tends to be slowest in the active adult years. If infant deaths are common, this difference in mean age is likely to be accentuated.

The balance of sexes of an exhumed population is statistically more likely to predominate in male skeletal remains, because of the relatively greater robustness of the male skeleton favouring preservation.

It is recommended that any subsequent investigation of a similar nature should be conducted on remains exhumed from a non-acid medium.

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Hospital Topics

Mortality from Acute Myocardial Infarction Before and After Establishment of a Coronary Care Unit

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Summary

A retrospective study of the mortality rate of acute myocardial infarction in two groups of patients treated before and after a coronary care unit was established showed no difference between them. Though it is difficult to compare two series retrospectively so far there are no well controlled studies to demonstrate clearly the value of coronary care units.

Introduction

During the past decade many studies on the results of treating acute myocardial infarction in coronary care units have been published (table I). Establishing and operating these units is very expensive and the most appropriate structure for coronary care units is still disputable. The results from Denmark's largest hospital before and after the establishment of a coronary care unit as an integral part of a medical admission section seem to raise some doubt about the generally accepted benefit of coronary care units.

Patients, Methods, and Results

In October 1967 the three medical departments of Bispebjerg Hospital opened a joint medical admission section with 22 beds,

TABLE I—Results from Coronary Care Units compared to Results from Medical Departments without Coronary Care Units

Reference	No Coronary Care Unit		Coronary Care Unit	
	No. of Patients	Mortality %	No. of Patients	Mortality %
Christiansen <i>et al.</i> , 1971 ¹	244	41	171	18
Hofvendal, 1971 ²	139	35	132	17
Killip and Kimball, 1967 ³	100	30	250	28
Langhorne, 1967 ⁴	60	37	70	13
Lawrie <i>et al.</i> , 1967 ⁵	—	22	400	18
Norris <i>et al.</i> , 1969 ¹¹	545	20	300	17
Robinson, 1969 ⁶	200	34	200	27
Present study	603	39	1,108	41

eight of which were provided with electronic equipment for monitoring patients with acute myocardial infarction. All acute medical admissions passed through this section, the emergency cases being brought directly by ambulance without stopping at emergency rooms, etc. Most non-cardiac acute patients were moved to the ordinary medical wards 24 hours after admission. Before being moved all new patients had a nine-lead E.C.G. taken and their serum aspartate aminotransferase (SGOT) and lactate dehydrogenase (LDH) were measured, thus allowing few acute myocardial infarctions to escape unnoticed. All patients with acute myocardial infarction were monitored for six days and then, if no complications occurred, they were moved to an ordinary medical ward for about three weeks of further hospitalization. Patients with a diagnosis of acute myocardial infarction established in other wards were usually moved to the coronary care unit. Contrary to the practice in many coronary care units there was no fixed age limit for admission to the monitored beds. There were no exact rules about which patients should take precedence in case of shortage of monitored beds, but in each case the decision was made on the basis of the age, general condition, and complicating diseases of the patient.

Our study deals with the period from October 1967 to December 1970. The records of all patients with a diagnosis of acute myocardial infarction in the medical wards during this

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period were reviewed. Thus we have included all cases of acute myocardial infarction whether the patients were admitted to the coronary care unit or not. Patients with cardiac arrest on admittance to the coronary care unit were included if any treatment was started in the unit.

Acute myocardial infarction was considered to be present if two of the following three criteria were satisfied: (a) characteristic history and clinical presentation, (b) characteristic E.C.G. changes, (c) characteristic rise in SGOT or LDH or both. In almost all fatal cases the diagnosis was verified at necropsy.

The results in this group were compared with a retrospective study from the same medical departments in 1962-3 before the establishment of the coronary care unit.¹ The diagnostic criteria were practically the same in the two groups though a few patients in the early study did not have their SGOT and LDH measured. The χ^2 test was used in the statistical treatment of the results.

The 1962-3 survey included 603 patients with acute myocardial infarction; 38.3% were women and 44.9% were 70 years of age or older. The 1967-70 survey included 1,108 cases of acute myocardial infarction; 44.6% were women and 48.4% of the patients were 70 years or older.

The age distribution in the two groups was similar (table II) and the mortality rate in the various age groups as well as in the two groups as a whole did not show any significant differences (table III). The number of deaths and time of death is shown in table IV.

TABLE II—Age of Patients in the two Groups

Age	1962-3		1967-70	
	No.	%	No.	%
0-49	33	5.5	56	5.1
50-59	122	20.2	181	16.3
60-69	177	29.4	335	30.2
70-79	192	31.8	377	34.0
≥80	79	13.1	159	14.4
Total	603	100	1,108	100

TABLE III—Mortality Rate from Myocardial Infarction in Various Age

Age	Mortality %		Statistical Significance	
	1962-3	1967-70	χ^2	P
0-49	21.2	17.9	0.15	0.6 > P > 0.7
50-59	31.1	24.3	1.73	0.1 > P > 0.2
60-69	36.2	40.9	1.09	0.2 > P > 0.3
70-79	44.3	46.9	0.37	0.5 > P > 0.6
≥80	49.4	57.2	1.33	0.2 > P > 0.3
Total	38.6	41.4	1.26	0.2 > P > 0.3

TABLE IV—Time of Death in the two Groups

Days after Admission	1962-3		1967-70	
	No. of Deaths	% of Total Deaths	No. of Deaths	% of Total Deaths
0-2	88	37.7	183	39.8
3-7	52	22.3	114	24.8
>7	93	39.9	162	35.3

Discussion

The study showed that there was no significant change in mortality from acute myocardial infarction after the establishment of a coronary care unit. Whether the two groups studied were completely comparable has, however, not been proved—for example, the second group might have been influenced by

the fact that greater care was taken to ensure that patients suspected of having coronary infarction were taken to hospital as soon as possible after the onset of symptoms. One might expect that some of the seriously ill patients who would formerly have died before reaching hospital arrived at the coronary care unit alive and consequently were included in the coronary unit group. Nevertheless, table IV does not show any significant difference in the number of early deaths, as one could have expected. Thus it seems that the two sets of data are comparable and that the unaltered mortality rate is real. Consequently, the question arises whether this result is due to this specific coronary care unit or whether it is a common phenomenon.

Possibly the intensive care in the coronary unit has reduced the intensity of observation and treatment of the patients after they have been moved to the ordinary medical wards. Another reason could be that this coronary care unit has been somewhat overloaded with patients. Compared with many other coronary care units the staff was relatively small and they were responsible for the whole admission unit (4,500-5,000 admissions per year). The number of monitored beds was probably also too small as there were only monitored beds for two-thirds of all patients with acute myocardial infarction, and not all could be monitored for the scheduled six days. But even the group of younger patients (under 60 years old) who, with virtually no exception, were treated with utmost attention and usually for the stipulated period nevertheless showed no significant decrease in mortality after the establishment of the coronary care unit (table III). The high mortality rate as compared with those in reports from other units may reflect the large proportion of older patients admitted to this hospital (table II).

It must, however, be considered whether coronary care units in the form described here are sufficiently effective. During the past six to seven years many studies have been published showing large reductions in the mortality of patients with acute myocardial infarction after the establishment of coronary care units. But few of these studies have been controlled by simultaneous registration of patients not admitted to the coronary care unit.^{2,3} Some reports present, as we do, comparisons between results from the same departments before and after coronary care units were established.^{4,5} Most of the reports do not give exact information on the policy of admission and selection for monitoring in the coronary care unit. Furthermore, it is not always completely clear whether all patients being admitted to a given hospital are included in the coronary care unit group. When patients are admitted partly to a coronary care unit and partly to a common medical ward it is difficult to avoid biases in selecting patients for the coronary care unit. For instance, patients who are eventually proved to have acute myocardial infarction but who do not on admission show typical signs of this will usually not be admitted to the coronary care unit. These patients have a much higher mortality rate,⁶ and will usually be included in a retrospective study and will then give rise to a higher mortality rate, especially when compared with a prospective study.

While not underestimating the biases in our study we should like to point out that the better prognosis so far published for patients with acute myocardial infarction after the establishment of coronary care units is not in accordance with our experience. So far as we know no controlled clinical study, correctly carried out, justifies the high priority given to these expensive, usually heavily staffed and highly specialized units. Bloom *et al.*⁷ studied the cost:productivity ratio of 32 coronary care units and concluded that the money spent on coronary care units might have been spent more profitably elsewhere. Another recent study⁸ stated that the mortality rate from pulmonary oedema was identical before and after the establishment of a coronary care unit, while expenses rose by nearly half.

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Conversations with Consultants

Forgotten Exiles in Castleport

FROM A SPECIAL CORRESPONDENT

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"We brought the N.H.S. to Castleport," said Mr. Blackstone,* the surgeon. "We arrived from London, with a car-load of children and luggage, and with a few other consultants appointed at the same time we set about providing a service for patients. The area is remote—a peninsular 100 miles from the nearest medical school—but it has marvellous scenery, sailing, and walking; and as a place to live and work it seemed very nearly perfect."

In Castleport in 1950 there was one small hospital in the middle of town, and the Ministry of Health sent down an inspector, who condemned it. The staff were promised a new hospital then—and indeed in 1951 a site was agreed and a starting date fixed—1956. "Since then," said Miss Whiterock,* another consultant, "there have been innumerable committee meetings; goodness knows how much has been spent on architects' fees as the design has been changed and changed again; and the starting date is now fixed for 1976. It may be ready for me when I need a geriatric bed."

Improvisation by Consultants

For 25 years the consultant staff have improvised as well as they could. They still have the small hospital in the centre of town, where almost all the acute work is done. There is one male medical, one male surgical, one female medical, and one female surgical ward. During the night patients are generally taken in to an admission ward which includes a four-bedded intensive care unit. They are then moved to the appropriate ward—and surgical patients are moved again two to six days after operation to one of the outlying convalescent hospitals. One of these used to be a tuberculosis unit, and now takes convalescent patients and is used for day-case surgery and burns; the other is a rambling country house, formerly the Bishop's palace, and there the patients have to walk up and down stairs or be carried. At neither unit is there really comprehensive cover by residents—they are run by regular visits from the consultants. Two old workhouses, one in Castleport and the other ten miles up the valley at Knockbridge, have been taken over as geriatric units, and one is also used for gynaecology while the other has a G.P. obstetric

unit. There are also two other tiny hospitals used for paediatrics and obstetrics. The pathological and radiological services of this scattered collection of hospitals are provided at the central Castleport unit—and a lot of time is spent moving blood and urine samples, x-rays, and indeed patients around. Little wonder that the system virtually collapsed during the ambulance drivers' industrial action last year.

Apart from its failure to provide the promised new hospital, the regional board has been reasonably generous about help with building. New operating theatres have been built; a new outpatients department at one of the old workhouses; the T.B. hospital has been upgraded, and the pathology department rebuilt. Furthermore the local community is generous: for example the monitoring equipment and respirators for the intensive care unit have been paid for by local community effort, and they have just raised money for a new fibre gastroscop.

Because of the geographical isolation of the community the consultant staff get on and cope with most things themselves. Blackstone himself, trained in London as a general surgeon, does abdominal surgery, urological surgery, emergencies in children, pneumonectomies for cancer, oesophageal surgery—and emergency neurosurgery such as removal of subdural haematomata. Miss Whiterock tackles a similar range and deals with the vascular emergencies. The paediatrician has been single-handed for 17 years; when he goes on holiday a locum is usually found from the teaching centre. At present there is no shortage of consultants—but it has been clear for some time that in specialties such as anaesthetics and geriatrics posts are filled only because overseas graduates are prepared to settle in Britain.

At the junior staff level the hospital is cosmopolitan. Occasionally a woman doctor married to someone employed locally applies for a job as a house physician: unless this occurs the residents come from medical schools abroad. Indeed there is a good "old-boy net" connexion with Eastern countries; and cousins, friends, and brothers of former S.H.O.s and registrars regularly arrive in England and take their first jobs in Castleport. Some specialties have more difficulty than others: the anaesthetists decided some time ago that the acquisition and training of juniors was more trouble than it was worth—now there are five consultants who between them provide 24-hour cover seven days a week.

As so often in country areas, there is no shortage of nurses, orderlies, and porters; but physiotherapists, occupational therapists, and other specialist ancillaries are few and far between—again their presence depends on the fluke of men

* a pseudonym