Comments on Detection of Cardiac Disease in Group Examinations*

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In this brief presentation remarks will be confined to the discovery and evaluation of heart disease as found in pre-employment examinations, in college entrance examinations, and in periodic re-examinations. Although the zeal for disease control may not exist for heart as it does for pulmonary disease, it is equally challenging in preventive medicine to attempt to discover and control latent heart disease before it assumes its devastating and incapacitating stages. Prompt recognition of heart disease has important implications for the victim's welfare; by the same token early assurance that suspected heart disease is not present has important significance for any person and particularly for the individual who is subject to unfounded fear. Care should be taken that the patient is promptly advised by his physician concerning significant abnormality. In personal experience, the patient with cardiac disease who has received a constructive explanation of his defect usually feels and oftentimes expresses appreciation.

The person who, on his own volition, seeks aid from the physician for the relief of symptoms or for health information is the individual who will be the most cooperative and most receptive of health advice. The practicing physician in his routine work has an unequalled opportunity to teach health habits and to discuss prevention as well as treatment of disease. It is advisable for the patient's own physician to present to him the findings of the examination. A certain degree of normal anxiety prompted the medical consultation; therefore, sound advice on the part of the physician should orient the individual with regard to his complaint. Those who come from physical surveys, pre-employment and school entrance examination, need especially to be appraised of the value of the findings of the examinations and their follow-up. At the other end of the clinical spectrum of patients with excessive anxiety stand those with indifference and sometimes boredom. By and large, examination of healthy young people instills good medical habits and teaches the coming generation to seek and evaluate advice from their physicians. It also may be said that, more and more, industry is attempting to recognize latent disease and defects by offering pre-employment and periodic examinations with the attempt to adjust work requirement to the individual's physical capacity.

History taking is an important part of the examination and is helpful if accurate and to the point. The history of rheumatic heart disease taken years after an attack in childhood may be unreliable but in all cases in question should lead to a careful examination. But once the examination

*Presented before the Medical Staff of the Student Health Service, University of Minnesota, March 2, 1953.
is negative and definitive, one should not hesitate to tell these individuals that they are normal even in the presence of a supposedly positive history. Too many people who have recovered from any demonstrable residuals of rheumatic fever have been left in a quandary with regard to the existence of heart disease. However, it must be kept in mind that sometimes signs of rheumatic heart disease are delayed for some years after the acute attack.

With regard to degenerative (arteriosclerotic) heart disease much more emphasis may be played upon a careful and accurate history. When an individual in the fourth decade and beyond has a definite, fairly abrupt diminution in his physical capacity—that is, has become short of breath quantitatively for tasks previously performed with ease—a positive indication of impaired cardiac function is present. Further study must indicate whether such impairment is due to intrinsic cardiac cause or extrinsic cause such as anemia. For instance, cases of leukemia often appear with dyspnea due to anemia as the chief complaint.

The recognition of the insidious onset of cardiac disease at times is important. The unrelenting fatigue of the 55-year-old auto mechanic (O. A.), examined over a period of years, was a true sign of developing coronary arteriosclerosis and impending fatal thrombosis, even though all other findings were negative except for low voltage of QRS complexes and they were interpreted to be within normal limits. In certain instances patients have admitted that the first sign of coronary insufficiency was shown when the effort of walking a few blocks would provoke substernal distress enough to prompt them to stop and windowshop on the sidewalk until relief was obtained. This is personally called “the window shopping sign” of coronary insufficiency. Interpretation and analysis of the history becomes the most significant feature of the examination.

With regard to the physical examination, the occurrence of sinus tachycardia will first be mentioned. This most common cardiovascular abnormality often has no significance as to disease but still has significance in the total estimation of the individual. This may be called an “examination tachycardia,” and there may be no other abnormal findings. Patients with so-called neurocirculatory asthenia or effort syndrome may show reactive tachycardia. Some of these individuals assert, and it is hoped accurately, that their pulse rate usually is in the 70's or 80's. A recent individual’s (M. B.) lowest pulse rate ever recorded by numerous observers was 110. His usual rates were 120 and over. All phases of his physical and laboratory examinations were negative. At times these individuals relate that they are scared only when in a doctor’s office. One is inclined to say that they probably respond to many life situations with tachycardia from loss of vagus tone or from sympathetic stimulation. With distraction of the patient, occasionally the rate will slow during the period of the examination. Assurance to these people is essential without too frequent recheck examination.

More difficult of explanation is the group that show, silently and as an isolated finding, transient or labile systolic and diastolic hypertension
without tachycardia. While it may be easy to put these individuals in the
general category of labile hypertension, determination of the irritative
provocation is worth seeking. In some instances, stressful living and school
conditions appeared to be provocative. Since such cases of hypertension
are picked up by chance without other associated findings, a record of
sustained elevation of pressure should probably be obtained before re-
porting any single variation to the patient. Most physicians have to adopt
and use the method of frank explanation, but also realize that not all
variations need be analyzed in detail before the patient.

The paroxysmal tachycardias are an important group of cases whose
early recognition will save the individual needless anxiety or incapacity
that might arise from inadequate or mistaken diagnosis of serious heart
disease. Often this disturbance of rhythm is an isolated finding in a
normal heart. The history is usually quite definitive and reveals in an
individual without other complaints episodes of abrupt onset of racing
or pounding of the heart, lasting usually for a few seconds or minutes;
extreme cases may last for hours. Breathlessness with slight precordial
discomfort may occur with the attack. Usually no provocation is apparent.
Confirmation of the diagnosis is made by observation of an attack and
by electrocardiogram to determine whether auricular, ventricular, or nodal
in origin. In cases followed for some years, and in one instance (Mrs. S. E.)
followed for over two decades, the attacks have become less frequent and
the heart has remained normal throughout.

Just as important at times is the recognition of arrhythmia due to
premature contractions. This most common type of arrhythmia in young
and normal individuals may become, if not correctly interpreted, the basis
for psychogenic heart disturbance. Careful study reveals the occurrence
of a "turn over" of irregularity or sometimes of a pounding of the heart
with or without tachycardia. The finding of extrasystoles and the deter-
mination of their frequency, followed by determination of normality of
the heart, form the basis of rational procedure and instruction of the
patient, with uprooting of cardiac fears. It should be mentioned that
sometimes in arteriosclerotic cardiac disease the occurrence of increased
frequency of ventricular premature contractions may be a precursor of
increasing myocardial irritability and possible damage, with total arrhy-
thmia. By and large, the isolated finding of premature contractions has
no clinical significance. In the normal individual, this irregularity may
lessen with tachycardia following exercise.

The detection of cardiac murmurs, with their interpretation, becomes
a common source of screening cases of cardiac disease through routine
physical examinations. Physicians have been intrigued by sounds in the
chest since the discovery of auscultation by Laenec. The stethoscope is
available to physician and surgeon alike, and its use is deterred by nothing
except lack of interest or inability to interpret what is heard. The subject
of cardiac auscultation is broad and worthy of more detailed study, but
only a few angles of the problem will be mentioned here.

The isolated findings of a grade one or two systolic murmur at the base
of the heart, usually over the pulmonic area, need not require further
examination or reference and may be accepted as functional or physiologic.
It is present in a considerable number of individuals if adequate time is
taken to ferret it out. No useful purpose is served by further recheck unless
the examiner desires study concerning other questionable cardiac findings.
The pulmonic functional murmur is associated with normal dynamics
rather than derangement of structure. Conditions which increase the
velocity of blood flow, such as anemia, pregnancy, hyperthyroidism, and
febrile states, are commonly associated with these functional or, better
yet, physiologic murmurs.

The systolic murmur becomes of more significance if it is loud, grade
three to four, and prolonged; if it is apical; if it is transmitted beyond the
cardiac border; if it is constant; if it is not variable with respiration and
posture; or if it is associated with marked variation in intensity of cardiac
tones, especially with masking of the first sound at the apex in mitral
insufficiency and accentuation of \( M_1 \) and sometimes \( P_2 \) in mitral stenosis;
also if it is associated with a distinct thrill or with cardiac hypertrophy.
The detection of such murmurs is often the first step in establishing
structural change in the mitral valve with insufficiency and with stenosis
if the presystolic and mid-diastolic murmurs appear.

Moreover, conditions that cause dilatation of the heart may cause
dilatation of the annulus of the mitral valve whose leaflets and chorda
tendineae themselves are normal. In the records of the University of
Minnesota Hospital 32 years ago, is the report of the case of a young
woman with exophthalmic goiter who developed postoperative thyroid
crisis and in whom, overnight, a loud intense systolic murmur appeared,
only to disappear almost as rapidly within one or two days as her recovery
progressed. Due to similar dilatation is the appearance of systolic mur-
murs in the failing heart, such as may occur in myocardial infarction.
Loud vibratory murmurs have appeared, due to ruptured leaflets, cusps
or chorda tendineae. In M.D., a fatal case of calcareous mitral stenosis
with small fish-mouth aperture, the paradox has been observed that the
thrust and murmur tended to disappear completely as the cardiac output
lessened with failure.

Categorically, it may be stated that the prolonged diastolic murmur
with or without associated cardiac findings is considered evidence of
aortic insufficiency. The degree of left ventricular strain present in some
of these aortic cases is inadequate to cause contour changes until after
years. It is also true that the peripheral vascular signs of Corrigan and
Duroziez may be likewise delayed in appearance.

A practical point in examination of large groups is that the individual
who is asked to come back for further cardiac examination is sometimes
unduly alarmed. This is also true in the recheck case in which the patient
is told to have an electrocardiogram with contour study and possibly
Master two-step test done before cardiac consultation. A word of explana-
tion will often obviate an anxiety reaction, for sometimes the first step in
iatrogenic heart disease is occasioned by the words or action of the phys-
ician who has not taken time to explain, after a competent examination, that this or that supplemental procedure was for the purpose of thoroughness. Minor signs found by that examination need not be mentioned to the patient, and if mentioned should be explained as within normal limits. Only infrequently do symptoms arise from the words or action of a physician. It would appear to the writer to be as much of a crime to produce in a normal individual heart symptoms due to fear as it would be to miss a case of marginal organic heart disease.

The interpretation of the electrocardiogram showing only minor variation from normal is fraught with danger. While evidence of important abnormality should never be disregarded, minor variations such as slight ST depressions and PR prolongations and small Q waves should not be emphasized, especially when isolated findings, and had best not be mentioned to the patient unless serial determinations give additional significance.

The use of the photofluorogram reveals cases with contour change and as an isolated finding poses a problem of some importance which may get the diagnostician into deep water. Recently in case J. K. the isolated finding of an enlarged conus of unknown origin without proved left auricular or other enlargement was explained to the patient as being of no known clinical or health significance. It would seem that catheterization studies would seldom be indicated to explore a relatively minor finding except where certain congenital lesions are suspected. It is true that mitral or aortic or hypertensive configuration of the heart in early stages has at times disclosed disease not previously detected. Of the cardiac findings noted on a recent large chest x-ray survey, practically all cases coming to my personal attention were already on record.

The greatest skill of the practicing physician and cardiologist, in my opinion, is exercised when he sits down with the patient and takes time to listen to his complaints and story and to establish the relative importance of this or that factor, such as nervous and emotional tension and physical effort. For although most people are fairly uniform in perception of pain, they vary greatly in their tolerance of pain. No physician doubts that the severity of a pain is modified by the patient's interpretation of it. For in spite of limitations, from the history, together with the results of the physical examination, the leads are given that establish the presence or absence of heart disease. The patient who comes in complaining of breathlessness at rest, of inability to get a full breath, of sighing respiration, of heart consciousness or palpitation, of sticking or stabbing chest pains, all or some of which usually appear when quiet but not after effort, may be assured that his symptoms do not indicate heart disease. At the same time a careful physical examination, sometimes with ancillary procedures, is done. Often revealing factors come out on the first consultation, such as the illness or sudden death of a relative or friend from heart disease.

A series of cases with psychogenic arrhythmias has been reported by Fox and McKinlay,¹ and the significance of management was there discussed. The first case previously seen in the group of psychogenic arrhy-
thmias mentioned above was that of a student who developed auricular fibrillation at test times. As Fulton\(^2\) has stated in discussing homeostasis, one can sit at a desk and overwork his heart just as much as if he were rowing a boat.

The multiple findings from the increased use of physical examinations, whether they reveal errors of habit, structural changes, or disturbance of organs or systems reflexly or otherwise, if soundly interpreted, will help to guard individual health and to stimulate interest in preventive medicine.

**SUMMARY**

1) The detection of latent heart disease through the examination of supposedly normal people and the evaluation of known disease in those actively employed raise questions about realistic methods of case discovery and about adequate interpretation of individual findings.

2) The individual who of his own choice seeks health advice from his physician is conditioned for the greatest benefit, granted that due diligence and interest are exercised by the examiner.

3) The history of previous illness, although difficult to obtain in group examinations, should be explored for further leads in case detection.

4) Certain physical findings such as the early diastolic murmur of aortic insufficiency or the pericardial friction rub may indicate the major abnormality.

5) The findings of mass screening methods such as routine chest x-ray films, electrocardiograms and other laboratory procedures should always have individual interpretation and must not in themselves be considered a complete diagnosis. Minor variations from normal have sometimes received unwarranted emphasis.

6) The manner in which special follow-up examinations are made and in which the information is conveyed to the individual may determine the development of undue fear of cardiac disease and of iatrogenic disturbance or the freedom therefrom.

7) The praise-worthy tendency in industry to use physically defective individuals, including cardiac cripples within the range of their capacity, demands that great care be given in estimating that capacity not only subjectively but objectively where possible.

8) Individualized attention to abnormal findings whether indicative of errors of habit, functional disturbance, or of organic disease will largely determine personal and public health value of group examinations.

**RESUMEN**

1) El descubrimiento de la enfermedad cardiaca latente por el examen de las personas aparentemente sanas y la evaluación de la enfermedad conocida en los empleados activamente, presenta problemas acerca de los métodos realistas para el descubrimiento de los casos y la adecuada interpretación de los hallazgos individuales.

2) El individuo por su propio criterio, busca el consejo médico, se bene-
ficia grandemente de la diligencia y el interés ejercidos por el que lo examina.

3) La historia de enfermedades anteriores, aunque difícil de obtener en los exámenes en grupos, debe explorarse para mayores guías en el descubrimiento de los casos.

4) Ciertos hallazgos físicos tales como un soplo al principio de la sistole propio de insuficiencia aórtica o el frotamiento pericárdico, pueden indicar una anormalidad mayor.

5) Los hallazgos de los métodos de investigación en masa, tales como las películas de tórax, electrocardiogramas y otros procedimientos de laboratorio, deben siempre sujetarse a interpretación individual y por si solos no deben considerarse suficientes para el diagnóstico. Variantes menores de lo normal, algunas veces han merecido énfasis injustificado.

6) La manera como los exámenes de seguimiento de los casos se conducen cuando proporcionan al enfermo, pueden conducir a indebido teror de enfermedad cardíaca produciendo también alteración en la libertad de acción de fuente iatrogénica.

7) La tendencia laudable en la industria de usar personas físcanamente defectuosas incluyendo cardiacos parcialmente incapacitados, necesita que se tenga gran cuidado para estimar la capacidad no sólo subjetiva, sino objetivamente cuando sea posible.

8) La atención individualizadora a los hallazgos anormales ya sean indicadores de error en las costumbres, trastorno funcional o enfermedad orgánica, determinarán gruesamente el valor personal y público de la salud de los grupos examinados.

RESUME

1) La découverte d'affections cardiaques latentes lors de l'examen d'individus apparemment normaux et l'estimation de l'importance de la maladie, lorsqu'il est connue, chez les gens qui ont une activité normale, posent certaines questions au sujet des méthodes pratiques d'examens systématisiques, et sur la valeur réel le des constatations faites chez chaque individu.

2) Celui qui choisit son médecin de son propre gré se trouve dans les meilleures conditions puisque celui qui l'examine se doit de lui consacrer toute son activité et tout son intérêt.

3) Les antécédents du malade, bien que difficiles à connaître lorsqu'il s'agit d'examens systématisques devraient être bien précisés pour prendre toutes les dispositions nécessaires au cas où une affection soit découverte.

4) Il est des constatations cliniques, comme le souffle diastolique précoce de l'insuffisance aortique ou le frottement péricardique que traduisent l'existence d'une altération importante.

5) Les découvertes d'examens systématisques, tel les que la radiographie thoracique, l'électro-cardiogramme, et les autres recherches de laboratoires doivent être toujours interprétées d'une façon individuelle et ne doivent jamais être considérées comme suffisant à elles seules à faire le diagnostic. On à parfois attribué une valeur inconsiderée à des modifications minimes.

6) Les personnes qui ont subi un examen systématique peuvent être
saisies de la crainte d’être atteintes d’une affection cardiaque et aliéner ainsi leur liberté de comportement, si les examens sont mal conduits et les résultats maladroitement communiqués.

7) Dans l’industrie apparaît maintenant la précieuse tendance de permettre une certaine activité aux individus physiquement déficients, y compris les cardiaques. Elle exige que soient estimées avec le plus grand soin les possibilités subjectives et quand c’est possible même objectives du malade.

8) En examinant des individus déterminés, on pourra constater des anomalies consécutives à des erreurs de régime, à des déficiences momentanées ou à des maladies organiques. Ces constatations seront d’un grand appoint pour juger l’importance qu’ont les examens systématiques, tant pour l’individu que pour l’hygiène sociale.

REFERENCES
