistically not significant)

Re-infarctions

During the first two months, two re-infarctions occurred in the Early Discharge Group while none occurred in the Control group. This difference was not statistically significant. There were twice the number of re-infarctions in the control group during the subsequent 3 months.

Cardiac failure

There were more readmissions on account of congestive cardiac failure in the Late Discharge Group during the two periods of observation.

Severe angina

Readmissions for severe angina not resulting in infarction were more frequent in the Early Discharge Group but again these differences were not statistically significant. The mean age of the 6 patients in the Early Discharge Group was 61.4 years, and all of them had mild left ventricular failure during the earlier stages of their infarcts.

Arrythmias

There were two cases of arrythmias requiring readmission. Both of them were from the Late Discharge Group and both were supraventricular tachycardias.

DISCUSSION

Prolonged hospitalisation and immobilisation has always been advocated in the past in order to allow safe healing of the infarcted myocardium by scar formation, and to prevent complications attributable to premature mobilisation, such as sudden cardiac death, re-infarction, cardiac rupture, ventricular aneurysm and arrythmias. These complications are rare, and they have to be weighed against the disadvantages of prolonged immobilisation. Diminished exercise tolerance, muscular wasting, chest infections, thromboembolism, and psychological disturbances, may all contribute to a delay in or even a failure to return to useful occupations afterwards.

In this controlled study of the two closely matched groups of patients, there was no significant increase in the rate of readmissions for cardiac complications during the first two months after discharge. Indeed there were no cardiac deaths in either group during this period. The small numbers of re-infarctions and readmissions for angina in the Early Discharge Group were not statistically different from the Late Discharge Group. Congestive cardiac failure and arrythmias were more frequent in the Late discharge group. Furthermore, this trend continued over the subsequent four months of observation so that the satisfactory results were sustained for up to 6 months of follow-up.

The findings also indicate that early mobilisation from the fourth day onwards was not responsible for any of the hospital deaths, and none of those patients mobilised early developed serious complications while in hospital.

Other studies undertaken in recent years have also reported the absence of significant risk from early mobilisation and discharges ranging from 3 weeks[5, 8] to ten days[6, 11] but several of these were not controlled studies. It is also worthwhile to point out that these studies were conducted in countries where socialised medicine and welfare states provide considerable social and economic support to patients after discharge from hospital. These facilities are not as well developed in Singapore but this drawback is in part compensated for by the stronger motivation of the breadwinner to return to work as soon as possible after discharge.

Thus earlier discharge, if safely conducted, can facilitate cardiac rehabilitation, by reducing the tendency of prolonged hospitalisation to erode the will and confidence to return to work, and to foster cardiac neurosis. There is also a significant economic advantage, as the cost of keeping a convalescing infarct patient for an extra week is considerable.

It is concluded from this controlled study of uncomplicated infarcts, that early mobilisation and discharge by two weeks does not significantly increase the risk of cardiac complications for up to six months afterwards.

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