

Heart and Coronary Disease

**Symptoms, Diagnosis
and Prevention**



**GETTING TO THE
HEART OF THE
MATTER**

Published & Distributed by
Allied Educational Foundation
in association with New York Cardiac Center



HEART AND CORONARY DISEASE

CAUTION

This is one of a series of pamphlets published by the Allied Educational Foundation in association with the New York Cardiac Center, non-profit organizations, as a public service to acquaint the general public with some of the latest activities, studies and developments in medical and nutritional fields. Each writer is permitted the widest latitude to present the information in a form that can be readily understood by those not acquainted with technical or medical terms.

It should be emphasized, however, that this pamphlet is for **educational and informational purposes only**. The Allied Educational Foundation and The New York Cardiac Center do not endorse, sponsor or recommend any treatment, diet or procedure, expressed or implied, contained herein whatsoever. All readers are cautioned and warned that no treatment of any kind or nature should be undertaken except at the direction and continuous supervision of a physician, preferably one specializing in that field of interest.

Symptoms, Diagnosis & Prevention

COMPOSED BY
GEORGE BARASCH
Professor of Research
Department of Management
Stevens Institute of Technology

REVIEWED BY
IRVING KROOP, MD, FACP
Clinical Professor of Medicine
Health Science Center
Downstate Medical Center
New York State University
and
Former Chief of the
Department of Cardiology
Brooklyn Jewish Hospital

HEART DISEASES

Chuck Hughes, star wide-receiver for the Detroit Lions professional football team broke across the line of scrimmage just as the center snapped the ball. Hughes was fast; in two long strides, he brushed past the defensive linebacker and raced downfield. The ball was already in the air. Hughes cut into the center of the field, leaped and snared it. Then, he faltered and fell to the ground with no one near him.



Chuck Hughes, professional football player, apparently superbly conditioned, died of a heart attack at the age of 28.

Millions of puzzled fans on that Sunday afternoon, October 24, 1971, had seen more than a fine catch. On their television screens they had watched a healthy human male, superbly conditioned, die of a heart attack. Chuck Hughes was 28 years old. A blood clot had plugged a severely diseased artery leading to his heart.

Gil Hodges, former manager of the New York Mets, watched his weight, dieted carefully and took regular exercise on the golf course. He was as good a golfer, too, as he was a shrewd and suc-

successful baseball manager. In the locker room following a routine 18 holes, Hodges suddenly complained of pains in his chest. He collapsed and died. Hodges was 47 years old.

Senator Lyndon B. Johnson was rushed to the hospital at age 47, and waiting news reporters were told that the exuberant Texas Democrat had suffered a "massive myocardial infarction." Recovery was prudent and slow. Johnson, at his doctor's orders, was determined to change his life-style, but not his career. He gave up smoking cigarettes entirely, cut down on his favorite fatty foods—barbecue beef, pastry and ice cream. He exercised moderately every day, swimming mostly, and sharply reduced his use of alcohol. He cut down on "Bourbon and branch-water," but did not give up politics.



President Lyndon B. Johnson was rushed to the hospital with his second heart attack. He died at the age of 65.

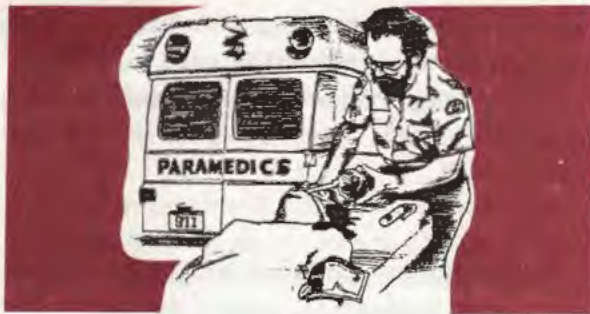
Following the assassination of President Kennedy in Dallas, Lyndon B. Johnson entered the White House at age 55. Throughout more than six pressure-filled years of office: long days, some

sleepless nights, grueling schedules of travel, Cabinet meetings and election campaigns, he enjoyed vigorous good health and looked it. But at age 65, Lyndon B. Johnson had his second, fatal heart attack.

Everything was routine on January 27, 1967. The simulated "countdown," part of the preparation for a 14-day spaceflight for Astronauts Grissom, Chaffee and White, was going smoothly. The three men in the new Apollo spacecraft checked and rechecked, recorded and listened, talking easily by radio to ground control. All systems were "A-Okay."

Then, an electrical spark touched off oxygen inside the space vehicle. In seconds, the flight compartment was a furnace of roaring flame and thick smoke. The first Apollo mission ended before it had really begun. Astronauts Chaffee, White and Grissom were dead in a freak tragedy.

Yet, when pathologists performed the autopsy on Lt. Colonel Virgil Grissom to determine the exact cause of his death, they were in for another shock: two of the three vital arteries that had fed blood to the astronaut's heart muscles were almost sealed with accumulated fatty deposits. Grissom had not known this, nor had his personal physician. The specialists employed by NASA to monitor the health of all flight personnel through every step of training over a period of years had discovered no reason to suspect the command pilot's condition. Virgil Grissom was in the prime of active life, only 40 years old. Still, he had been dying . . . slowly, secretly, silently . . . of atherosclerosis before the spark and the fatal fire.



Lt. Colonel Virgil Grissom, astronaut, was in the prime of his life, only 40 years old. Still he was dying. . . slowly, secretly, silently of atherosclerosis before the spark and the fatal fire in the Apollo.

When Dwight D. Eisenhower's blood pressure dropped, so did the Dow-Jones average. The New York Stock Exchange seemed a barometer of the President's health. During his first term in office and again during his second term, Eisenhower suffered a "mild" heart attack and a "mild" stroke. Eight years after the first incident, Dwight D. Eisenhower died . . . of a heart attack.

Bill Betaman used to play basketball in high school and never smoked. After college, he did put on weight, a "spare tire" around the middle which he blamed on all the coffee (light, with two sugars) and Danish he consumed at the office where he wrote copy for a major advertising firm. Bill not only wrote copy, he read it, too, before and after it was printed in weekly magazines. Bill was health-conscious. He read about cholesterol and blood serum and had his blood tested. 300mg? Wow! Bill knew that the "average" American blood cholesterol index was the highest in the world, ranging between 230 and 270, while doctors considered the "safe" range to be down at 160 to 180. It was past time to do something. And he did.

Bill cancelled the Danish orders, learned to drink his coffee black and warned everybody on the commuter train to Greenwich about saturated fats in the American diet. He bought a pair of special shoes and joined hundreds of thousands of men (and women, too) in the new health-sport of jogging. Every night, he put on shorts and a sweatshirt and jogged. At first, he took it easy, getting in shape slowly, until a few months later, he could jog 3 miles around the neighborhood, followed by kids and local dogs.



Overweight, a diet of red meat, fats, sugar and salt, a daily dose of alcoholic beverages, and smoking a few packs of cigarettes a day is a sure formula to increase cholesterol, triglycerides and the chances of a heart attack.

It worked! Bill Betaman's weight dropped by 12 pounds. His "spare tire" shrank, and when summer came, the new bathing trunks he bought were two sizes smaller than the old ones he had to squeeze into. One year to the day after his first blood test, Bill went back. His cholesterol count

was down to 255, within the "average" range. Better. Getting there, but still not "safe."

Bill cut down the salt intake in his daily diet. More proteins, but no butter and no potatoes. He read about vitamins and started swallowing a daily dose of Vitamin C to ward off colds. He couldn't afford to get sick, not with his job at the advertising agency. Bill worked nearly as hard at improving his health as he did writing copy.

In the office, the phone rang all day long. Lots of meetings with clients, and every week there were deadlines to meet. Even when he came home tired, he went out to jog. Regular exercise, that was the thing. No, he couldn't give up black coffee . . . six, eight cups a day. It kept him going, and he never felt better in his life. Why, he even jogged upstairs on his way to bed!

Bill Betaman was a restless sleeper, tossing and turning. Which is probably why his wife Ellen didn't wake up when her husband's heart stopped as he slept.

Bill Betaman, average sort of guy, took good care of himself, almost a "health nut." Only 36 years old and "never sick a day in his life." Diagnosis: coronary thrombosis . . . heart attack.

The cardiologist looks at the young patient seated on the edge of the office chair. David Delter is a fat kid. Not just pudgy, but a full, soft, 45 pounds overweight and not yet in his teens. His paternal grandfather, an assembly-line worker, had

been fat, too, despite a peptic ulcer he blamed on his work. Grandfather had died, in the men's room, at 61. . . coronary thrombosis. The life insurance paid for a degree in engineering for David's dad. He had the same somotype or body-shape, an endomorph, narrow in the shoulders and pudgy. The patient's mother, her fingers pressed nervously against her mouth is not exactly thin, either. She is a widow. David's father died shoveling snow after a big Christmas dinner. He was 43. Now, she was worried about her son. She ought to be.



Bill Betaman, an average sort of a guy, took good care of himself, almost a "health nut." Only 36 years old & "never sick a day in his life." Couldn't give up black coffee. . . 6 to 8 cups a day. It kept him going. Diagnosis: coronary thrombosis. . . heart attack.

Blood pressure: diastolic 105, systolic 165. High, dangerously high. Blood cholesterol level 310. Too high at any age. Uric acid value of 8.0. Another bad sign. Cloudy blood serum indicating high triglycerides. David had all the symptoms, and all of them were serious.

"He eats good, Doctor, he really does. Bacon and eggs every morning. Toast and cereal, the good kind that's on TV a lot. Two, maybe three quarts of milk every day. Cheeseburgers he likes. Right, Davy? Sweet corn with butter and salt. Ice cream . . . Not the cheap kind, but with real fruit. Meat and potatoes, but lots of vegetables, all kinds. I make him take his vitamins, too, Doctor. B complex and C. And the new one. Vitamin E. To make his blood slippery or whatever."



When a heart attack strikes, quick transportation to the nearest hospital for emergency treatment may save your life.

David Delter has a diet intake of more than 4,000 calories each day. He complains of sore, puffy tendons at his elbows and the back of his feet. It could be xanthomatosis, even though the boy had not yet developed the typical fat pads on the eyelids. More likely, he was hyperlipemic, with an inherited inability to metabolize fats.

The school report stated he was doing poorly in sixth grade studies, often "felt sick" during gym periods and was excused. Too heavy and slow for

Little League baseball, David had a bike, but seldom rode it. According to his mother, the boy watched about 6 hours of television daily, more on weekends.

In the three years since his father's heart attack, David had seemed to lose interest in almost everything. He was withdrawn and listless, except for brief bouts of cranky irritability. He had "below-normal peer compatibility," according to his home room teacher. Twice he had been sent to the principal's office for fighting. Like most fat kids, David Delter didn't look very aggressive.

Five days earlier, his mother had noticed a slurring in the boy's speech. He "felt dizzy," and his balance was poor. There were pills in the family medicine cabinet. Many kinds of pills, too many, probably. His mother had a new fear. Had David been taking medications prescribed for others? Was her son "on drugs"?

The cardiologist read over the report of the psychiatrist, his colleague at the clinic: "Hypertense . . . habitual jaw-clenching and finger-twiddling . . . moody and non-communicative . . . repressed anxiety symptoms . . ."

The resting ECG showed nothing. The Master's Test, no abnormality, as such. But the X-rays . . .

The cardiologist looked again at the boy, then at the mother. They were waiting for the worst, the mother already tearful, the boy sullen, resentful. The woman's voice shook.



"Oh, my God! A stroke. Doctor, he's only a little boy!"

"Doctor, tell me! What's the matter with my boy?"

"David has . . ."

"Heart trouble! Just like his father! I knew it!"

"David has had a stroke, Mrs. Delter. A little one. What we sometimes call a strokelet."

"Oh, my God! A stroke. Doctor, he's only a little boy!"

"Twelve years old, Mrs. Delter. And he's a white male. There's the family history here."

"Heredity! From his grandfather!"

"The somatype. The body-shape we spoke of, you remember."

"Built just like all the Delters."

"His medical records from your family and the school"

"He's always had to be careful. Since he was a baby."

"And he's overweight, too."

"He can go on a diet. Today! But I can't starve the child, Doctor. He might get sick!"

"David is ill, Mrs. Delter."

"What is it? There must be some mistake! Maybe?"

"What, exactly, caused the strokelet we don't yet know. But there's no mistake. What has happened to David is not all that unusual. In twenty years of practice, I've seen an increasing number of young patients. The sensible thing right now is to continue with tests. There are many reasons, combinations of reasons why your young son has

'heart trouble,' physical reasons and mental ones, too."

"Oh, Doctor. I wish we'd known sooner!"

The cardiologist sighed.

"So do I, Mrs. Delter. So do we all."

STATISTICS OF CORONARY DISEASES

600,000 Americans die as a result of heart attacks each year—on the average, 1,643 each day or 68 persons every hour, better than 1 per minute.

More than 50% of heart attack victims die before a rescue squad can reach them or they can be rushed from home or work to hospital or emergency treatment centers.



One half of heart attack victims die before they can be rushed to a hospital for emergency treatment.

American families paid nearly \$65 billion to specialists, surgeons, hospitals and nursing homes for the treatment of heart and related blood-vessel diseases in the year 1986.

When an American visits his family doctor 10 times, at least once it is because of some heart problem. The bill for consultations presented by the nation's doctors and nurses for their services was nearly \$11.8 billion in 1986.

Americans paid nearly \$5 billion dollars in 1986 to purchase prescription drugs to maintain life and minimize the pain of atherosclerotic disease. Incapacitated victims have lost wages and salaries estimated as high as \$13.6 billion.

The odds are slightly better than 2 to 1 that a white American male will die, directly or indirectly, from coronary disease.

Heart disease ranks first among the causes of death in Australia, Canada, Finland, France, Germany, Denmark, Norway, Sweden, the Netherlands and the United Kingdom (England, Scotland, Northern Ireland and Wales), prompting Britain's foremost epidemiologist to write: "Coronary thrombosis is the scourge of Western civilization."

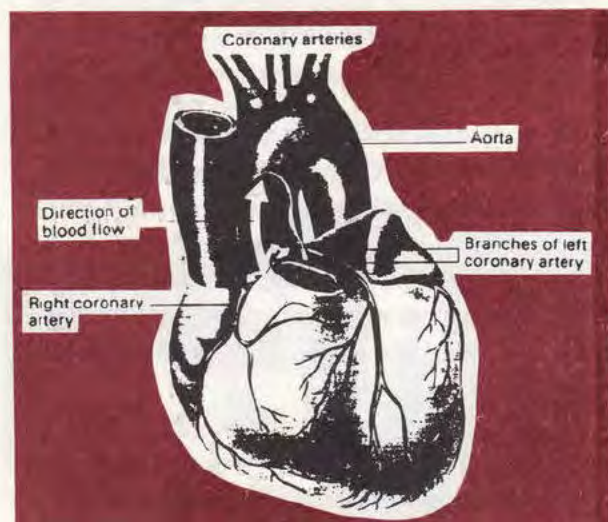
The Japanese appear to suffer from the highest blood pressure in the world and consume over 130 tons of salt, each, in a life-time.

While, typically, black American women exhibited a higher incidence of coronary disease than black American men, data in recent decades indicates a rising number of victims among white American women.

Not until 1912 could an American doctor find a complete description of "heart attack." Written by James Herrick, M.D., it was based on six case histories taken in Chicago.

Only 50 years after Herrick's comprehensive study of coronary thrombosis, more than 255,000 American males were declared to have died of the disease and approximately 150,000 American women.

About the same time, David Spain, M.D., chief



Blockage of coronary arteries has significantly increased in all adult male groups. Young Americans are not only dying in larger numbers but faster than their fathers.

pathologist at Beth-El Hospital in New York published his findings in the American Journal of Medical Sciences: the blockage of coronary arteries had significantly increased in all adult males grouped by ages; forty-year-olds exceeded fifty-year-olds of the previous generation. Young Americans were not only dying in **larger numbers** but at a **faster rate** than their fathers.

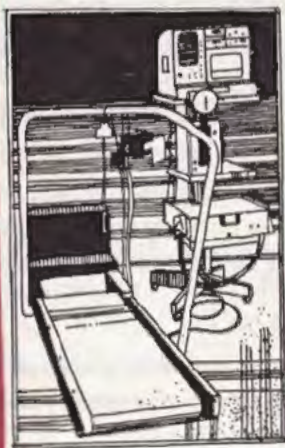
200,000 American men who had exhibited **no symptoms whatever** of coronary disease died in 1973 . . . of heart attacks.

COMMON DANGER SIGNS

When you are at work, exercising or even walking up a hill or flight of steps, you get "winded," feel short of breath. This happens quite often.

At night, you find it uncomfortable to try to sleep lying down. You have to sit up in bed for a few minutes and find yourself trying to catch your breath. Fresh air from an open window seems to help, but when you lie down, the feeling of suffocation comes back.

Your heart beats in an odd, disturbing way. It seems to race or throb as if you had been working or exercising violently. Or your heart skips a beat or feels like it's jumping in your chest. This feeling lasts longer than just a few seconds and happens fairly frequently. You have "palpitations," as this is called.



A stress test is a helpful procedure for diagnosing your cardiac and circulatory condition.

From time to time, you feel pain—really **uncomfortable**, even severe. Sometimes it's as if your whole chest area was on fire, burning. Sometimes it feels like a dull, cruel ache in either arm, the back, even the neck and jaw. The pain seems to come more often than it used to.

Your ankles and feet have swollen and look and feel puffy. But you don't have varicose veins. Your shoes and socks no longer fit with comfort. You have noticed that you have gained weight rapidly in a short time, and it seems to have settled below the knees. It has become uncomfortable to walk for any distance. You have to sit down and rest for a while before going on.

You seem to get tired more easily than you did, even though you do about the same things every day. Even a good night's sleep doesn't seem to help much. You don't feel sick, really, but washed-out, pep-less, or "bushed."



Inability to sleep, feeling uncomfortable, an accumulation of puffiness in the ankles, head noises, indigestion, dull pain in the chest are all danger signs of impending heart attack.

You hear "head noises"—a buzzing or ringing in your ears. It seems to happen for no special reason, even when you're resting comfortably after a big meal. You feel a little light-headed, even dizzy once in a while.

WHAT IS "HEART TROUBLE"?

"Heart trouble" is the street-corner term for a fairly wide range of coronary conditions and heart diseases. Heart disease—while it may, indeed, be or cause trouble—is not a heart attack. The types of diseases of the heart differ in cause, danger, natural history and resulting damage. The treatment of coronary disease differs from the emergency procedures necessary to save the life of the victim of heart attack. Not all forms of "heart trouble" can or do cause coronary attack, as such. Nearly 95% of all heart attacks are caused by coronary disease.

The American Heart Association classifies heart diseases into several categories.

Congenital Heart Disease

Congenital Heart Disease is a defect noted at birth or thereafter which may affect the valves of the human heart, the muscle and, less often, the large blood vessels that lead from and to the heart. For reasons not completely known, the heart valves may have failed to develop normally and completely in the unborn child. There may be small holes or slits or abnormal openings that permit the passage of blood in an incorrect and dangerous manner, from the pulmonary veins into the right atrium instead of into the left atrium, for instance. Any one or more of the four heart valves may be too wide or too narrow. The most common form of congenital heart disease is a defect and displacement that causes an aorta to receive blood from both the right and left ventricles of the heart, causing the condition known as "blue babies."



Congenital heart disease is a defect noted at birth or thereafter which may affect the valves of the heart muscles, and, less often, the large blood vessels.

Congenital or birth defects such as the above and others may occur alone or in combination. Some are so serious that the infant dies within days, hours or even minutes of birth. Some permit the child to grow to normal adulthood without great difficulty. A few forms of congenital heart disease can cause the death of an unborn child. Severe virus infection, especially German measles, contracted by the mother during early pregnancy is the most common cause of some birth defective hearts.

Since 1939, a variety of surgical procedures have been developed to remedy the most common forms of congenital heart disease. While some of these techniques are not a cure, they do permit most of the 30,000 afflicted American infants to survive or to be restored to healthy, active, normal or near-normal lives. Complete surgical correction becomes possible in the older child.

Heart Murmur Heart Murmur is not a congenital heart disease, as such, but rather a sound or range of sounds occurring as the heart beats. Noises are caused as the blood rushes through the neighboring blood vessels to, then through and from the heart. In some cases, murmur is no more than the sound of very active circulation that is not caused by or related to heart disease. This is common in children, and the sounds may fade away as the child grows up. Many are detected by pediatricians using a stethoscope, the every-day office listening device, and do not cause problems so serious that the child must be denied a normal, active life.



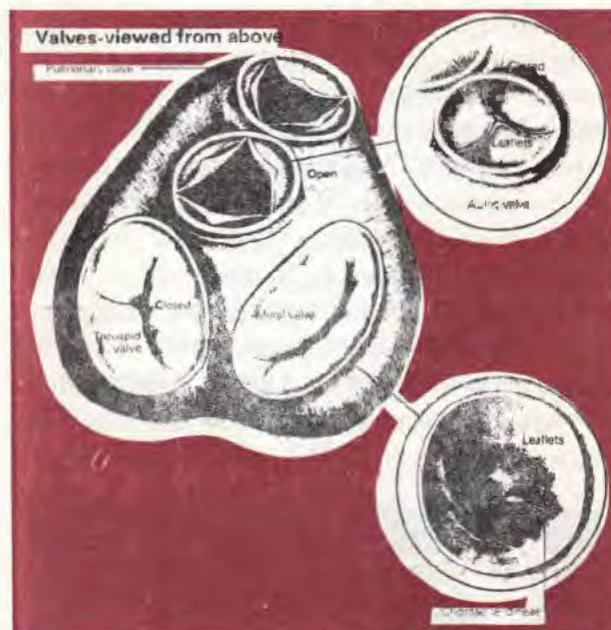
Heart murmurs are a range of sounds occurring as the heart beats. It is common in children and the sounds may fade away as the child grows up.

Some heart murmurs are not normal and innocent. A heart valve does not completely close or closes at the wrong instant, driving the blood back away from the heart. Blood pours back and forth between two heart chambers instead of passing swiftly through. A small bridge, not normally open, permits blood to pass between major blood vessels. These conditions require examination by a cardiologist—a specialist in diseases and conditions of the heart—and the skilled services of a cardiac surgeon.

Rheumatic Heart Disease

Rheumatic Heart Disease is, again, not a cause but an aftereffect of one of the most serious diseases of childhood, rheumatic fever.

Tiny organisms called Group A hemolytic strep-



Some heart murmurs are not normal or harmless. The heart valve does not completely close, driving the blood back and forth between two chambers instead of passing swiftly through.

tococcus cause infection, usually in the throat. The infection goes away in a few days and the child seems to recover. After this false, free period of 1 to 3 weeks, the symptoms of rheumatic fever appear: high fever, increased heart-beat rate and red, painful swellings that "migrate" from one joint of the body to another, appearing in one area which swells, but then returns to normal while another place in the body is affected. Rheumatic fever attacks can be mild, running full course in several weeks, or severe, lasting for many months.

Unlike most childhood diseases which can be contracted or "caught" only once, one attack of rheumatic fever does not prevent or lessen later attacks. In fact, the child who seems to recover is

quite likely to suffer again, unless treated in one or more ways. Subsequent attacks of rheumatic fever can be milder or more severe than the first attack. Once very common, a real "child-killer," rheumatic heart disease can be treated very effectively, even prevented, by penicillin prescribed or administered by the family doctor. Normally any child diagnosed as having "strep throat" or "strep sore throat" will be promptly treated with penicillin. Rheumatic fever will not appear, normally, after the free period of 1 to 3 weeks. Adults do not normally "catch" rheumatic fever after age 25.



Rheumatic fever can be mild, lasting a few weeks. A severe case can last for many months and may result in rheumatic heart disease. Today it can be treated very effectively with penicillin.

Rheumatic fever causes permanent injury or damage to the heart, enough to cause the victim to be very restricted in activity, although usually

moderate exercise is not dangerous. In almost all of the cases, the damage done affects the valves on the left side of the heart. Heart valves are constructed so that the blood will flow through them in one direction only. But rheumatic fever causes a shrinkage around the edges of the mitral and the aortic valve. This "insufficiency", not enough valve tissue to close completely, permits the moving blood to leak back into the heart chamber or back into the blood vessel it just came from. The heart muscle tissue grows, trying to pump the proper amount. At first, since it works harder, the heart seems to be more efficient, but as the patient ages, the degree of "insufficiency" increases and eventually the heart will fail to function at all. Rheumatic heart disease damages the valves, injures the heart muscle and, in about 75% of the cases, causes an irregularity known as fibrillation.

In rare cases, then, rheumatic heart disease can cause such damage to the heart muscle that heart failure will occur. Almost always, rheumatic heart disease causes death by the process of heart failure, secondary to valvular disease. The incidence of rheumatic heart disease has declined in the developed countries of the world, but rheumatic fever is still a health problem in developing countries. Rheumatic fever is a disease which follows an untreated streptococcal sore throat. It is a disease which is associated with poverty and overcrowded living conditions prevalent in Third World countries.

Heart irregularities

Heart irregularities occur in a fairly large percent of quite normal and healthy people. Most of the heart irregularities in normal people are not dangerous

and are of no real importance. But since these shifts are noticeable and may cause some slight discomfort, many people experiencing this sort of heart activity become frightened, convinced that they are having a heart attack or will soon suffer one. This is not true. All healthy babies and children have irregular heart rhythms due to fever, exercise and happy excitement.

Premature beat Premature beat is a common form of heart irregularity which can occur at times in all people. Heart beat coming slightly before it is due can be caused or increased in frequency by physical fatigue, overeating, too much smoking or nervous tension. Not surprisingly, it

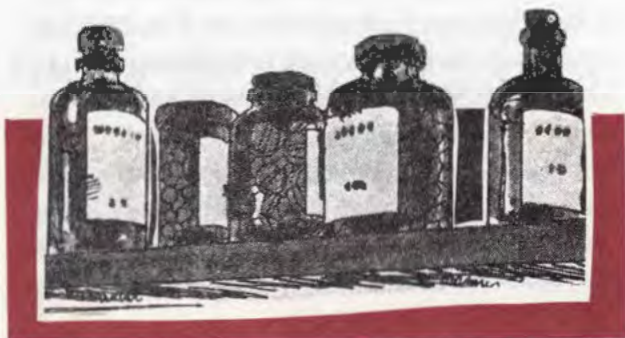


Premature heart beat is a common form of irregularity which can occur at times in all people. Physical fatigue, overeating, too much smoking, or nervous tension are some of the major causes.

frequently happens over holiday festivals and after weddings. Despite what a good many love songs say, the heart does not "skip" or drop a beat. Since the extra beat comes early, the next seems unnaturally delayed, but in this condition the **total number** of beats per minute remains the same. Only the rhythm has changed, and that only slightly. Generally speaking, premature beat disappears after light exercise, such as walking. Unless the heart beats prematurely 15 to 20 times per minute, there is no loss in cardiac output to worry about. If lighter diet, less work and tension, and reduced smoking do not make premature beat lessen or vanish completely, a family doctor may prescribe a mild dosage of three long-used drugs: digitalis, quinine or pronestyl. Most patients can take these drugs without problems.

Tachycardia Tachycardia, from two ancient Greek words, **tachy** = rapid and **cardia** = heart, is a tongue-and mind-twister, since when pronounced ("Tacky-car-dee-uh") it sounds to some ears like "attack of the heart." The first incident of this condition can be very frightening, since heart rate zooms from 70-80 per minute to as high as 200, drops suddenly to 100, then falls back to 70-80, all in a few minutes. If the condition lasts longer than a few minutes, this paroxysm will cause great fatigue or exhaustion. The organs and tissues of the body have not received the normal amount of oxygenated blood. The longer the condition, the greater is the "oxygen debt." Simply holding one's breath for over 6 seconds and leaning forward so the upper body is parallel with the floor will usually bring a short seizure of tachycardia to an end.

If paroxysms of supraventricular tachycardia occur frequently, drug treatment with quinine, digitalis or pronestyl will prevent them. Simple tachycardia is not serious, does not injure the heart, does not cause heart disease and can cause only discomfort and fear, but not death.



Tachycardia is a rapid increase in the rate of heart beat. It often requires emergency drug therapy.

Ventricular tachycardia

Ventricular tachycardia is serious and potentially dangerous, since it most frequently occurs in hearts already diseased and is most likely to happen if a coronary artery is nearly or completely plugged by a blood clot. The heart muscle, already damaged, simply cannot contract up to 200 times per minute to pay off its "oxygen debt" created by the plugged artery. Tachycardia that originates in the ventricles of the heart will not respond to the simple maneuvers listed above. Emergency drug therapy and even electrical conversion to regular rhythm may be necessary. Maintenance of normal rhythm may require long-term antiarrhythmic drug therapy.

Atrial Fibrillation

Atrial fibrillation is a weak, uncoordinated twitching of the heart muscle without a coordinated contraction of the muscle as a whole. Nerve impulses signal the upper chambers of the heart at a rate of 400 to 500 per minute, rather than at the normal signal rate of 70 to 80 per minute. Stunned by this barrage of signals, the upper chambers do not contract at all or merely twitch, while the lower chambers contract rapidly but not in regular rhythm. The condition is serious.

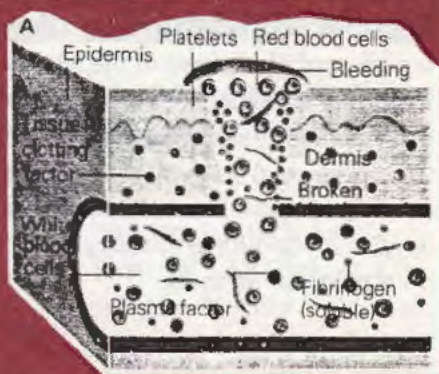
In many cases, atrial fibrillation once started becomes a permanent heart condition. Often, it indicates heart disease. It begins with short seizures which become longer and more frequent. Fibrillation can be controlled by the drug digitalis, which controls the rate of the heart beat. Actually, the upper chambers continue to fibrillate, but the drug blocks the storm of rapid atrial signals, allowing the normal 70 to 80 rate to pass to the lower chambers of the heart. Patients frequently must continue digitalis or antiarrhythmia drug therapy on a permanent basis.

Atrial fibrillation is the most common heart irregularity and appears mainly in association with rheumatic heart disease and atherosclerotic heart disease. This condition may cause heart failure. The rapid, uncontrollable twitching may shake loose very small blood clots that have already formed in the heart's upper chambers. If this occurs on the right side of the heart, these clots can be pumped into the lungs, where they occlude pulmonary arteries. This dangerous complication of fibrillation—plugged blood vessel of the lung—is called **pulmonary embolism**. These

blood clots can pass into other areas of the body if they are vibrated loose and pumped from the left side of the heart. Embolism can strike now in the brain, kidneys, spleen and stomach.

This danger can be controlled by administering anticoagulant drugs which prevent blood particles from sticking together to form clots. So, fibrillation can be controlled and so can its dangerous by-product, the blood clot, by means of modern drug therapy.

Below: In the case of a wound, injured blood vessels bleed and platelets (small sticky cells in blood) rush to the site to help seal it (A). Tissue-clotting factors are released and plasma factors enter the area



Heart Block

Heart Block happens when the nerve impulse sent from the upper chambers after contracting does not reach the lower chambers, signalling them to contract. These signals are delayed by 0.14 to 0.20 seconds from upper to lower chambers when the heart is beating at its normal rate of 70 to 80 times per minute. If the lower chambers beat only once, when the upper chambers beat twice, this condition is called 2 to

1 heart block. If the block is greater, the ratio may go to 3 to 1, then 4 to 1. Beyond this point, complete heart block causes signals not to reach the lower heart chambers at all, and the lower chambers contract at their own slow rate.

Like fibrillation, this condition begins with mild, short seizures but increases in frequency and duration, with block becoming a permanent condition. This state is common among elderly persons already suffering from atherosclerosis of blood vessels leading to the heart, for it is the coronary arteries that supply the blood needed for the conduction tissues between the upper and lower chambers. Without a proper blood supply, the impulse signals cannot be received. Gradually, these conduction tissues die and are replaced by scars which may contain calcium deposits. Progressive scarring of the conduction tissues may also occur in the older age groups, without diseased coronary arteries.

Partial and complete heart block may result in very slow heart rates, so slow that the heart cannot deliver an adequate amount of oxygenated blood to the brain. Deprived of oxygen, the brain ceases to function normally. The patient will experience light-headedness, "dizziness," a sensation of "blacking-out," and even unconsciousness. If the blood flow to the brain is restored within minutes, then consciousness is restored and the patient is said to have fainted. After 4 minutes of oxygen deprivation, brain cells begin to die. If the circulation to the brain is not restored, brain death results.

Syncope

Syncope, from another ancient Greek word meaning "to cut off," is the technical term for fainting spells experienced by victims of heart block, especially complete heart block. The patient who is subject to frequent spells of fainting is not only in danger himself, but may endanger others, especially if driving a car or operating machinery. Electronics experts, working with cardiologists, have created a variety of heart "pacemakers." They are so small they can be inserted under the skin of the patient, and they send out properly-timed impulses to the lower chambers of the heart for many years.



Abnormalities are usually discovered when a routine electrocardiogram is taken as a screening procedure.

Wolff-Parkinson-White Syndrome (W-P-W)

Wolff-Parkinson-White Syndrome (W-P-W) is an electrocardiographic abnormality which is found frequently in normal individuals. Usually the abnormality is discovered

when a routine electrocardiogram is taken as a screening procedure.

The electrocardiographic changes occur because the electrical impulse from the upper chambers of the heart (atria) bypasses the normal conduction pathway and short-circuits to the lower chambers (ventricles) by a fast-conduction accessory pathway. W-P-W is usually not associated with heart disease but is frequently misinterpreted to represent serious heart disease, because it resembles bundle branch block. A small percentage of patients with W-P-W do experience supraventricular tachycardia, which can be treated with antiarrhythmic drugs.

Bundle branch block

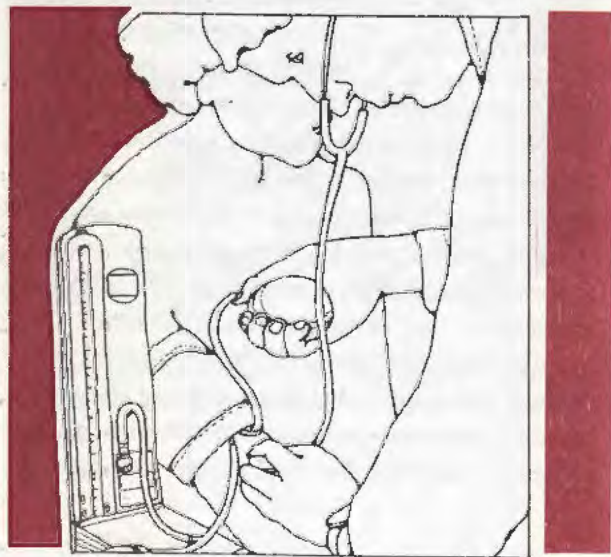
Bundle branch block is a frequent electrocardiographic abnormality. The main conduction bundle from the up-

per chambers (atria) to the lower chambers (ventricles) divides into the right bundle branch to the right ventricle and the left bundle branch to the left ventricle. Either bundle can be the site of a block of conduction. Pump function of the heart is normal even though contraction of the ventricles is not in normal sequence due to the block. The bundle branch blocks in the young may be present without significant heart disease. However, bundle branch blocks are associated with viral or coronary heart disease in the older age groups.

"High Blood Pressure"

"High Blood Pressure" to the public is known as **hypertension** to medical scientists. The pressure within human arteries is measured by an in-

inflatable cuff connected by tubing to a hollow glass tube filled with mercury. The blood flow is temporarily stopped by blowing up the cuff. Then the air is released from the wrap-around cuff until the examining doctor or nurse can hear the first beat of the heart pumping blood into the arteries. At this instant, the number of millimeters of mercury pushed up in the tube is noted as the **systolic** pressure. As the air in the cuff is released still more, slowly and steadily, the examiner can hear no sound at all. At this instant, the heart is in diastole, getting ready for the next pumping contraction. The pressure within the artery is noted as the **diastolic** pressure. Normal blood pressure ranges from 110 to 140 millimeters during systolic or pumping action of the heart, and between 70 to 90 millimeters during diastole. Most people,



Normal blood pressure within the artery ranges from 110-140 millimeters on the systolic side and 70 to 90 millimeters during diastole. Actually the lower number recording the diastolic pressure is more important in cases of hypertension.

when commenting about blood pressure, give only the systolic figure of 150, while medical scientists will indicate both by saying, "150 over 90." Actually, the lower number, recording the diastolic pressure, is more important in cases of hypertension.

A single check of both pressures may be considered enough, when both fall within the range accepted as normal. However, fear, anxiety, discomfort, heavy cigarette smoking out in the waiting room, a heavy meal, even the behavior of the doctor or nurse may cause a marked rise in systolic pressure and a lower, but significant rise in the diastolic pressure. First, abnormally high pressures are usually rechecked and the figures averaged. Either one or both of these two pressures, systolic or diastolic, may be high in patients diagnosed as cases of hypertension. If diastolic pressure mounts, pushing the column of mercury up over 90 millimeters in repeated tests, then the patient is considered to have hypertension.

Hypertension is generally divided into two categories: primary, when the cause is unknown and secondary, when some cause or associated condition has been identified. There are a number of diseases and conditions which either cause or are associated with hypertension: abnormalities of the central nervous system (the brain and spinal cord), of the cardiovascular system (the heart and blood vessels), of the endocrine system (the glands, especially the adrenals and the pituitary), or in the renal system (the kidneys, especially a low blood flow to them or an infection in various parts of them).

Primary or "essential" hypertension, unknown in cause, can itself cause damage to the blood vessels when the condition persists. This form of high blood pressure is quite common among American adults. Undiagnosed or uncontrolled, primary hypertension can, in many cases, cause heart disease that leads to heart failure. In recent



Evidence is accumulating that control of hypertension slows the progression of hardening of the arteries and heart attacks.

years, concerned groups like the American Heart Association have sponsored free public check-ups at local schools, firehouses or at mobile facilities.

Primary hypertension is not related to any other disease. Its cause is unknown, but many factors come into play to disturb the normal regulation of the blood pressure. These include influences on the heart as a pump and the arterial tree as a conduit, a system with a systolic and diastolic

pressure. The pressure in the system can be modified by the central nervous system, the sympathetic nervous system, the hormones of the adrenal gland, and other neuro-humoral substances.

Even though the exact cause of hypertension is unknown, optimum control of the blood pressure in treating hypertension is most important. Good control prevents cardiac enlargement, heart failure, stroke, and kidney failure. Hypertension is a major risk factor for coronary artery disease. Evidence is accumulating that control of hypertension slows the progression of the atherosclerotic process.

"Executive heart"

"Executive heart" is another myth of those public attitudes and beliefs about coronary conditions. Back in

1958, Dr. Lee and Dr. Schneider made a study of white-collar workers in New York and concluded: "... Our data reveal no increase in the incidence of either hypertensive or arteriosclerotic disease in the executive class." Many other more recent tests have confirmed these findings. High blood pressures are most frequently observed in patients at lower levels of duty and responsibility in both civilian and military life, not only in America, but all over the world.

Angina pectoris Angina pectoris, a disorder rather than a disease, was well-described in 1768 by William Heberden, an English physician, who



Angina or pain felt in front of the chest has been called the "cry of the heart" and can be excruciating. It is simply a lack of blood supply that nourishes the heart muscle.

wrote: "Those who are afflicted with it are seized while they are walking (more especially if it be uphill, and soon after eating) with a painful and most disagreeable sensation in the breast, which seems as if it would extinguish life if it were to increase or continue; but the moment they stand still, all this uneasiness vanishes." More modern writers speak of pain sharp as a knife wound or a crushing sensation, as though the sufferer's chest were caught in a giant vise.

The **angina** or pain, while normally felt in the front of the chest, can also reach the shoulder, arm, or neck. It has been called "a cry of the heart" and can be excruciating. What happens is simple: the blood supply that nourishes the heart muscle is not enough to meet the demands of the work it must do.



Angina is not a heart attack but a clear signal that a heart attack may be on its way due to the obstruction of the coronary blood vessel leading to the heart.

Angina pectoris is not only very painful, but very serious, since it is the most common symptom of the disease responsible for 95% of the heart attacks in America: coronary atherosclerosis. Angina is **not** a heart attack, but a clear signal that a heart attack may be on its grim way. A common form of what the public calls "heart trouble," angina is a painful protest that coronary atherosclerosis has already progressed to a serious point. **Warning: Heart Attack Ahead!**

Heart infections Heart infections, the result of invasions by bacteria or viruses, can strike at the valves, the membrane sac that surrounds the heart, or the muscle itself. Since these infections attack

the organ that feeds blood to all other organs and tissues of the human body, they are serious diseases.

Endocarditis, a heart valve infection, was 99% fatal until 1943. With the discovery of penicillin and other antibiotics, 90% of endocarditis cases are now curable. The infection is usually caused by "green strep," usually a harmless bacteria found in the human mouth. Green strep must find a weak area in the human system and, most typically, it moves to heart valves previously damaged by rheumatic heart disease or congenital heart disease. Once lodged in the weakened valve, the agent of infection multiplies and forms "vegetations," growths of bacteria and blood constituents. The symptoms are loss of appetite, weakness, the "ache-all-overs," with chills and fever that can

reach daily peaks of 104. Tiny red spots may appear on the skin. The victim may develop anemia, further weakening his resistance. The vegetations on the valve may tear loose, and be carried by the moving blood to arteries in the legs, abdomen or brain, causing gangrene of the affected organ.

Penicillin treatment is required promptly and the patient is usually hospitalized to receive up to 50 times the normal dose of this drug, along with other antibiotics, such as streptomycin. Treatment can last as long as six weeks. Antibiotic prophylaxis during minor operations, such as tonsil and tooth removals, can protect against endocarditis. If endocarditis is not diagnosed promptly, permanent and severe damage to the valves will result and the skills of a cardiac surgeon must be applied to insert an artificial valve.

Pericarditis

Pericarditis, caused by a virus, inflames the pericardial sac which encloses the heart. Usually, the patient comes down with a respiratory infection but soon notices chest pains when he coughs, breathes deeply, or lies down. The pain may spread to the shoulders, back and abdomen and can be so strong that at times it feels like the agony of angina pectoris.

The pericardial sac is formed by two membranes, one firmly adherent to the surface of the heart and the other forming a loose protective envelope around the heart. There are 2 to 3 ounces of clear fluid in the sac which lubricates the heart as it contracts. When pericardial inflammation sets in, the fluid becomes gritty and thick. The



Heart valve infection can be serious and fatal unless promptly treated with penicillin. Treatment can last as long as six weeks.

doctor may then hear a characteristic rubbing sound with his stethoscope. The electrocardiogram can also help make the diagnosis.



When pericardial inflammation sets in, the doctor may hear a characteristic rubbing sound with his stethoscope.

The inflammation of the pericardial linings is self-limited. Treatment consists of controlling the pain and reducing the inflammation. Aspirin can do both. Steroid administration is reserved for severe cases. The inflammation may recur for many months, but eventually the body's natural defenses eliminate the infection. Occasionally, a large amount of pericardial fluid remains after the acute episode. If it compromises the function of the heart, it can be drained.

Acute bacterial pericarditis is rare because bacterial pneumonia and bacterial infections respond to antibiotic therapy. Tuberculous pericarditis may be acute and may resemble the acute

bacterial or viral forms. However, a chronic form is characterized by a large accumulation of pericardial fluid which has to be drained surgically. In many instances the pericardium itself is excised.



Treatment of inflammation of the pericardial lining consists of controlling pain & reducing inflammation. Aspirin can do both.

Constrictive pericarditis

Constrictive pericarditis occurs when the adherent membranes thicken and stiffen, changing from a soft bag

holding the lubrication for the working heart muscle into a rigid container that seriously hampers the regular contraction of the heart. The normal pattern of contraction and relaxation is interfered with and prevents the heart from filling. The return of the blood through the veins is so slowed that the veins swell in the neck. Fluids build up in the legs and abdomen, and the liver enlarges.

Constrictive pericarditis can at times be diagnosed by conventional X-ray examination because calcium deposits in the thickened and scarred pericardium are detected. Echocardiography may also contribute important information. A definitive diagnosis preoperatively is usually made by cardiac catheterization and angiography. The imprisoned heart can only be freed by surgical excision of the constricting, thickened pericardium.

Myocarditis

Myocarditis is an inflammation of the heart muscle itself. The heart muscle can be affected when a generalized bacterial or viral infection is present. The heart muscle can also

be affected in diseases where an allergic response causes inflammation. Thus, conditions like rheumatic fever, mumps, influenza, and other viral illnesses may cause myocarditis.

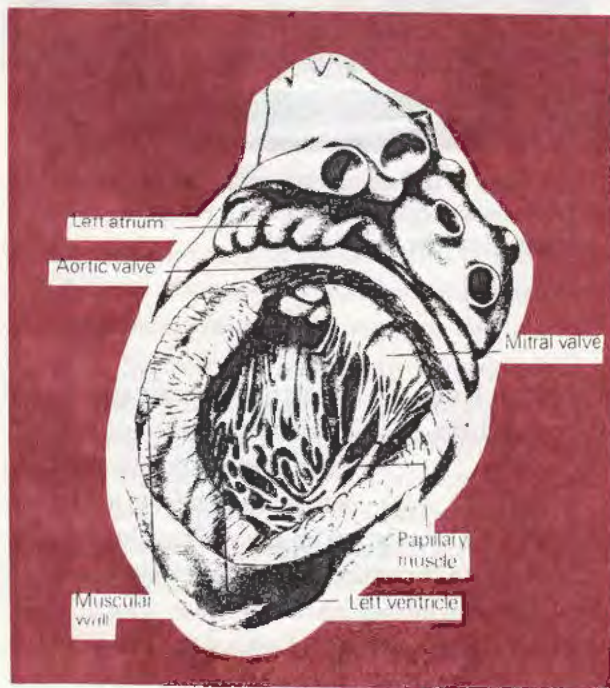
At times, the inflammation is mild and self-limited with little residual damage. When severe, the heart becomes enlarged and flabby. Symptoms and signs of heart failure become increasingly more severe. Eventually these patients become candidates for heart transplantation.

WHAT IS HEART FAILURE?

When the chambers of the heart are so weakened that they are unable to pump enough blood to meet the needs of the body, then the heart is said to be in "Failure." The heart's pumping efficiency is dangerously low. Cardiac reserve is the difference between the actual work the heart usually performs and the top effort it can make when stressed by work, exercise, emotional states, with or without changes in heat and humidity. Cardiac reserve is reduced in heart failure.

Heart failure can be caused by long-standing hypertension, valvular disease, coronary artery disease, and congenital heart disease. The inability of the heart to meet the oxygen demands of the body by an adequate cardiac output leads to adjustments which cause fluid congestion in the lungs in left heart failure, and swelling of the liver and the legs in right heart failure.

Heart failure can be precipitated or aggravated



An inflammation of the heart muscle is referred to as Myocarditis. The heart can become enlarged and flabby and eventually cause heart failure.

by conditions which put a strain on the circulation. These include anemia, infection, an overactive thyroid, a marked disturbance in the rate and rhythm of the heart, an increased external workload, emotional stress, and an increased salt intake. All these conditions can be treated effectively, thereby eliminating, or at least improving the symptoms and signs of heart failure.

The earliest symptoms of heart failure are muscle fatigue and dyspnea ("disp-knee-uh"). Fatigue is easily experienced because the working muscles are not furnished with an adequate supply of blood nutrients. Rapid and difficult breathing, dyspnea, is caused by blood pooling in the lungs, when the heart fails as a forward pump. Even usual work and exercise can make the patient breathe rapidly, many shallow intakes or "panting." Breathing becomes hard work, which caused further distress to the patient. The patient soon learns that he can sleep only if propped up; otherwise, he feels as if he is drowning. He wheezes like an asthma victim and a coughing spell may produce a frothy, pink-tinged sputum. Since the congested lungs are less able to bring oxygen into the blood, and the blood itself is backed-up by the damaged heart, the victim may be driven from his bed to a chair. He feels comfortable only with his entire chest upright.

Excess fluid in the lungs can be heard by a physician listening through a stethoscope. This fluid interferes with the proper passage of oxygen from the air sacs into the blood, and the patient shows signs of cyanosis ("sigh-a-no-sis"), a dusky blue color of the skin.

All the tissues of the body are affected to some

degree by congestion. When the liver becomes involved, it cannot function normally. If too little blood reaches the kidneys, they cannot process waste materials and eliminate salt and water in the urine. The adrenal gland makes this abnormal kidney condition worse and still more salt and water remain in the body tissues. The patient puts on weight, and usually the legs show signs of swelling. The flesh has a dough-like consistency and pits when pressed. Fluid build-up swells the abdomen and presses up against the lower portions of the already-stiffened lungs. Normal digestion of food is upset. Excess fluid in the brain may make a normally quick-witted person appear slow, depressed, and dull.

Treatment of Congestive Heart Failure

If properly treated, most patients do not suffer all the discomfort and distress caused by symptoms of congestive heart failure. First of all, physical and emotional rest are essential to reduce the external work load of the weakened heart. Prolonged bed rest is not recommended because it leads not only to body muscle disuse, but to the formation of clots in the veins, and possible embolism to the lungs. Dietary restriction of salt is most essential, if salt and water retention is to be avoided.

Diuretic drugs promote the excretion of salt and water in the urine and are a mainstay for the relief of congestive heart failure. Control of hypertension reduces the pressure-work of the heart and thereby improves cardiac reserve. Anemia, infection, or an overactive thyroid must be recognized and corrected.



Early signs of heart failure are fatigue, difficulty in breathing, fluid in the lungs, swelling of the legs, slow movement, and depressed, dull mentality.

Digitalis

Digitalis, a drug derived from the foxglove plant, remains the most commonly used agent in the treatment of congestive heart failure. First described in 1785 by Dr. William Withering, an English physician and botanist, digitalis strengthens the muscle fibers of the heart, thus increasing the power of heart contractions. It helps to reduce heart size and to slow heart rate. The efficiency of the heart is improved, so it does not have to work so hard. In small, daily doses, digitalis helps the kidneys to produce more urine, ridding the body of excess fluids. A patient on digitalis therapy can lose up to 20 pounds from the legs and abdomen without diet. Once adjusted to avoid side effects, digitalis maintenance may enable a patient to return to active life for many years.



Digitalis remains the most commonly used agent in the treatment of congestive heart failure. It strengthens the muscle fibers of the heart thus increasing the power of heart contractions.

Sodium Reduced Diet

Sodium-reduced diet will help many patients counteract the tendency their bodies have to retain salt and water.

While not many sufferers are required to give up foods which already naturally contain salt, most will be instructed by their doctors not to add salt either in cooking or at the table. Human taste buds adjust to reduced sodium intake. Food is quite tasty, even when the patient uses as little as one-third teaspoon per day. Salt-substitutes help many to adjust to sodium-reduced diets.

Antihypertensive drugs

Antihypertensive drugs, come in four broad categories and affect patients differently according to the known or probable cause of their high blood pressure or the associated conditions the examining doctor has noted. One group reduces the flow of nerve signals to the blood vessels, making them relax or dilate slightly. These drugs block the messages sent by the nerves. Hydralazine acts directly on the muscle walls and dilates the small blood vessels. Tranquilizers calm the central nervous system but may work too well in some patients by creating apathy. Another group of drugs called "site-usurpers" actually move into the areas beyond the nerve fibers and usurp or take over the area normally occupied by a chemical produced within the body. Nerve signals are turned down a bit. The blood vessels do not tighten as much and pressure is reduced. Thiazides are diuretic drug compounds which help the kidneys get rid of sodium (salt) and water in the body. Diuretic drugs cause the taker to pass unusually high amounts of urine. Sensitive patients, before they complain, should stop and think which they would rather do: visit the restroom frequently or the hospital emergency center, perhaps only once.

Nitroglycerin Nitroglycerin, one of the most powerful explosives known, is administered in tiny quantities to angina sufferers to relieve the dreadful pain and to prevent further seizures. The drug dilates or opens the coronary arteries. In seconds, the terrible pain dies away. Nitroglycerin is not a narcotic or "pain killer," nor is it habit forming. The prompt power of its effect is not lost with time, since humans do not develop a

tolerance for the drug. The same, small, safe amount works without danger every time. Nitroglycerin has been used since 1879. It can be taken every day, if needed, or before any activity that puts an extra burden on the heart: physical labor, healthy recreation or sexual intercourse.



For more than 100 years, nitroglycerin tablets have been used effectively to provide relief to angina sufferers. It is not habit-forming and can be used often without danger.

WHAT IS HEART ATTACK?

His wife or his children say, "He's had a heart attack." His family doctor or cardiac specialist says, "The patient suffered coronary occlusion

with myocardial infarction." Both mean that one or more of the blood vessels nourishing part of the heart muscle has become closed off. The normal supply of oxygen-rich blood the heart muscle cells need to do their work has been so reduced that part of the heart muscle (myocardium) has died (infarction). Why? How?

The **how** of heart attack is well understood by medical scientists. It is the last stage of the disease called **atherosclerosis** which affects the coronary arteries, often called coronary atherosclerosis or coronary artery disease. The clogging or thrombosis of an artery can and does take place in many areas of the human body. Only the clogging of an artery feeding blood to the heart muscle can cause a heart attack.

The first typical symptom is chest pain, **angina pectoris**, varying in severity from a dull aching pressure to a terrible clamping agony. Total rest does not relieve the pain, neither does a dose of nitroglycerin. The pain can last for several hours and a powerful narcotic is needed to block the agony.

The patient feels a terrible anxiety, a sense that death is near. He breaks into a cold sweat and his face turns a dreadful ashen gray. He is so short of breath that he gasps, struggling for oxygen. He may belch gas, retch, and vomit, as though experiencing an especially serious stomach upset or indigestion. Some patients remember only feeling tired, a brief cold sweat, or shortness of breath. Perhaps 10% of attacks cause no pain at all.

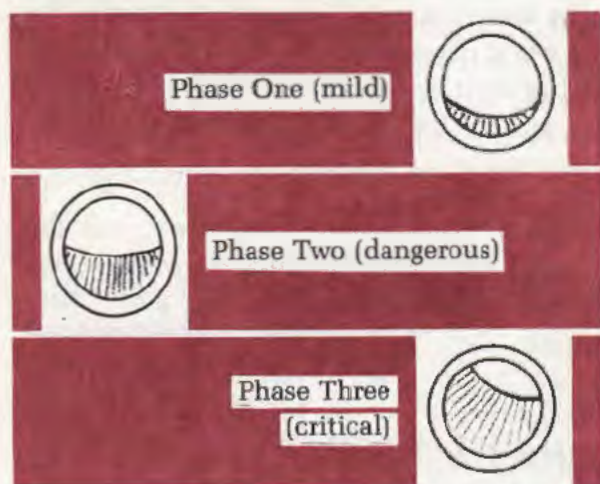
Each year approximately 1,500,000 new cases

of heart attack—coronary occlusion and myocardial infarction—are reported. In 1983, the mortality was 547,100 and was most frequent in the first 6 to 12 months after the attack. Approximately 45% of heart attack victims are under 65 years of age, and 5% are under 40 years of age.

Athero means "mush" in Greek, and the material that gradually builds up on the inside of the coronary arteries is at first a soft, fatty deposit. "Oma" is Greek for "growth" or "tumor," for this "mush" is not merely dropped out of the blood like mud or silt, but continues to grow through still-mysterious behavior of the cells lining the interior of the blood vessels and the further deposition of cholesterol. This double deposit-and-growth process becomes firmer when more fibrous material accumulates. The process does not form in an even layer but in plaques of varied thickness, often where an artery branches or bends. Since coronary arteries are quite small (about the width of a small soft-drink straw) only a relatively small atheromatous plaque is enough to jeopardize the muscle of the heart.

The atherosclerotic plaque begins as a yellow streak of fatty deposit containing cholesterol. Continued deposition of fatty material and the reactive response of the lining cells and smooth muscle cells of the artery lead to continued enlargement of the plaque. This takes years, but progression is accelerated by high blood cholesterol, hypertension, and smoking. A thrombus, or clot, is prone to form on or near a plaque and will add to the size of the plaque. When the plaque narrows the lumen of the artery so that the area is reduced by 75%, blood flow is critically reduced

and the obstruction is considered significant. (See diagram.)



The degree of coronary artery obstruction can be estimated by performing coronary arteriography, which visualizes the patient's coronary arteries on movie film. This procedure is usually done when a patient suffers significant anginal pain and is being considered a candidate for coronary artery bypass surgery.

When an atherosclerotic coronary artery is occluded in a slow and gradual manner, the patient may be asymptomatic because nature provides for collateral circulation, the opening up of new blood channels to supply the area of heart muscle deprived of an adequate blood supply. When this occurs, the heart contracts normally and the electrocardiogram may be normal. However, when the heart is subjected to an increased work load, it may behave abnormally. Thus, when coronary artery disease is suspected, a treadmill exercise test and/or an exercise radionuclide angiogram may be indicated to uncover an abnormal response.

A critically narrowed atherosclerotic coronary artery is prone to become occluded acutely by a thrombus (clot). When this occurs, the patient has suffered an acute coronary thrombosis and myocardial infarction. Myocardial infarction means that the area of heart muscle supplied by the completely occluded artery has died because the blood supply has been completely interrupted.

Mortality from acute coronary occlusion and myocardial infarction is directly related to the amount of heart muscle which dies. The subsequent development of heart failure in a surviving patient also depends on the extent of the infarction. For the past few years, an extraordinary research effort has been directed to discover methods of early treatment in order to save as much jeopardized heart muscle as possible, thereby favorably influencing the course of the acute attack. There is adequate time for salvage of the heart muscle, because it takes 4 hours of total occlusion for irreversible damage and death of cells. If the onset of the heart attack (coronary thrombosis) is timed with the onset of the chest pain, then **early** intervention, within 4 hours, could reverse the death of heart muscle cells. Patient education has emphasized early recognition of symptoms, early hospitalization, and early treatment.

Some salvage of heart muscle and reduction of mortality were accomplished with the introduction of coronary care units. Current research efforts to improve on the past experience include: 1) the early relief of the obstruction by dissolving the intracoronary thrombus with drugs; 2) cracking and flattening the atherosclerotic plaque with a balloon inserted into the coronary artery; 3)

eradicating the plaque and thrombus with a laser beam; and 4) re-establishment of blood flow by emergency coronary artery bypass surgery. Of course, all of these treatments must be accomplished within 4 hours for maximum benefit. The logistics and cost of delivering this kind of care are also under intense study, considering that there were over 1,000,000 heart attacks in the United States in 1983.

WHAT IS A STROKE?

A stroke is a lay term denoting a sudden loss of brain function caused by an interruption of blood supply of oxygen and nutrients to an area of the brain. For instance, a paralytic stroke means that the area of the brain that controls motor function has been affected. The flow of blood to a section of the brain can be shut off by hemorrhage or by a clot.

A cerebral hemorrhage occurs when a defect in the wall of a cerebral artery bursts. This occurs frequently in patients with uncontrolled hypertension. A cerebral thrombosis usually occurs in arteries that are damaged by atherosclerosis similar to what happens in coronary thrombosis and myocardial infarction. The end result is death of brain tissue called cerebral infarction. Another form of stroke is caused by a clot carried in the blood stream from the heart, or from the arteries in the neck which lead to the brain. This traveling clot, or embolus, occludes by becoming stuck in a cerebral artery.



Not only is a stroke an acute disaster with a high death toll, but it requires extensive financial & human resources of the health care system for prolonged treatment & rehabilitation of the living patient.

In 1983, there were 500,000 new strokes, 156,400 deaths from new strokes, and 1,930,000 stroke patients still living. Not only is a stroke an acute disaster with a high death toll, but it requires extensive financial and human resources of the health-care system for prolonged treatment and rehabilitation of the living patient. Even after initial rehabilitation, the patient may still be an unproductive member of society and a burden to the family.

For the above reasons, stroke prevention is most important. Many strokes can be prevented if high blood pressure is diagnosed and controlled. The risk of rapidly progressing atherosclerosis can

probably be modified by a low fat, low cholesterol diet and by not smoking.



Diet is an important factor in reducing the risk of a stroke. Hypertension, that is not controlled, can cause cerebral artery bursts and paralysis.

Good control of diabetes will reduce the risk of stroke. Thick blood with a high red blood cell count favors cerebral thrombosis. Lowering the red cell count by donating blood can help. Optimum treatment of heart disease decreases the risk of stroke, since a failing heart is a source of emboli which can travel to the brain arteries.

A most important way to reduce the risk of a major stroke is to identify and treat "little strokes," or transient ischemic attacks, so-called TIAs. Major strokes are frequently preceded by early warning symptoms like temporary weakness or numbness of the face, arm, and leg on one side of the body, temporary disturbance of speech, temporary visual disturbances, particularly in one eye, and unexplained dizziness, unsteadiness, or sudden falls. Prompt diagnosis and treatment can prevent a major catastrophic stroke.

In order to properly evaluate a stroke, the physician resorts to the electroencephalogram, which measures the brain waves, and the CAT scan, which can delineate the disturbed anatomy of the brain. In addition, arteriography can visualize the large carotid arteries in the neck for the presence of obstructing or ulcerating atherosclerotic plaques. The intracranial arteries can also be visualized by arteriography.



Early warning symptoms in patients such as weakness of face, arm, and leg on one side of the body, temporary speech disturbance, visual difficulty in one eye, or unsteadiness should be promptly diagnosed and treated to prevent a stroke.

After an accurate evaluation is made, drug therapy may include intravenous heparin, long-term oral anticoagulants, and long term aspirin administration. In selected patients, surgical excision of obstructing or ulcerating plaques in the carotid arteries may be indicated.

Cardiovascular disease deaths in 1983 numbered 949,400, nearly 50% of all deaths, and greater than twice the combined number of deaths from cancer and accidents. Cardiovascular disease remains a major health problem but it is gratifying to know that from 1972 to 1983 total cardiovascular mortality decreased by 30.7%, stroke by 47.1%, hypertensive disease by 40.7%, coronary heart disease by 31.2%, and rheumatic fever and rheumatic heart disease by 47.7%.

This reduction in mortality has been explained by the modification of the risk factors for atherosclerotic disease, i.e., reduced incidence of smoking in men, lower dietary fat intake, and above all the drug treatment of hypertension.

Health gains

Health gains in hypertension have been significant. Now, even severe cases can be controlled and complications avoided. Enlarged hearts work more easily, thanks to low-sodium diet and drug treatment. Heart failure has been reduced sharply, and the threat of stroke diminished. The death rate from "high blood pressure" has decreased by 50% and is still going down!

NINE DANGEROUS MYTHS

Despite scores of books and hours of television documentaries, the public is still attracted by many myths and misunderstandings concerning cardiovascular disease. Myths and

misunderstandings are dangerous because they tend to discourage acceptance of up-to-date, reliable recommendations which are based on medical research.

"Heart attacks are caused by high-pressure jobs. I'm not a top executive or a political big-shot, so I don't have to worry."

While it is true that stress and tension are a major contributing factor to coronary diseases, statistics show that top corporate executives have a lower incidence of attack than younger men farther down the promotion ladder. Salesmen, clerks and junior execs work under the greatest pressure to succeed. Likewise, generals and admirals suffer less from coronary diseases than lieutenants, sergeants and chief petty officers. Attitude and behavior toward work is more significant than type or level of labor.

"Heart attacks are caused by too much cholesterol. Eggs and butter have a lot of cholesterol in them, so if I cut them out completely, I won't have a heart attack."

Eggs, butter and other dairy products such as most types of cheese, whole milk and ice cream do contain high amounts of cholesterol and saturated fats. However, it is not possible to attribute high serum cholesterol levels only to intake of certain foods. Reduced consumption of saturated fats and cholesterol-high foods is part of a broader anti-coronary program.

"Heart attacks are caused by smoking. I don't smoke (I just quit) so the chances are good that I'll never have to worry."

Heavy cigarette smokers who puff more than 10 per day are more than 3 times as likely to suffer from early onset of coronary disease than persons who have never smoked. Smoking alone does not cause heart attacks, but eliminating the habit can reduce the risk. Diet, smoking, and stress combined create high risk. Clearly breaking this habit will reduce your chances of throat and lung cancer, and chronic obstructive lung disease.

"Heart attacks are caused by over-exertion, like shovelling snow. Besides, exercise makes you hungry. You eat and your weight goes up."

Persons of all ages who are in good health should indulge in regular moderate physical exercise. Walking, recreational swimming, biking, golf and mixed doubles tennis are fun and good for most people. Be aware that nearly 50% of all heart attacks occur during periods of rest or sleep.

Violent work or play is bad for any person over 35 who is not in shape. Regular exercise—10 minutes each day—just walking on flat ground or gentle hills will burn off 50 calories a day without appreciably increasing appetite. You can easily walk off 5 pounds a year and improve muscle and tissue tone. Heart attacks can follow overexertion in people who ignore their symptoms and deny the presence of angina.

"Heart trouble is hereditary. It's fate. You're either prone to it or not, so there's nothing you can really do about it."

Some forms of heart disease are inherited, but not many. Careful family histories of health habits may reveal that a pattern of premature coronary disease is the result of heavy smoking, careless diet, untreated hypertension, diabetes, and high work stress. Specialists agree that there is a probable influence of inherited ability to metabolize or burn off fats and cholesterol. Except for familial hypercholesterolemia, hypertension and diabetes, medical scientists are not sure to what degree any person's coronary risk is influenced by his ancestors. In any event, heredity cannot be modified, but risk factors can be neutralized.

"Heart attacks can be prevented by taking Vitamin E. Or that new wonder drug everybody's been talking about in the papers."

Normal human needs for Vitamin E can be met by moderate use of everyday unsaturated vegetable oils sold on the shelves of supermarkets. Very few reputable researchers have been able to confirm the claims of vitamin enthusiasts who think that E (or Vitamin C or B-3) are really effective. Since 1946, alpha tocopherol (Vitamin E) has been used in massive doses to treat atherosclerosis, high blood pressure and rheumatic heart disease, but anecdotal "proof"—reports of individuals and small groups here and there who have been helped—has not been duplicated by longer, larger research experiments. There are many drugs now available: antihypertensives, antidepressants, antilipidemics, and antiarrhythmics that will calm

you down, cheer you up, help control the fats in your blood and regulate your heart beat. All can benefit some patients to some degree, but not all patients can tolerate certain drugs. Some have harmful side- or aftereffects. There is no "wonder drug" to prevent or cure coronary artery disease.

"Heart attacks are caused by being overweight. Drop twenty pounds fast and you'll be okay."

Obesity is not a major risk factor for coronary artery disease. However, obesity is frequently associated with diabetes and hypertension, which are major risk factors. Obesity will interfere with normal respiratory and cardiac function and will aggravate existing cardio-respiratory illness. Obesity should not be treated with short-term crash diets, thyroid medication, benzidrine-type appetite suppressants or diuretics. Such treatment is dangerous and may occasionally prove fatal. Obesity should be treated with a low-calorie diet, modification of eating habits, and possibly with the expertise of a nutritionist.

"Heart attacks can be prevented by jogging. It's good for you."

There is no evidence that physical exercise will protect one from atherosclerosis of the coronary arteries. Exercise may indirectly influence favorably the risk for coronary disease by helping to maintain ideal body weight, increasing the blood level of "good cholesterol" (HDL cholesterol), by making it easier to control hypertension, and by reducing stress. Regular ex-

ercise, for 30 minutes three times a week, will train the skeletal muscles to work more efficiently, and make it easier for the heart to supply blood oxygen and nutrients to the working muscles.

Exercise need not be strenuous and competitive. Walking, swimming, bicycling, and aerobics are effective. It is wise to get a physician's advice before beginning an exercise program, in order to avoid musculo-skeletal injury and to determine whether underlying heart disease is present.

Jogging may be too strenuous for certain individuals and may precipitate a heart attack, if significant coronary artery disease is already present. The same can be said for competitive sports, like singles-tennis, squash, and handball.

"Heart attacks happen to old people. Retired businessmen and retired athletes. A heart attack before 65 is a fluke, an accident."

The Framingham Heart Study, after a 26 year follow-up, estimated that 984,200 men in the United States suffered a coronary attack in 1983. Of these, 4.8% were between 29-34 years of ages, and 50% between 35-64 years of age. Notably, 48,200 young men between 29 and 34 years of age suffered a heart attack.

In contrast, it was estimated that no women between 29 and 34 years of age had a coronary attack. The total number of women with heart attacks was 517,400, and 26.8% occurred under 65 years of age.

Approximately 45.2% of the men had their attacks after 65 years of age, in contrast to 73.2% of the women. In the 75-84 age group, the incidence is practically the same for men and women.

These statistics indicate that coronary attacks occur in the young as well as in those over 65 years of age and that retirement is not a factor. Coronary artery disease is a progressive involvement of the coronary arteries by atherosclerosis with many factors contributing to its progression other than age.

Instead of believing in
these myths and others,

REMEMBER

When a man dies, he does not just die of the
disease he has; he dies of his whole life.

C.P. Peguy

Copyright © 1987 by
The Allied Educational Foundation in association
with The New York Cardiac Center, Inc.

All rights reserved.

The Contents Of These Pamphlets May Not Be
Reproduced In Whole or in Part Without Written
Permission In Advance.