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SEMINAR ON THE PREVENTION OF MAJOR CARDIOVASCULAR DISEASES

EM/PRV.MJ.CARD.VSC.DIS/8

Teheran, 10 - 17 December 1972

ENGLISH AND FRENCH

ORGANIZATION OF CARDIOVASCULAR SERVICES IN GENERAL HOSPITALS

by

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I INTRODUCTION

The rate of change that hospitals have undergone in less than a generation does not show signs of diminishing. Most changes reflect technological and scientific advances as well as new cultural and demographic trends.

The rapid increase in medical science and technology makes no longer possible for any physician either to master all new techniques or to cover all fields of clinical medicine. The increasing complexity of medicine has led to a rapid development in medical specialization and the concentration of many activities at/or near the hospital.

There is also a growing awareness among the public that adequate health care constitutes a basic human right (7) and not a privilege, which has encouraged an increase in the demand for such services. At the same time there have been important demographic changes. There is

a shift in the age distribution of the population due to two main factors: the steady decline of the birth rate, which has been dramatic in developed countries and the trend of mortality during the last one hundred years which has shown a marked reduction of mortality in early life, considerable in middle life and only moderate in late life. This means that relatively more people survive into middle or late life, ages where there is normally a higher prevalence of cardiovascular diseases.

New cultural trends, like the use of modern transportation which leads to sedentariness, prolonged excessive mental strain of modern life in overcrowded cities, fat-rich diets, etc., are all factors which play a part in the high rates of morbidity and mortality from cardiovascular diseases. These factors can and should be controlled with adequate preventive programmes. These facts make the organization of cardiovascular services an urgent need in main general hospitals.

It is necessary to point out that the degree to which the clinical work of the hospital is departmentalized is determined almost entirely by the extent of specialization of the medical staff. As a minimum, however, a general hospital should comprise four basic departments that can cover practically all the specialities, that is, general medicine, general surgery, gynaecology and obstetrics and paediatrics. In the small hospital this will probably be the full extent of division into clinical departments, but as the hospital increases in size and the medical staff becomes more specialized other departments will be added.

The span of cardiovascular services in general hospitals ranges from the one extreme where a doctor interested in cardiovascular diseases puts

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The span of cardiovascular services in general hospitals ranges from the one extreme where a doctor interested in cardiovascular diseases puts

aside some beds for cardiovascular patients having at his disposal ECG equipment, to the other where a complex, sophisticated department is developed with equipment for monitoring patients, cardiac catheterization, special coronary care units, etc.

Success of any specialized service depends more on the effectiveness, skill and experience of its doctors, nurses and auxiliary personnel and their work, than on its equipment.

2. ADMINISTRATIVE ORGANIZATION OF A CARDIOVASCULAR SERVICE

2.1 Organization of Hospitals

The organization of hospitals and their administrative patterns vary in different countries but there are some basic principles that apply to most of them.

A hospital cannot be thought of as a single institution but as a network of hospitals in given areas. As a result, a regional approach to hospital services has developed (10). Subject to this principle Regional Boards or Regional Directors are responsible for planning, co-ordinating and supervising regional group of hospitals. At the level of the individual hospital the administrative structure is determined mainly by its size. The function of the Director of the hospital is to direct, supervise and co-ordinate the work of the various departments, and to act as a channel of information between the hospital staff and the regional authority.

2.2 Organization of Departments

Under the Director of the hospital comes the heterogeneous group of Heads of Departments who are responsible to the Director for the work in

their respective field. Each medical department has a certain degree of autonomy and it is organized according to its particular function.

2.3 Organization of specialized services

As the size of the medical staff increases and the doctors become more specialized other units, within the department, should be developed. A Head of Service reporting directly to the Head of Department, from whom he receives delegated authority, should be in charge of each unit. This subdivision permits exercise of authority and control with more specialized competence. The number of doctors, nurses and auxiliary personnel within each of these specialized services will depend on the size and functions of the unit.

Based on these considerations it is easy to visualize the organizational structure of the hospital as a pyramid where authority is delegated from top to bottom becoming smaller at each successive level.

A cardiovascular service constitutes one of these specialized units, within the Department of Internal medicine. Its organizational structure will depend on its size and the services provided.

3. TECHNICAL ORGANIZATION OF A CARDIOVASCULAR SERVICE

The technical organization of a cardiovascular service should always start with an objective study of the actual need and its justification in terms of availability of professional skills and supportive elements sufficient to warrant the investment and support the decision to establish the new facility.

In the technical organization of a cardiovascular service an analysis will be made of the following:

3.1 Nursing unit;

3.2 Cardiac catheterization and angiocardiography;

3.3 Coronary care unit,

3.4 Mobile coronary care unit;

3.5 Paediatric cardiovascular service;

3.6 Cardiovascular surgical unit;

3.7 Exercise tests unit;

3.8 Rehabilitation services for C.V. patients;

3.9 Out-patient department;

3.10 Home care programmes; and

3.11 Co-ordination and cardiovascular services.

3.1 Nursing Unit

The ward or nursing unit for cardiovascular patients does not differ from any general ward. In spite of the variation in design of wards, there are still many hospitals in countries of this Region whose wards are the traditional large room accommodating twenty to forty patients, usually along each side with a space between the beds down the centre, being known as the "Nightingale" type of nursing unit. This system facilitates observation and nursing attention, but has the draw-back, among others, of lack of privacy. This has lead to the construction of smaller wards 4, 8 and 10 beds, that provide more privacy and more flexibility in their use.

Any of these types of nursing units may perform the functions for a cardiovascular service, if basic facilities are available (props, sockets for electrical equipment, etc.).

Nevertheless the nursing units are not the most important consideration in the setting up of a cardiovascular service since they do not differ from other wards. The most important elements to be considered are those related to special procedures in the speciality which are analyzed below.

3.2 Cardiac Catheterization and Angiocardiography

(a) Basis for this unit

Cardiac catheterization and angiocardiography are inseparably wedded in the modern diagnostic laboratory (2) since they are increasingly mutually complementary.

Cardiac roentgenology has become a true sub-speciality such as roentgenology using special techniques like cinefluorography with image-amplifier screen, venous angiocardiography, selective angiocardiography, etc. A cardiovascular service needs its own equipment for these procedures.

(b) Design

While space for radiology in general has tended to increase during the past two decades, space requirements for any of the specialized studies are considerably above the average. An area of at least 56 m^2 (7x8 m) is suggested since the number of persons involved in the procedures can become considerable. There is also the problem of the patient's bed (rather than a stretcher), as well as the number of pieces of equipment on wheels: sterile trays, carts, etc.

Whenever possible the unit should be installed in a room not far from the CCU in view of the possible need for resuscitator equipment during investigations, and the possibility of using the equipment for

the insertion of pacemaking electrodes where there is no portable X-ray machine with an image intensifier for the CCU.

Adjacent to the cardiac catheterization space, a working area of at least 12 m^2 for haemodynamic laboratory is a must. A storage or instrument room in communication with the principal room is desirable as well as cleaning facilities for the maintenance of equipment.

(c) Equipment

The basic equipment of the unit is the examination table at which the doctor works with the patient, the X-ray generator and the X-ray tube. The components to complement the equipment for the advanced examination procedures, as in cardiovascular radiology, are: image intensifiers, cameras for cinefluorography and 70 mm fluorography, films changers. More sophisticated installation will also include television chains and video-tape recorders. Other necessary equipment are: high pressure injectors, devices for measuring, recording and displaying physiological data including instruments for blood gas analyses. The total equipment of the unit should constitute a fully integrated flexible system based on compatible components. The system can be extended by adding more components to provide facilities for more complex examinations like bi-plane examination techniques etc.

(d) Staff

An adequately trained cardiologist should be in charge of this unit. A nurse, a X-ray technician and a laboratory technician should ideally complement the staff of this unit.

3.3 Coronary Care Unit (CCU)

(a) Basis of this unit

A study of the natural history of patients with acute myocardial infarction shows that they are associated early in the course of illness with life threatening arrhythmias which, if detected, are treatable. For these patients there is a very high mortality rate on the first day of hospitalization and a decreasing mortality rate on the subsequent days. If they can survive the first few days then the outlook is reasonably good.

With reference to the three principal complications which are treatable, the ranges of occurrence and mortality reported in various studies are (13):

	Occurrence %	Mortality %
Arrhythmias	13 to 41	15 to 60
Cardiogenic shock	11 to 21	40 to 60
Congestive heart failure	16 to 71	32 to 72

It is in the area of arrhythmias that the greatest hope for therapy lies at the present time and it is on this concept that the coronary care unit has evolved.

(b) Design

From the point of view of workload a hospital with 200 or more beds and with more than 100 acute myocardial infarction admissions per year may be justified in establishing a separate CCU unit, subject to adequate personnel and services.

For some small hospitals it may be advisable a "Coronary-Intensive care unit" under one single unit. (14)

The rectangular rooms common to most hospitals are quite suitable for CCU's unit, allowing for reasonable renovation.

(i) The CCU should be located as close as possible to the emergency admitting area and to a medical or cardiovascular ward to facilitate rapid mobilization of appropriate personnel and equipment. It should also be close to the X-ray unit of the cardiovascular service.

(ii) The area around the patient's bed should provide easy accessibility and adequate space for both routine and emergency patient care (around 12 to 14 m^2 for each bed).

(iii) The central nursing station and work area should be located so as to permit direct visual observation of all patients. (40 to 55 m^2 for this area).

(iv) The surroundings should be cheerful and tranquil (sound-proofed ceilings and floor coverings).

(v) Emergency electric power sources must be provided. Satisfactory provision should be made for adequate electrical circuits with the necessary voltage for mounting and connecting equipment (adequate grounding and no electric interference problems).

(vi) Provision should be made for the following additional rooms adjacent to the CCU: physician's consultation and sleeping room, lounge for nursing personnel, and a family waiting room. It is highly desirable to have available a procedure room in which such techniques as pacemaker electrode insertion and electric shock therapy can be applied.

(vii) As far as possible beds should be separated by partitions to prevent patients from being aware of the problems of their neighbours.

(viii) Adequate air conditioning for the sake of patients should be provided to control temperature and humidity in the presence of constant equipment operation.

(ix) Two-way intercoms are highly desirable.

(c) Equipment

The essence of the CCU is continuous electrocardiography and trained observation for "aggressive management of cardiac arrhythmias" (5). The basic equipment to ensure satisfactory function is:

(i) Each bed must have a cardiac monitor with oscilloscope to monitor the ECG. A simplified lead system with adhesive chest electrodes leaves the limbs free to allow the patient to move more freely in bed, diminishing the hazard of thrombosis (3). A pulse rate meter and alarm are essential adjuncts to the monitor. (For psychological reasons it is desirable that monitoring should be kept out of immediate vision of the patients).

(ii) Each bed should be provided with its own oxygen outlet, suction equipment, overhead light, and intravenous stand.

(iii) Beds must be of a type which permit the rapid application of resuscitation techniques (8).

(iv) Each bed should be provided with a bedboard to give firm support of the thorax during cardiac compression.

(v) Each CCU should have at least two electric defibrillators, which is the most important therapeutic tool in the unit (5).

(vi) The other two electrical therapeutic tools in live-threatening arrhythmias are the "cardioverter" and the "electric pacemakers" (at least two "demand" type pacemakers with a good supply of catheter pacemakers). The equipment and particularly the skill to use them should be available.

(vii) Equipment for endotracheal intubation and positive pressure ventilation should also be standard equipment in a CCU.

(viii) A portable electrocardiograph which should be the sole property of the unit for recording daily standard electrocardiograms.

(ix) A portable X-ray machine with an image intensifier (for the insertion of pacemaking electrodes).

(x) A resucitation cart, mobile cart stocked with accessible medicine and equipment.

(xi) Miscellaneous. Stethoscopes, tourniquests, blood pressure cuffs, etc.

(d) Additional equipment

(i) Central monitoring consoles or "slave" oscilloscopes mounted on a central panel at the nursing station are very useful (they must not replace "eyeball monitoring" which is by far the most important). If less than four patients are monitored these slave oscilloscopes are probably not necessary (5).

(ii) A mechanical chest compressor for cardiac massage (more effective than the arms of the physician or nurse and less tiring).

(e) Staff

The staff of the coronary care unit should include:

(i) Medical Director. A cardiologist should be appointed Unit Director with the responsibility of formulating all policy and carrying out overall procedure within the unit. He reports to the Head of the Department through the chief of C.V. Service.

(ii) Staff physicians. Physicians' coverage should be based on a 24-hours, 7-day week. They should be primarily responsible to the unit, and immediately available at all times.

(iii) Staff nurses. A minimum of one specially trained graduate nurse should be on duty at all times (the ideal nurse/patient rate should be one nurse for every 1-1,5 patients), remembering that the nurse is the key figure in the CCU.

(iv) Auxiliary nurses. Highly motivated, specially trained auxiliary nurses can be of great value in bedside patient care under the supervision of graduated nurses.

(v) Secretary. A non-medical person appointed as unit secretary will be responsible for keeping track of admissions, transfer, and discharges. She may be responsible for inventory of equipment, answering the telephone and placing calls for the doctors and nurses in the unit.

(f) General recommendations

(i) Standardization of equipment. All electronic instruments should be purchased from the same company. This will facilitate the substitution of one part for another; the interchange of one instrument for another; and the education of the nurses and other staff personnel. The company which provides equipment should also provide for servicing and repair.

(ii) Electronic technician. An electronic technician with training in medical electronic instrument, who is readily available is highly desirable in a CCU. He must look after the equipment with a "preventive maintenance" approach.

(iii) Policy. Admission and discharge criteria should be established as well as the specific responsibility and authority of all medical, nursing, auxiliary and administrative personnel. It is highly desirable to promote the admission of patients at the earliest possible time (8).

(iv) Training. All the CCU staff should have participated in formal training courses with particular attention to electrocardiography and resuscitation techniques. For the continued efficiency of a CCU there should be regular meetings to discuss the various medical and administrative problems within the unit as well as recent technological and scientific advances related to the subject.

(v) Point to stress. There is a danger of staff concentrating too much on the machines. The problem lies in the fact that they can become "equipment-oriented" and it is necessary to remember that there is a patient at the end of all that machinery. The equipment is secondary: it is very valuable and a lot can be accomplished with it, but it is also possible to do a lot without it.

3.4 Mobile Coronary Care Unit (MCCU)

(a) Basis for this unit

The same principles as applied to CCU are applied to MCCU with more emphasis on the need to avoid any delay in the application of intensive care since most of the deaths in the first hours of acute myocardial infarction are due to ventricular fibrillation which could be prevented if promtly and properly treated.

Experiences in many countries have demonstrated the feasibility of integrating MCCU's services within the existing systems of medical care organizations, particularly hospitals. With MCCU, coronary patients can be put under intensive care quicker than by any other

means. Therefore, the principal objective of the MCCU is to deliver skilled medical care to the coronary patient at the place of the attack at the earliest possible moment.

(b) Design

Ambulances in general use are suitable for MCCU. The only requisite is space so that a doctor and at least a nurse can monitor the cardiac rhythm of the patient and if necessary administer treatment including cardiac resuscitation. Consequently the ambulance must also provide space for equipment.

(c) Equipment

Generally speaking the basic equipment required in a MCCU is the same as for the CCU. The following items are regarded as indispensable for a MCCU: Oscilloscope with ECG writer, portable DC defibrillator, equipment for artificial ventilation, laryngoscope and endotrachial tubes, oxygen, suction apparatus, equipment for intravenous infusion and sampling and a complete set of drugs for treating cardiovascular patients.

(d) Additional equipment

Portable battery-operated demand pacemaker with pacing electrodes and portable anaesthesia equipment.

(e) Staff

The ideal team should comprise a cardiologist with experience in CCU, a nurse trained in the techniques of coronary care and a technician (or other trained auxiliary worker) specially trained to administer shock therapy, record ECGs, etc. The ambulance driver may also help in the carrying of equipment and of the patient.

(f) General recommendations

A MCCU is effective in the measure it is co-ordinated and integrated with an efficient hospital CCU.

The MCCU's team should be always immediately available for an emergency call. To fully utilize this skilled staff when there is under utilization of the coronary component the MCCU could also be used for other types of emergency. The development of MCCU should be adapted to local conditions: needs and resources (manpower, skill, organization and availability of equipment).

It seems useful to point out that there are some basic requisites for the establishment of a MCCU. These are: adequate telephone network and roads, and a population relatively concentrated. At the same time it is necessary to avoid delays in contacting the mobile coronary care services by proper education of patients and potential patients. It is generally agreed that patients with known coronary artery disease should be encouraged to obtain the appropriate aid immediately they develop symptoms suggestive of myocardial infarction (11).

3.5 Paediatric Cardiovascular Service

(a) Basis for this unit

Great advances in the field of paediatric cardiology have been made during the past three decades. Until relatively few years ago the exact diagnosis of a congenital heart disease was a difficult theoretical exercise of academic interest only. However, the advent of cardiac surgery and the possibility of surgically correcting these congenital anomalies have completely changed the situation into a matter of great practical importance.

Antibiotics, highly technical laboratory diagnostic procedures, new surgical techniques, cardiac prostheses, and modern anaesthetic methods have all played a significant role in the successful management and treatment of heart diseases in the paediatric age group as well as in adults.

Paediatric cardiology has become a separate speciality by itself and it is particularly in this field that teamwork has proved to be of highest value. Working together closely as a team, the cardiologist and surgeon have accomplished many cures for cardiac diseases previously considered hopeless (4).

(b) Design

The paediatric cardiovascular service may be a specialized unit within the general cardiovascular service of a hospital or a specialized separate service in a children's hospital or in a paediatric service. The paediatric cardiovascular service should be thought of neither as medical cardiovascular service nor as a surgical cardiovascular service, but as both.

A paediatric cardiovascular service needs to have those units already specified for adults with the exception of those for coronary care. Besides, it has to be attached to a surgical service with its operation suite which will be analyzed in the section below, recovery room and/or a special type of intensive care unit, known as "cardiac surgery unit". While paediatric services, in spite of the need for single rooms for isolation, could establish multiple-bed wards with many advantages, a

paediatric cardiovascular service calls for more single-bed rooms in which to care for children in the diagnostic and pre-operative phase of hospitalization, as well as in the post-operative phase after discharge from the cardiac surgery unit. The rooms should be ample, cheerful and have a home-like atmosphere, but at the same time should have all the elements to assure a quick and efficient management of the patient in routine and emergency situations. Each bed should be provided with its own oxygen outlet, suction equipment, bedboard, sockets for electrical equipment, etc.

According to the hospital's resources and policy, the surgical sector of the paediatric cardiovascular service may have a recovery room and/or a cardiac surgery unit for the care of the children during the critical period of the post-operative phase. Because of the potential risk of cardiorespiratory emergencies during this period, children must never be left unattended and the drugs and equipment stated below should be readily available, as well as specialized staff coverage of doctors and nurses based on a 24-hours, 7-day week. The best choice for post-operative control of children (as well as adults) is the cardiac surgery unit, a multi-bed specialized ward similar to an intensive care unit in its set-up and facilities. The number of beds in these units will depend on the size of the services, the workload and the policy regarding the average number of days children are kept in the unit.

(c) Equipment

The different specialized units comprising the paediatric cardiovascular service (cardiac catheterization and angiocardiography, exercise tests unit, etc.), require the equipment previously discussed.

The cardiac surgery unit for the post-operative management of cardiac surgical patients requires the following equipment (6):

(i) Equipment for the administration of oxygen (gauge, mask, tent or croupette);

(ii) Thoracic suction apparatus with extra bottles (500 cc size for children);

(iii) Intravenous stands and tray;

(iv) Extra bottles of 5 % dextrose and water intravenous solutions, and, if available, a paediatric infusion set that allows for more accurate administration and calibration of intravenous fluids;

(v) Sphygmomanometer and stethoscope;

(vi) Nasogastric suction apparatus with whistle-tip catheters and a Y connector for endotracheal suction and appropriate size Levine tubes,

(vii) Graduated container for measuring urinary drainage;

(viii) Urinometer and litmus paper;

(ix) Automatic positive pressure machine with appropriate masks and various-sized endotracheal tubes and laryngoscope;

(x) A cardiac cart or separate items that include:

a. A cardiac arrest tray with all equipment necessary for intrathoracic cardiac massage

b. Tracheostomy tray

c. Thoracentesis set

d. Emergency and other drugs such as lanatoside C, digoxin, digitoxin, calcium gluconate, epinephrine, phenylephrine, hydrochloride, levarterenol menadione sodium bisulfite, procaine amide hydrochloride, aminophylline, isoproterenol, sodium bicarbonate, calcium chloride, molar sodium lactate, and heparin sodium. In addition, sedatives such as phenobarbital, morphine sulphate, and meperidine hydrochloride should be readily available;

e. Syringes and needles of varrying sizes including intracardiac needles;

f. Defibrillator and pacemaker and equipment for placing intracardiac electrodes;

g. Padded tongue depressors.

(xi) Four large Mayo clamps for chest tubes;

(xii) Equipment (Thermorite mattress, icebags, etc.) for temperature reducing measures,

(xiii) Bladder-drainage equipment

(xiv) Extra linen.

(d) Staff

Among the specialized staff of the various units comprising the paediatric cardiovascular service the most important personnel are the paediatric cardiologists, cardiovascular surgeons and specialized nurses (the nursing care of infants and children who have cardiac operations has become a special area of nursing practice (6)). Their number varies according to workload and size of the service.

3.6 Cardiovascular Surgical Unit

(a) Basis for this unit

The same principles as those which apply to the paediatric cardiovascular service are applied to the cardiovascular surgical unit showing that it is not only in the field of congenital heart diseases that cardiovascular surgery has progressed. Great advances have also come about in the surgery of adquire valve lesions, diseases of the vessels, surgical treatment of coronary patients, etc.

(b) Design

The cardiovascular surgical unit may be a specialized unit within the department of surgery or a separate unit attached to a cardiovascular service.

The ward should preferably comprise single or double-bed rooms with the facilities already specified.

For the post-operative care of patients, there is a need for a cardiac surgery unit which does not differ from the unit already

Described for the surgical unit of the paediatric cardiovascular service.

The operation room for this unit deserves special comment. The problem of its size is an unanswered question since this is related to the future progress of cardiovascular surgery and the striking and rapid changes taking place in procedures and equipment. While for most purposes the standard size of operating rooms should be approximately 25 square metres (five by five) to 36 square metres (six by six) the operating room for cardiac surgery should be at least 49 square metres (seven by seven).

(c) Equipment

Among the specialized instruments for cardiovascular surgery one very important item is the heart-lung machine used in open heart surgery for circulating blood extracorporeally through filters and oxygenator. This machine with all the persons involved in its function and the surgical team, are the factors which necessitate increased size of the operating room for cardiovascular surgery.

(d) Staff

The number of cardiovascular surgeons, doctors, nurses, specialized and auxiliary personnel, and ancillary staff, will depend on the size of the unit and the workload.

3.7 Exercise Tests Unit

(a) Basis for this unit

The cardiovascular system, with the lungs and blood, constitute the oxygen transportation system (1) which under normal conditions can meet the demand for oxygen of the muscles under any circumstances. At rest, the consumption of oxygen of the muscles is low, increasing under maximum activity to 100 times the resting value. In cases of cardiovascular diseases this demand cannot be completely met.

Exercise tests are used for the purpose of assessing the functional efficiency of the cardiovascular system both in health and disease ; in health to test fitness for special types of work or sports; in disease to help in the diagnosis and prognosis of certain cardiovascular diseases and for evaluating the effect of preventive, therapeutic and rehabilitation programmes.

In an Exercise Tests Unit of a cardiovascular service the only type of tests used are the so-called "submaximum" tests. The more strenuous "maximum" tests used on exercise physiology are not generally used in these units. Among the "submaximum" tests there are two types: the "recovery tests" in which measurements are taken during the recovery period following exercise, and the "efforts tests" in which measurement are taken during exercise (1).

(b) Design

The room for the Exercise Tests Unit must be of a size to permit the accommodation of the equipment and the staff necessary for the

exercise tests with ample space between the different types of ergometers to facilitate measurements and control of the patients.

The unit should be ideally located not distant from the coronary care unit since the occurrence of ventricular fibrillation or other emergencies could happen during the tests exercises. It should also be located adjacent to the Evaluation unit of the Rehabilitation Services with which it shares some facilities and staff.

(c) Equipment

Methods for exercise testing vary from the simple procedures of knee-bending, climbing stairs etc., to sophisticated techniques for which apparatuses are used. The most widely used types of ergometers for exercise tests are: bicycle ergometer, steps, treadmill and arm crank. An ECG and a sphygnomanometer,are essential since ECG recording and blood pressure measurements are usually an integral part of the exercise tests. If the unit is located at distance from the CCU it is necessary to reckon with a defibrillator and a set of cardio-vascular emergency drugs, as well as with a respirator. The unit must be equipped with a couch where patients may lie and rest.

(d) Staff

The ideal team should comprise a physician, a nurse and a physio-therapist or technician, with basic understanding of exercise physiology and ECG and able to recognize any abnormality or impending difficulties and immediately interrupt the test and initiate emergency therapy.

3.8 Rehabilitation Services for C.V. Patients

(a) Basis for this unit

Until recent years a majority of the medical profession looked upon rehabilitation as an extra-curricular activity of medicine. Today the situation is different and medicine has fully recognized that medical care cannot be considered complete until the patient with a physical disability has been trained "to live and work with what he has left" (12). The basic philosophy of rehabilitation is that the physician's responsibility does not end when the illness is ended; it ends only when the individual is retrained to live and work with the faculties he still possesses through a comprehensive programme of physical, psychological, social and vocational rehabilitation. It is necessary to stress that any programme of rehabilitation is only as sound as the basic medical service of which it is a part, and that physical rehabilitation should start as soon as the patient's clinical condition allows, to avoid complications resulting from prolonged bed rest.

(b) Design

It is generally agreed that most of cardiovascular patients can be rehabilitated by adequately staffed and equipped cardiovascular service. Only exceptional cases should be referred to special rehabilitation centres. The rehabilitation unit should be located adjacent to the Exercise Tests Unit since both units are mutually supporting. The Exercise Tests Unit is the place where the functional effect of a rehabilitation programme is evaluated.

The rehabilitation unit comprises two sub-units: the evaluation unit and the treatment area.

(i) Evaluation unit: Here the general assessment of the patient is completed. This is not only testing of the functional efficiency of the cardiovascular system analyzed in the Exercise Tests Unit, but goes further in analyzing the social situation of the patient, assessing his ability and appraising his psychological state in the immediate circumstances resulting from his cardiac condition, as compared with his previous attitudes and behaviour. The unit is only an examining area with cubicles separated by floor to ceiling solid partitions for confidental interviewing. The number of cubicles will depend on the staff.

Since the Rehabilitation Services are a functional continuation of the Exercise Tests Unit, part of the facilities should have a common use. These facilities are: a reception area with comfortable waiting space, an office for the performance of administrative and clerical duties, dressing rooms for the staff equipped with lockers, shower, and a lounge if possible, and toilets for patients.

(ii) Treatment Area: The establishment of this area as a separate unit is justified only in very exceptional cases. For example, when the cardiovascular services have a very important programme of rehabilitation of cardiovascular patients covering a big area and with huge attendance. Usually the same treatment area of the general

rehabilitation services of the hospital should be used for cardiovascular patients under the supervision of cardiovascular services' personnel. When the Exercise Tests Unit has a physiotherapist among its staff, it is possible to perform there some physical rehabilitation activities.

(c) Equipment

This is usually the same as for a general unit, that is: equipment for thermotherapy, electrotherapy, mechanotherapy, therapeutic exercises, etc.

(d) Staff

The cardiologist in charge of the Exercise Tests Unit may also be responsible for the Rehabilitation Services for cardiovascular patients. The same applies to the nurse. For the evaluation unit, the services of a social worker, a psychologist, and a vocational counsellor are necessary. For the treatment area if separated from the general rehabilitation services of the hospital, the services of physiotherapists and occupational therapists are required, their number according to the workload.

3.9 Out-patient Department of the Cardiovascular Service

(a) Basis for this unit

The OPD constitutes an important unit in a cardiovascular service. It should be physically integrated with the general OPD of the hospital, providing - on ambulatory basis - the following services:

(i) It serves patients who do not require hospitalization by providing them diagnostic, curative and rehabilitative services.

(ii) It provides diagnostic services for patients requiring further hospitalization for some special procedures.

(iii) It provides follow-up treatment and control after patients' discharge from hospital wards.

(iv) It promotes health education and preventive programmes for cardiovascular diseases.

The last point deserves some special comments. All the activities of the OPD are oriented towards keeping a closer contact with the community served by the hospital. This point particularly stresses the need for an active initiative in a preventive approach to the community.

The preventive aspects of health care cannot be divorced from the curative ones and the OPD should be the focal point for this integration. Specialized teams could perform epidemiological investigation to describe the distribution of cardiovascular diseases and formulate etiological hypotheses aiming at developing programmes for the prevention and control of cardiovascular diseases with special emphasis on health education. This task should be an important activity of the OPD.

An efficient OPD may substantially reduce the demand for beds in the cardiovascular services.

(b) Design and equipment

It corresponds to the design and equipment of the OPD of the hospital concerned.

(c) Staff

The staff working in the curative aspects of the OPD should ideally be the same as that working in the wards which facilitates co-ordination between wards and OPD for the hospitalization and follow-up of patients. The staff for the preventive aspects of the OPD should comprise an epidemiologist, a health educator and appropriate personnel, for the epidemiological surveys and preventive campaigns.

3.10 Home Care Programmes

A very important facet of ambulatory care of cardiovascular patients is home care. A home care programme makes it possible to extend needed services to the patient after he has been discharged from the hospital and returned to his home.

Patients are admitted to a home care programme only after a stay in the hospital and remain under supervision of the cardiovascular service as long as they are on the home care service. Implicit is the idea that home care programme is mainly dealing with the home care of patients who otherwise would be treated in hospital (9).

Decision to admit a patient to home care service comes through the judgement of the cardiologist in close collaboration with nurses and social workers.

When medical and housing requisites are met, home care has many advantages, among which are the lower cost and the positive emotional influence on the patient of remaining in his own environment. Difficulties lie on the

shortage of manpower (many people are involved in a home care programme) and the reluctance of doctors to accept the uncertain conditions they are likely to encounter during home visits. However, the main link between the hospital and home is the visiting nurse and/or social worker who can supervise the patient, review his progress and advise, when necessary, his readmission to hospital.

In a home care programme, all services for the patient are arranged for and co-ordinated through the hospital. The programme should be managed by a physician (director or co-ordinator of the home care programme) for whom an office and secretariat facilities are needed. There is also a need for part-time use of a conference room where the director of the programme can meet and discuss with physicians, nurses, social workers and other specialists, activities and problems relating to the programme.

3.11 Co-ordination and Cardiovascular Services

The Oxford dictionary defines "co-ordinate" as to bring parts into proper relation. Therefore, co-ordination deals with the task of blending efforts in order to ensure successful attainment of an objective. It should be pointed out that co-ordination makes possible a total accomplishment in excess of the individual parts making up that total. Co-ordination is so important in a cardiovascular service that it deserves some special comments. It will be analyzed under two main headings:

(a) Internal Co-ordination

(i) Teamwork

(ii) Co-ordination between different services of the hospital

(b) External co-ordination

(a) Internal co-ordination

(i) Teamwork. This refers to the co-ordination among staff members of the cardiovascular service in which the effort of each specialized doctor, nurse, technician, etc. should be blended, timed and carefully directed so that the team's actions become synchronized as a unit thus maximizing the results. Teamwork does not just come into existence as a consequence of people working together. Specific measures should be taken by the Head of service to ensure this teamwork attitude.

(ii) Co-ordination among different services of the hospital. This refers to the co-ordination of the cardiovascular service with other medical department and services of the hospital. The first thing to stress here is the need for a quick transfer from hospital reception to coronary care unit for suspected infarction patients. The administrative formalities of admission could be completed after his hospitalization in the unit. In respect of co-ordination with other medical departments, this is a must not only for the efficient running of the cardiovascular service but for the whole hospital and is the best way to ensure good medical care services for all those attending the hospital. Here again it is necessary to stress the need for ensuring quick transfer from other hospital wards to coronary care units if a patient gets an infarction while hospitalized.

(b) External co-ordination

This refers to the co-ordination between the hospital cardiovascular service with cardiovascular services and/or other medical services outside the hospital.

The co-ordination with cardiovascular services outside the hospital could be developed as a type of "regionalization" in which the hospital cardiovascular service acts as a centre to which to refer particularly difficult or specially characterized patients who required more sophisticated diagnostic procedures and/or hospitalization, at the same time the hospital cardiovascular service staff can regularly visit the out-lying medical services and conduct training meetings, consultations, conferences and the like. On the other hand the personnel of these services can visit the hospital cardiovascular service for specialized training. This is useful not only for physicians, but for nurses, laboratory technicians and other specialized personnel. This results in a two-way co-ordination flow.

Special emphasis should be given to co-ordination between the cardiovascular service and the school health services. Here lie all the complex educational problems posed by children with cardiac disease. Probably, the main problem concerns the vocational orientation of these children. Here it is necessary to stress once more the need for teamwork, since the school physician must co-operate closely with the cardiologist, the treating physician and the occupational therapist, to make the child and his family understand and accept the child's present and future limitations as well as his vocational possibilities.

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