

CARDIAC PSYCHOSES:

A Study of the Etiology, Clinical Features, and Prognosis.

THESIS

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INTRODUCTION

Acute mental disturbances have been known to appear during the course of chronic heart disease.

The connection between the latter and psychosis may be an accidental one, as in the insane asylums we find numerous cases in which the psychopathy is associated with disease of the heart. But I am only concerned with the psychic disorders that may occur as a direct consequence of cardiac decompensation. In other words, I have limited my discussion to those mental changes that may complicate advanced cardiac disease in otherwise sane persons.

Special reference has been made to their causal factors, clinical features, and prognosis.

SUMMARY OF THE LITERATURE.

The literature on the "cardiac psychoses" is extremely meager, and the majority of text-books are silent on the subject.

Duroziez (2) reported a number of cases of psychopathic outbreaks and attributed these to the effect of digitalis medication.

H.O.Hall (3) called attention to the delirium and hallucinations during the course of digitalis therapy. He quotes a case of Babcock's, where a man with aortic insufficiency manifested a mild delirium which disappeared after the use of digitalis was discontinued.

Henry Head (5), in a masterly manner, has described the mental changes that so often accompany visceral disease, including heart affections. He chiefly concerns himself with hallucinations of sight, sound, smell, and calls attention to the states of depression, exaltation, and suspicion. The hallucinations are especially frequent in aortic disease. He attempted to show that the only constant factor in these psychoses is referred visceral pain accompanied by superficial tenderness. The pain, however, must be of considerable intensity and of some duration in order to bring about mental symptoms in their sufferers.

David Riesman (9) sums up the underlying etiology of the "cardiogenic psychoses", as he calls them, under six divisions. First, an accidental one occurring in an individual of psychogenic make-up; second, concomitant disease of the kidney, uraemia; third, acidosis; fourth, various drugs and poisons, notably alcohol, digitalis, e.t.c.; fifth, liver and intestine "swamping of the system with toxic material"; sixth, direct disturbance of the cerebral circulation affecting the higher centers.

Romberg (10) notes acute psychoses in heart disease with severe disturbance of the cardiac mechanism. He encountered thirteen instances in twelve hundred patients with chronic heart disease in the Leipsig Clinic. These are chiefly of a depressive character and are associated with abrupt changes in the patient's demeanour. He holds to the view that they are of grave prognostic significance.

W. W. Hamburger (4) has reported five cases of acute confusion in patients suffering from advanced and recurring cardiac failure. He speaks of circulatory and toxic factors in these conditions, making reference to high arterial blood pressure, to advanced generalized arteriosclerosis, and to intoxication by various drugs, notably digitalis, quinidine, belladonna, alcohol, etc.

E. Leyser (8) distinguishes those cases of cardiac psychoses in which the heart disease is pathogenic, i.e. determining the whole mental disturbance; and those in which it is pathoplastic, i.e. influencing and colouring the patho-psychic situation, which is primarily determined by other factors.

PROCEDURE.

The work of this thesis was begun in December, 1927, when as house physician at the Montefiore Hospital for Chronic Diseases, New York, I had the opportunity of seeing many cases of heart disease under the most favourable conditions for accurate observation.

I have been particularly impressed with the development of mental symptoms in certain cases of far advanced cardiac decompensation. Three hundred sixty nine cases of chronic heart disease have been carefully studied in the wards of the hospital during a period of seven months and eight cases of psychoses found. These patients were under my personal care; they belonged to the usual hospital class, had suffered from heart disease, and each had had a definite history of one or more attacks of congestive failure. None of them had a history of insanity.

The notes were taken by myself, by interrogating the patients, by observing them from day to day, and by gaining information from the nurses in attendance concerning the patients' behaviour at night.

REPORT OF CASES:

CASE 1. ---- S.W., female, aged fifty-five, housewife, was admitted to the Montefiore Hospital on August 15, 1923, and died on February 29, 1928.

She had had a cough for five years, haemoptysis with praecordial pain, weakness and loss of weight for two years, and breathlessness on exertion of five weeks' duration.

HISTORY:

The patient had been apparently free from symptoms up to 1918, when she began to cough and to bring up a mucco-purulent expectoration.

Three years later, she had noticed on several occasions that her sputum had been blood-streaked. Repeated examinations of same were negative for tubercle bacilli.

As time went on, she began to suffer from praecordial pain, became progressively weaker, and constantly lost in weight.

About five weeks prior to her admission to the hospital, she became breathless on exertion, and this condition had steadily grown worse.

Her past personal history was practically irrelevant. Her habits were satisfactory.

There was no history of mental or nervous disease in her family.

PHYSICAL EXAMINATION:

On admission, the examination revealed a poorly nourished female, aged fifty-five, somewhat dyspnoeic, not cyanotic.

The pulses were equal and regular, rate 92 beats per minute, the vessel wall was moderately sclerotic.

The arterial blood pressure was 175 systolic and 85 diastolic.

The heart was moderately enlarged to the left and to the right, and showed signs of mitral stenosis and insufficiency of the mitral and aortic valves. The rate was 92 beats per minute, the rhythm regular.

There were signs of fluid in the right side of the chest, signs of congestion in the left lung at its base posteriorly.

The liver was enlarged, with its lower edge reaching about two-and-one half fingers' breadth below the right costal margin. There were no tenderness or palpable masses in the abdomen, no signs of ascites present.

The legs were not oedematous.

There was no evidence of organic disease in the nervous system. The mental state of the patient on admission was normal.

LABORATORY FINDINGS:

The blood Wassermann reaction was negative, blood chemistry normal. The blood-count showed: Hgb. 80%; R.B.C. 4,250,000; W.B.C. 6,800; Polymorphs. 68%; Lymphocytes 32%.

The urine contained a moderate amount of albumin, few epithelial cells, and occasional granular casts.

The Phenol-sulphone-phthalein test showed an excretion of 35% of the dye in the first two hours.

The sputum was negative for tubercle bacilli.

Radioscopic examination of the chest revealed a pleural effusion at the right base. The heart was markedly enlarged to the left and to the right. There was no evidence of a neoplasm in the lungs on X-ray examination.

Electrocardiographic records had been normal from the day of admission to the hospital until four years later, when an electrocardiogram showed auricular fibrillation.

Specimens of pleural fluid were clear in appearance and yellowish in colour, had an average specific gravity of 1015, and contained some red blood cells, few lymphocytes, but no organisms. On two occasions, irregular epithelial-like cells were noted and interpreted by the pathologist as "tumour cells". However, on subsequent repeated examinations, no tumour cells were found in the aspirated fluid.

IMPRESSION:

- A. Chronic Arteriosclerotic cardiac valvular disease:
 - 1. Mitral stenosis and insufficiency.
 - 2. Aortic insufficiency.
- B. Cardiac hypertrophy and dilatation.
- C. Cardiac failure:
 - 1. Right hydrothorax.
 - 2. Chronic passive congestion of the liver and lungs.
- D. Hypertension.
- E. Arteriosclerosis.
- F. Chronic nephritis.

COURSE AND PROGRESS NOTES:

The patient was at first admitted on the cancer service of the hospital, where a lung tumour was suspected. A diagnostic pneumothorax was induced with partial successful collapse of the lung, but no distinct mass could be made out in the chest cavity. Radioscopic examination of the chest also failed to reveal any neoplastic growth there. The patient had been tapped eleven times. The aspirated fluid was not characteristic of that usually found in lung tumour.

After a short stay on the cancer service, she was transferred to the medical division of the hospital as a decompensated cardiac with signs of repeated accumulations of fluid in the right pleural cavity.

Her condition progressively became worse. Eighteen months after admission, she began to show severe signs of cardiac failure. She was unable to walk a few steps without becoming markedly breathless and cyanotic, had to sit upright in bed, complained of praecordial pain, of violent palpitations, of epigastric distress, and of severe headaches. The pulse became totally irregular, the heart showed extra-systoles, the lower edge of the liver had reached the level of the umbilicus, the spleen was palpable below the left costal margin, the legs became oedematous and remained in this condition till death.

Associated with the congestive failure, there developed a psychosis. The patient suddenly became highly emotional and quarrelsome, uncooperative, insisted on getting out of bed in spite of rigid orders to remain there, refused food and medication. Her memory for recent events became very poor, but she had a clear memory for things that happened a few years ago. A month later, she became completely irrational and disoriented as to time and place, failed to recognize her nearest relatives.

She frequently saw imaginary faces at her bedside and

"fire-balls" flying about the ceiling in the ward. Her vision at the time was good, and physical examination of her eyes was essentially negative. There were no hallucinations of sound or taste.

She became quite deluded, - had a feeling that everyone in the ward was talking about her, and fabricated tales of poor nursing service. Had no delusions of grandeur.

She constantly mumbled to herself incoherently. Was very restless and noisy at night, slept at intervals under hypnotics, was drowsy during the day. Her daily habits were most unclean.

Throughout her stay in the hospital, she was kept at rest, was under digitalis, urea, and salyrgan, had been tapped from time to time. In spite of all active treatment, her condition had not only failed to improve, but her cardiac decompensation has advanced with marked rapidity, and along with it also the mental condition.

During the last few weeks of her life, dyspnoea and orthopnoea were marked, cyanosis of her face and hands were intense. The pulse was rapid and fibrillating. The systolic blood pressure came down from 175 to 140 mms. of mercury. The veins in the neck were distended, the heart was dilated in all directions and showed signs of mitral stenosis and insufficiency of the mitral, aortic, and tricuspid valves. Fluid in the chest had rapidly reaccumulated in spite of repeated thoracenteses. The liver edge remained at the level of the umbilicus, was tender and pulsatile, ascites and oedema of all the extremities were marked.

Two days before exidus, the patient became more irrational and more noisy, was delirious at intervals. She died suddenly on February 29, 1928, about four and a half years after admission to the hospital and five months after the onset of her mental complication.

AUTOPSY REPORT:

ANATOMICAL DIAGNOSIS.

1. Healed endocarditis of the mitral valve.
2. Mitral stenosis.
3. Cardiac hypertrophy and dilatation.
4. Arteriosclerotic kidneys.
5. Generalized arteriosclerosis.
6. Chronic passive congestion of internal organs.
7. Hydrothorax.
8. Ascites.
9. Oedema of the lower extremities.
10. Congenital anomaly of the pulmonary valve: four cusps.
11. Indeterminate vegetations of the mitral and aortic valves.

Autopsy was performed four and a half hours post-mortem. The essential findings only will be described very briefly.

The abdominal cavity contained 750 c.c. of light brown fluid, the left side of the chest contained 1200 c.c. of dark brown fluid. There was no excess of fluid in the pericardial sac. Dense fibrous adhesions were present on the right base of the lung with the pleura firm and one cm. in thickness. There was marked serous atrophy of the epicardium.

The heart was hypertrophied and moderately dilated in all its chambers. The myocardium was pale-brown in colour with extensive microscopic areas of fibrosis and marked fragmentation of muscle. The endocardium showed a moderate number of pale-yellow streaks. The measurements of the orifices were as follows;- pulmonary and aortic eight cms. each, mitral six, and tricuspid thirteen cms. in diameter. The pulmonary valve showed a congenital anomaly of four cusps, the aortic contained a few small filiform vegetations. There was anatomical evidence of healed endocarditis with calcification and stenosis of the mitral valve, and several filiform vegetations at its free margin. The tricuspid was normal in appearance. The coronary vessels were tortuous and showed marked thickening of all their coats on microscopic examination.

There was evidence of marked chronic passive congestion in all the parenchymatous organs, the kidneys in addition showed the usual appearance of and anatomical changes in arteriosclerotic kidney disease.

The aorta contained numerous atheromatous plaques with occasional areas of ulceration, the smaller vessels were generally sclerotic.

The brain weighed 1100 grammes, was negative on external examination. The meninges were normal in appearance, the vessels at the base of the brain showed a moderate number of small soft raised yellowish plaques on their inner surface. Thus, there was evidence of cerebral arteriosclerosis. No abnormalities were noted in the spinal cord.

Case 2----M. S., male, aged sixty-two years, tailor, married, was admitted to the Montefiore Hospital on August 23, 1927 and died January 27, 1928.

His chief complaints were sleeplessness, weakness, and loss of weight, -- of twenty months duration.

HISTORY:

The patient has been apparently well up to January 1926, when he complained of weakness, burning sensation in the epigastrium, and loss of weight. Was told he had diabetes.

In February 1926, he was admitted to one of the New-York's hospitals in a semi-comatose state, with signs of cardiac decompensation, glucose and acetone in the urine. With improvement of the cardiac condition, the glycosuria and acetonuria also disappeared. He was admitted on five subsequent occasions to the same hospital for the relief of cardiac failure with pleural effusions, restlessness, insomnia, and marked breathlessness on the slightest exertion. During his last stay in that hospital, in August 1927, he was tapped on two occasions. The aspirated fluid from the pleural cavities appeared to be blood-tinged, but negative for tumour cells and for tubercle bacilli. Was admitted to the Montefiore Hospital on August 23, 1927.

He gave no history of acute rheumatism or any of its manifestations, no other infections. Venereal disease denied.

The patient stated he was a heavy drinker of beer, wine, and whiskey, but a moderate smoker of tobacco.

There was no history of any nervous or mental disease in his family,

PHYSICAL EXAMINATION:

On admission, the examination revealed a man of sixty-two years old, fairly well developed, undernourished, quite dyspnoeic, with pallor of the face, cyanosis of the lips and ears. The temperature was normal.

The pulses were equal and regular, the arterial wall palpable and thickened. The blood pressure was 172 systolic and 90 diastolic. There were slight visible pulsations in the vessels of the neck.

The apex-beat was not visible nor palpable, no thrills or shocks felt. The area of cardiac dullness was increased to the right and to the left, but it was difficult to make out definite borders of the heart. There was accentuation of the second aortic sound, no murmurs could be heard. Heart rate 80 per minute, with occasional premature beats.

The chest was barrel-shaped. There were signs of emphysema in both lungs, except at their bases posteriorly, where one could make out signs of fluid in the right chest and signs of chronic passive congestion on the left side.

The liver was not enlarged, the kidneys and spleen not palpable, no signs of ascites in the abdomen.

There was cyanosis of the fingers and toes, but no oedema of the extremities.

There were no signs of organic disease in the nervous system. The mental status on admission was normal.

LABORATORY FINDINGS:

The blood Wassermann reaction was negative, urea-nitrogen normal, blood-sugar 178 mgs. per 100 c.c. of blood. The blood count showed, - Hgb. 85%; R.B.C. 4,410,000; W.B.C. 8,400; Polymorphs. 70%; and Lymphocytes 30%.

The urine contained no sugar or albumin, no other pathological constituents.

Gastric analysis revealed a total acidity of 7 and no free hydrochloric acid. Examination of the faeces showed no gross or microscopic blood.

Radioscopic examination of the chest showed a marked increase in the size of the heart, and a pleural effusion at the base of the right side of the chest. X-ray examination of the gastrointestinal tract failed to show any abnormality there.

The electrocardiogram showed premature ventricular beats.

IMPRESSION:

- A. Diabetes mellitus -- mild.
- B. Generalized arteriosclerosis.
- C. Hypertension.
- D. Cardiac hypertrophy and dilatation.
- E. Cardiac irregularity, -- premature ventricular beats.
- F. Senile emphysema.
- G. Cardiac failure
 1. Right hydrothorax.
 2. Chronic passive congestion of the left lung.

COURSE AND PROGRESS NOTES:

During his stay in the hospital, the patient was on a general diabetic diet and received no insulin. He complained on and off of belching, heart-burn, and weakness. Two months after admission, he began to show symptoms and signs of marked cardiac failure, with weakness, dyspnoea and orthopnoea, intense cyanosis, bilateral hydrothorax, ascites, and oedema of the lower extremities.

In association with the cardiac decompensation, there developed an acute psychosis. For several nights prior to the onset of his mental aberration, the patient had slept very little, was restless at times and complained of praecordial pain and epigastric distress.

On the night of October 24, 1927, he suddenly became very restless and noisy, got out of bed and sang religious songs. Since then there had been a marked change in the patient's behaviour. He became completely irrational and disoriented as to time and place,- was unable to tell the day of the week and where he was. His memory for recent events had gone, so that he could not tell what he was doing a week ago and was unable to give an account of his illness. Remote memory was good. He failed to recognize his nearest relatives and took no interest in what was going on in the ward. Became very irritable, quarrelsome and stubborn in his demands, refused food and medication.

He was frequently troubled by a darkish figure appearing at his bedside at night, draped and indistinctly outlined, resembling a face and figure as seen through a gauze. He had often experienced strange and unpleasant tastes in his mouth, without anything to account for these sensations. His vision was good and the tongue was clean and moist during these hallucinations. There were no hallucinations of sound.

He had a feeling that his neighbours in the ward were plotting against him, and that the nurses had neglected him. He was, however, perfectly satisfied when they told him it was all nonsense. He had no delusions of grandeur.

Had suffered from marked insomnia and restlessness at night, persisted in getting out of bed and had to be restrained by nets.

His speech was incoherent and at times abusive, cursing the doctors and nurses.

He was very dirty about his daily habits, expectorating and urinating on the floor.

Throughout this condition, the patient presented definite evidence of severe cardiac failure with signs of chronic passive congestion in the viscera. The temperature was never elevated.

Under digitalis and urea, with repeated chest aspirations and rest in bed, the patient's general condition gradually improved. With the return of cardiac compensation, the psychosis had entirely disappeared. His discharge from the hospital was considered, but the paroxysms of cardiac failure, the sallow appearance of his face, and the presence of cardiac enlargement,- suggested marked coronary artery disease. The prognosis as such was very poor.

The patient died suddenly five months after admission to the hospital and three months after the onset of his psychic complication. The cause of death was considered to be coronary occlusion.

AUTOPSY REPORT:

ANATOMICAL DIAGNOSIS:

1. Generalized arteriosclerosis.
2. Marked coronary arteriosclerosis.

ANATOMICAL DIAGNOSIS: (Continued)

3. Fibrosis of myocardium.
4. Arteriolo-sclerosis of kidneys.
5. Cardiac hypertrophy and dilatation.
6. Chronic passive congestion of internal organs.
7. Hydrothorax and ascites.
8. Polyp of pylorus.

Autopsy was performed four and a half hours post-mortem, the organs removed through a scrotal incision. The essential findings only will be described.

The abdominal cavity was free of adhesions and contained about 500 c.c. of clear free fluid. The left pleural sac contained about 1000 c.c. and the right sac 500 c.c. of clear fluid. There were a few light fibrous adhesions at each apex and a few over the anterior surface of the right lower lobe. The pericardial sac was free of adhesions and apparently free of fluid.

The heart was 525 grammes in weight, hypertrophied, and markedly dilated in all directions, the enlargement being chiefly ventricular. The myocardium of both ventricles was fibrotic in many situations, the endocardium showed occasional small atheromatous patches. The orifices were somewhat enlarged, the leaflets thickened along the lines of closure. The coronary arteries were tortuous and showed extensive sclerosis throughout with calcification of the stems and larger portions of the branches. The left circumflex branch at its posterior termination showed a marked encroachment of its lumen by thickened intima and led to an area of diminished thickness of the posterior wall of the left ventricle.

The lungs showed evidence of chronic passive congestion and slight oedema with pleural opacity and interlobar pleuritis on the right side. The branches of the pulmonary arteries contained numerous atheromatous patches.

The liver was normal in size, somewhat fatty in appearance, and markedly congested.

All other internal organs presented the usual appearances of chronic passive congestion. The pancreas showed in addition a moderate fatty infiltration and interacinar fibrosis, the islands of Langerhans were not apparently affected.

Incidentally, there was found a small pedunculated polyp, one c.c. in diameter, at the pyloric end of the stomach.

There was a marked generalized arteriosclerosis with calcification in the vessels throughout the body, especially in the aorta and median sized arteries.

Unfortunately, no permission was obtained to remove the brain and cord for examination.

CASE 3 --- M. S., male, aged sixty-six, letter carrier, married, was admitted to the Montefiore Hospital on October 24, 1927, complaining of weakness and palpitation for five years, cough with expectoration of one month's duration.

HISTORY:

The patient had been apparently free from cardio-vascular symptoms until 1922, when he had a sudden apoplectic stroke resulting in a left sided hemiplegia. There was no motor or sensory aphasia. At that time he was told he had a "bad heart". Within several months, he recovered function of the affected side, but there remained a residual weakness.

During the five years following his cerebral insult, the patient frequently complained of slight breathlessness and palpitation on exertion, otherwise he had been ambulatory, walking about without much distress, the distance he could walk being of course limited.

In January, 1927, he had several attacks of praecordial pain radiating down the left arm. Two months before admission, he became weak, more dyspnoeic, and at times he appeared to have acted in a childish manner.

His past personal history is practically irrelevant, venereal disease denied. Has always been a heavy smoker.

Two of his sisters died of cardio-renal disease, but there is no history of nervous or mental disease in his family.

PHYSICAL EXAMINATION:

This showed an old man of sixty-six, fairly well developed, poorly nourished, somewhat dyspnoeic and cyanotic, mentally disoriented.

His pulse was 90 beats per minute, fibrillating, with marked sclerosis and tortuosity of the radial arteries. The arterial blood-pressure was 188 systolic, 90 diastolic.

There was slight visible pulsation in the vessels of the neck and in the episternal notch. The apex-beat was found in the fifth intercostal space about one finger's breadth outside the nipple line; it was heaving in character and accompanied by a systolic thrill. Cardiac dullness was increased to the left. A faint systolic murmur could be heard at the mitral area and propagated towards the axilla, the second aortic sound was accentuated. Heart rate 110 beats per minute, action totally irregular.

There were signs of chronic passive congestion at the bases of the lungs posteriorly.

The liver was enlarged, with its lower edge felt about three fingers breadth below the right costal margin. The spleen and kidneys were not palpable.

Both ankles were slightly oedematous.

Neurological examination revealed evidence of a residual left hemiplegia. Mentally, he showed a psychosis cardio-vascular in origin.

LABORATORY FINDINGS:

The Wassermann reaction was negative, blood chemistry normal; the blood count showed,- Hgb. 80%, R.B.C. 4,200,000, W.B.C. 8,300, Polymorphs. 69%, Lymphocytes 31%.

The urine was 1030 in specific gravity, contained a moderate amount of albumin, but no other pathological constituents.

Radioscopic examination of the chest failed to show any abnormality in the lungs. The heart was enlarged, especially in the region of the left ventricle. The aorta somewhat widened.

An electrocardiogram showed auricular fibrillation.

IMPRESSION:

- A. Chronic Arteriosclerotic cardiac valvular disease.
 1. Mitral insufficiency.
- B. Cardiac hypertrophy and dilatation.
- C. Cardiac irregularity.
 1. Auricular fibrillation.
- D. Generalized and cerebral arteriosclerosis.
- E. Hypertension.
- F. Psychosis, cardio-vascular in origin.

COURSE AND PROGRESS NOTES:

Soon after admission to the hospital, the patient was put on digitalis during the day and sedatives at night.

One month after admission, he had a cerebral insult with symptoms and signs of cortical irritation. He was unconscious for fifteen minutes, after which he was found to have a marked sensory and motor aphasia. Under proper care and digitalis, his general condition improved very rapidly. Within a fortnight, he was up and about in the ward, able to use his extremities; his speech was good.

There are alternating phases in the mental state of this patient,-- at times his mind is quite clear, but most of the time he is psychotic. He is disoriented as to time and place and has no insight into his condition. His memory is poor, especially for recent events. He knows he had been a letter carrier, but is unable to give an account of his illness. At times, he has failed to recognize his wife and daughter, and on several occasions he had mistaken them for the nurses and ward-maids. He calls the doctors his brother-in-laws and the nurses his sister-in-laws.

He frequently wakes up at night to see a figure of a man standing at the bottom of his bed, calling him out of the ward. The features of the "man" are indistinct, as if seen thru a gauze. When this vision appears, the patient gets out of bed and walks right out into the corridor. On one occasion he dressed up and stole his way out into the street to call at the police station for protection against the "man". The orderly got him back into the ward, and I finally convinced the patient that no one had called him out, but it was simply his fancy.

On one occasion, he imagined himself to be the superintendent of the hospital. I saw him at that time going up and down the long corridor and giving orders to the doctors and nurses.

His attention is poor, and he shows no interest in his surroundings, pays no attention to his wife or to his only daughter when they are visiting him.

Appears highly emotional and irritable. He is quite resistant to care, refuses food and medication, persists in getting out of bed at night, strips himself completely. At times he is very restless, continually picking at something, tearing beddings, and has to be restrained by nets.

Sleeps only during the later part of the night, while in the early hours he is troubled by the above hallucinations and delusions. His speech is incoherent, as he always wanders off from one subject to another when spoken to. His language has never been coarse or abusive throughout his present illness.

He has been fairly clean about his daily habits. The temperature has always been at the normal level.

The patient was still in the hospital at the time I had written my present dissertation.

CASE 4.--- A.G., female, aged seventy-two years, a school teacher, single, was admitted to the Montefiore Hospital on November 10, 1927, complaining of gangrene of her right middle toe, of two months duration.

HISTORY:

In March 1926, the patient had been to one of the New-York's hospitals for shortness of breath and was told she had an enlarged heart. In September 1927, her right foot began to swell, and within a week the middle toe became painful and black. She then attended a dispensary, and there she was told that she is suffering from diabetes, with the gangrene of her toe as a complication of that condition. In October 1927, the patient suddenly developed a psychosis. Her conversation became illogical, she did not know where she was, and began to mistake one person for another. In this condition, she was admitted to the hospital the following month.

On inquiry, it was found that she had been taking digitalis for eight months in succession prior to admission to the Montefiore Hospital.

She had measles and whooping-cough in infancy, malaria at the age of sixteen. No rheumatic infection in any form. Venereal disease denied. Her habits were satisfactory.

There was no history of nervous or mental disease in the family. Her father died of kidney disease at the age of sixty-three.

PHYSICAL EXAMINATION:

On admission, the examination showed an old female of seventy-two, poorly nourished, and badly dehydrated. Her skin was dry and loose with evidence of considerable loss in weight.

The pulse-rate was low, -50 beats per minute-, fibrillating and weak; the vessel-wall moderately sclerotic. The arterial blood-pressure was 175 systolic and 80 diastolic. There was marked pulsation of the carotids in the neck.

The apex-beat was palpable in the sixth intercostal space, at the anterior axillary line; the area of cardiac dullness was increased in all directions; there were signs of stenosis and insufficiency of the mitral valve.

The chest was emphysematous in type, and there were a few signs of congestion in the lungs.

The liver was not enlarged, there was no evidence of ascites in the abdomen.

The extremities were only slightly oedematous. The right middle toe was dry and black, the dorsalis pedis artery was palpable on the left side, not palpable on the right.

Ophthalmoscopic examination revealed increased tortuosity of the retinal vessels.

Neurological examination was essentially negative.

MENTAL STATUS.

On admission, the patient showed a catatonic attitude, held her arms up in the air in prayer attitude for fully an hour and a half. She was completely irrational and disoriented as to time and place. Her memory was gone for recent events, she did not recognize her nearest relatives. In the hospital, she was non cooperative, refused to take food and medication.

She frequently saw a "little girl" behind the chair at her bedside at night, while there was no one there at the time; and often heard imaginary voices as of women talking to her. During these hallucinations, her vision and hearing were good, and examination revealed no abnormality in her eyes or ears. She had had no hallucinations of taste.

While on her way to the hospital, she believed that some people were following her in an attempt to kill her with knives. There were no delusions of grandeur.

She hardly paid any attention to her visiting friends and took no interest in her surroundings.

At times, she had been exalted and recited various poems, at others she simply mumbled to herself.

Her speech was somewhat excessive, at times incoherent, but never abusive or coarse.

She was restless at nights and persisted in getting out of bed, so that she had to be restrained by nets.

She slept at intervals when under hypnotics. Her daily habits were clean. The temperature has never been elevated during her psychic condition.

LABORATORY FINDINGS:

The blood Wassermann reaction was negative, blood sugar 116 mgs. per cent, urea nitrogen normal. The blood count showed, - Hgb. 95%, R.B.C. 4,450,000, W.B.C. 12,000, Polymorphs. 69%, Lymphocytes 31%.

The urine contained a trace of albumin, but no other pathological constituents.

Radioscopic examination of the chest showed a moderate enlargement of the heart to the left and right.

Electrocardiogram taken shortly after admission showed auricular fibrillation.

IMPRESSION:

- A. Chronic Arteriosclerotic cardiac valvular disease.
 - 1. Mitral stenosis and insufficiency.
- B. Cardiac hypertrophy and dilatation.
- C. Cardiac irregularity
 - 1. Auricular fibrillation.
- D. Cardiac failure.
 - 1. Chronic passive congestion of the lungs.
 - 2. Oedema of the legs (slight).
- E. Toxic psychosis (digitalis intoxication).
- F. Generalized arteriosclerosis.
- G. Gangrene of the right middle toe.
- H. Diabetes Mellitus (mild degree).

COURSE AND PROGRESS NOTES:

The history of long continued digitalis medication, the slow pulse rate (50 beats per minute), and the coincidental development of acute psychosis, - at once suggested digitalis intoxication. The drug was discontinued, and this was followed by a marked improvement in the patient's condition. The pulse became normal in rate and rhythm, and the mental confusion gradually disappeared and has never returned since.

Under proper care, the right middle toe recovered from its gangrenous state, and regained its regular functions.

On one occasion the urine showed a trace of glucose, the blood sugar was 116 mgs. per cent, and a sugar tolerance test indicated a mild degree of diabetes mellitus. The patient was put on a restricted diet for a short time, and the condition cleared up entirely.

CASE 5.--- A. L., male, aged sixty-nine, a canvasser by occupation, married, was admitted to the hospital on November 8, 1927, complaining of breathlessness and palpitation on exertion, and praecordial pain, of three year's duration.

HISTORY:

The patient had been apparently well up to three years before admission, when he began to have shortness of breath and palpitation on exertion. These symptoms had become progressive. He became easily exhausted, had to sit upright in bed at night, and a year later, he was forced to give up work because of the breathlessness. He subsequently had several attacks of severe sub-sternal oppression and praecordial pain, relieved by rest in bed. One year prior to admission, he had noticed swelling of his legs, and a few months later also enlargement of his abdomen. He suffered from severe headaches, dizziness, and ringing in the ears, had frequency of micturition, especially at night.

He had gonorrhoea at the age of thirty, an attack of acute rheumatism at forty-four, when he was confined to bed for five weeks with high fever and painful joints. Has had a chronic cough for many years.

He is a heavy smoker and occasionally drinks whisky at meal time.

There is no history of nervous or mental disease in his family.

PHYSICAL EXAMINATION:

On admission, the examination showed a well developed and well nourished old man, very dyspnoeic and orthopnoeic, with an anxious expression of his face, acrocyanosis of his cheeks, lips, hands, and feet.

His pulse was 80 beats per minute, regular in rhythm, with marked sclerosis and tortuosity of the radial arteries; both pulses were equal. The blood pressure was 180 systolic and 108 diastolic, the same on both sides.

There was marked engorgement of the veins in the neck, the chest was emphysematous in type.

The apex-beat was not visible nor palpable, the heart enlarged in all directions, considerably so to the left as far as the anterior axillary line. An abnormal area of dullness was found in the second left intercostal space. Auscultation revealed signs of mitral stenosis and insufficiency, and a harsh systolic murmur with accentuation of the second sound could be heard at the aortic area. Heart rate 80 per minute, with occasional premature beats.

There were signs of fluid in the chest at both bases posteriorly, the remainder of the lungs were emphysematous.

The liver was enlarged to about ten centimeters below the right costal margin, not tender, the spleen and kidneys not felt. There were signs of a moderate amount of free fluid in the abdomen.

Both lower extremities were markedly indurated by a large brawny oedema extending way up the thighs and also including the external genitalia.

There were no signs of organic disease of the nervous system, and the mental state of the patient on admission was apparently normal.

LABORATORY FINDINGS:

The blood Wassermann reaction was negative, blood chemistry normal. The blood count showed, - Hgb. 83%; R.B.C. 4,300,000; W.B.C. 8,600; Polymorphs. 74%; Lymphocytes 26%. Smear normal.

The urine contained a moderate amount of albumin, occasional epithelial cells, no other pathological constituents.

Radioscopic examination of the chest showed an increase in the lung markings due to congestion, and a pleural effusion at both bases. The heart appeared markedly enlarged, with the left border almost reaching the lateral wall, the arch of the aorta slightly dilated.

Electrocardiogram showed left ventricular preponderance. Cerebrospinal fluid serology was negative.

IMPRESSION:

- A. Hypertension.
- B. Generalized arteriosclerosis.
- C. Chronic bronchitis.
- D. Chronic pulmonary emphysema.
- E. Chronic Rheumatic cardiac valvular disease;
 1. Mitral stenosis and insufficiency.
- F. Dilatation of aorta.
- G. Cardiac hypertrophy and dilatation.
- H. Cardiac failure;
 1. Bilateral hydrothorax.
 2. Chronic passive congestion of liver, lungs, and kidneys.
 3. Ascites.
 4. Oedema of the lower extremities and of the external genitalia.

COURSE AND PROGRESS NOTES:

The patient was admitted to the hospital with typical symptoms and signs of severe cardiac decompensation.

With rest in bed and under proper care and treatment, he began to improve during the first few days of his stay here.

Shortly afterwards, he developed a psychosis. He suddenly became irrational and disoriented; did not know where he was, whether in a hospital, hotel, or at home. He failed to recall recent events, but had no difficulty in recognizing his friends and near relatives.

Became irritable and very resistive to care; refuses food and medication, insists on getting out of bed and wanders about from one place to another; does not cooperate in recording his intake and output of fluid.

He often considers medication as an attempt upon his life. Has had no hallucinations of any kind.

At times, he is very much distressed and suffers from a feeling that something dreadful is going to befall him. At other times, he fears death, and pleads to go home.

He is stuporous and drowsy most of the time and takes no interest in what is going on in the ward. Is restless at night, and very often he falls out of bed, wanders about the ward, so it is necessary to keep him under restraint by nets. He sleeps at intervals under sedative medication.

His speech is incoherent, but never abusive or coarse.

He is most unclean in his daily habits, expectorates and urinates on the floor in the ward, in the dining room, and in fact anywhere.

The temperature has always been normal throughout his illness.

Since admission, the patient has constantly been under careful digitalization, under a salt-free diet and limitation of fluids. He has had repeated phlebotomies performed upon him, which were followed by infusions of glucose intravenously. The symptoms and signs of cardiac failure along with its complicating psychosis have improved on several occasions. But each time they have reappeared with greater severity. The patient is still in the hospital.

CASE 6.---S.G., female aged forty-eight, housewife, married, was admitted to the hospital in June, 1927, complaining of breathlessness and cough of five year's duration.

HISTORY:

Five years before admission, the patient began to have breathlessness on exertion and developed a productive cough, which often interfered with her sleep at night. She became more breathless, weak, and unable to attend to her housework.

In January 1927, following three days of severe vertical headache, the patient was found lying unconscious on the floor with rigidity and paralysis of the right side of her body. She was incontinent to urine and faeces. Within two hours, consciousness returned, but she was left with a right sided hemiplegia, and a mild sensory and motor aphasia. Her doctor said her condition was due to high blood pressure.

A few weeks prior to admission, her breathlessness became more marked, so that she had to sit upright in bed at night, and many times she would be awakened from sleep towards the early morning with a choking sensation in her throat.

She had acute rheumatic fever at the age of forty-one and was confined to bed for several weeks with pain and swelling of her ankles, knees, and wrists, the condition having subsided in one joint while affecting another one.

Her habits were satisfactory.

The family history is irrelevant.

PHYSICAL EXAMINATION:

On admission, the examination showed a middle aged female, fairly well developed and nourished, markedly dyspnoeic and orthopnoeic, with an anxious expression of her face, intense cyanosis of the lips, cheeks, hands and feet. She assumed the attitude of a right-sided hemiplegia.

Her pulse was eighty beats per minute, fibrillating, volume good, vessel wall moderately sclerotic. The arterial blood pressure was 190 systolic and 100 diastolic.

There was marked throbbing of the vessels in the neck with distended veins, especially on the right side.

The heart was enlarged to the left as far as the anterior axillary line, enlarged somewhat to the right. There were signs of mitral stenosis and insufficiency, and the second sound at the aortic area was accentuated.

There were signs of fluid in the right side of the chest with chronic passive congestion on the left side.

The liver was enlarged to about five fingers' breadth below the right costal margin, the kidneys and spleen not palpable. No ascites present.

There was intense cyanosis of the hands and feet, and a marked pitting oedema of both lower extremities.

Neurological examination revealed signs of a residual right-sided hemiplegia, with a mild motor and sensory aphasia. The fundi oculi showed arteriosclerosis of the retinal vessels.

The mental state of the patient on admission was perfectly normal.

LABORATORY FINDINGS:

The blood Wassermann reaction was negative, blood chemistry normal. The blood count showed, - Hgb. 86%; R.B.C. 5,500,000; W.B.C. 6,000; Polymorphs. 74%, Lymphocytes 26%. Smear normal.

The urine contained a trace of albumin, no other pathological constituents.

Radioscopic examination of the chest showed a pleural effusion at the right base and an increase in the lung markings due to congestion. The heart was markedly enlarged to the left, somewhat enlarged to the right.

Electrocardiogram showed auricular fibrillation and left ventricular preponderance.

IMPRESSION:

- A. Hypertension.
- B. Generalized arteriosclerosis.
- C. Chronic Rheumatic cardiac valvular disease;
 1. Mitral stenosis and insufficiency.
- D. Cardiac irregularity
 1. Auricular fibrillation.
- E. Right hemiplegia with slight motor and sensory aphasia.
- F. Cardiac hypertrophy and dilatation.
- G. Cardiac failure:
 1. Right hydrothorax.
 2. Chronic passive congestion of lungs, liver.
 3. Oedema of both lower extremities.

COURSE AND PROGRESS NOTES:

The patient was at first admitted to the neurological division of the hospital and after a short stay there, she was transferred to the medical service. Here she has been under digitalis, rested in bed, and her chest was tapped on several occasions. In spite of repeated thoracenteses, each time the fluid in the chest rapidly reaccumulated. Dyspnoea and orthopnoea had become progressive, oedema of the legs persisted.

Eight months after admission, the patient's mental condition had changed to that of a psychosis. She became quite dazed and disoriented as to time and place. Her memory for recent events had gone, as she could not remember where she had put things and what she had been told recently. Became very irritable and resistive to care, refused to take food and medication, or to stay in bed. She lacked all interest in her surroundings.

An almost constant feature in her psychosis was a state of unaccountable depression. She would sit by herself in the farthest corner of the ward, away from everybody, with a feeling as if something dreadful was going to happen to her. Would be indifferent as to questions concerning her comfort; she did not wish to be spoken to, and if anyone in the ward spoke kindly to her when in this condition, tears would come into her eyes, and she would often weep bitterly for quite a long time afterwards. In spite of this depressive mood, she had never had any suicidal tendencies.

Was never subject to hallucinations of any kind, but had been subject to delusions of persecutions. She suspected everyone in the ward was talking about her. Accused the nurses of being her enemies, and on one occasion she complained that a nurse was actually cruel to her. On careful inquiry, I found that it was all untrue. The patient could often be convinced that all her accusations were simply her fancies.

Her speech was somewhat defective due to a mild aphasia. She slept poorly at night. Was quite clean about her daily habits.

The temperature had never been above normal throughout her illness.

Quite suddenly, her apathetic state changed to that of acute mania. She became so wild and maniacal that she had to be transferred to a mental hospital for more proper care. There she died suddenly after admission, two months after the onset of her mental aberration.

CASE 7.----- J.F., male, aged forty-three, a driver by occupation, single, was admitted to the hospital on February 23, 1928, and died May 2, 1928.

His chief complaints were, "heart-trouble", swelling of the legs, and inability to void, of three months' duration.

HISTORY:

The patient had been apparently well up to three months before admission, when he began to have epigastric distress and pain radiating to the praecordium, with no relation to meals.

He became dyspnoeic and orthopnoeic, complained of palpitation of the heart on exertion. Prior to the onset of his present illness, he was able to do hard work and to walk up five flights of stairs without difficulty.

One month later, he developed hoarseness and a persistent unproductive brassy cough. At times, he had had great difficulty in voiding urine.

The above symptoms had grown worse during the few weeks previous to his admission to the hospital.

He gave a history of gonorrhoea at the age of twenty-eight and of a hard chancre at thirty-one. He always indulged in irregular habits of food and sleep, but at no time in excess of alcohol or tobacco.

There was no history of nervous or mental disease in his family.

PHYSICAL EXAMINATION:

On admission, the examination revealed a well developed poorly nourished middle aged man, somewhat dyspnoeic and orthopnoeic, with pallor of the skin, puffiness of the lower lids, and cyanosis of the lips and ears.

The pulse was 80 beats per minute, regular in rhythm, the right feebler than the left, the vessel-wall not palpable. The arterial blood-pressure was 56 systolic and 46 diastolic on the right, 84 systolic and 0 diastolic on the left side.

There were increased pulsations of the carotids and a moderate distension of the veins in the neck, more marked on the right than on the left. No tracheal tugging could be made out.

The apex-beat was not visible, but palpable in the fifth and sixth left intercostal spaces just in the nipple line. No thrills or shocks felt over the praecordium. Cardiac dullness was moderately increased to the left and also at the base over the aortic area. A harsh systolic and a blowing diastolic murmur were heard at the base of the heart, both transmitted towards the apex and to the Ziphoid-sterni.

Heart-rate 90 beats per minute, rhythm regular.

There were signs of chronic passive congestion over the base of the right lung posteriorly.

The liver was enlarged to the level of the umbilicus and was tender on palpation, the spleen and kidneys were not palpable, and there were no signs of fluid in the abdomen. Rectal examination was essentially negative.

The extremities were not oedematous. The deep reflexes were normal.

The pupils were slightly irregular, the left pupil reacted sluggishly to light and to accommodation, the right was practically fixed. The fundi oculi were negative. Remainder of the neurological examination revealed no evidence of organic disease of the nervous system.

The mental condition of the patient on admission was normal.

LABORATORY FINDINGS:

The blood Wassermann reaction was strongly positive (++++), blood-chemistry normal. The blood count showed, - Hgb. 70%; R.B.C. 3,400,000; W.B.C. 8,800; Polymorphs. 77%; Lymphocytes 23%.

The urine had a specific gravity of 1030, contained a moderate amount of albumin, but no other pathological constituents.

Roentgen examination of the chest showed an increase in the lung markings due to congestion. The heart was horizontal, aortic in shape, with marked enlargement and prominence of the left ventricle. No apparent enlargement of other chambers. There was marked widening of the ascending and descending aorta with elongation of the ascending portion.

Electrocardiogram showed left ventricular preponderance. Cerebro-spinal fluid serology was negative.

IMPRESSION:

- A. Chronic Syphilitic cardiac valvular disease:
 1. Aortic insufficiency.
- B. Cardiac hypertrophy and dilatation.
- C. Luetic aortitis.
- D. Cardiac failure:
 - 1 Chronic passive congestion of the right lung, of the liver, and kidneys.
- E. Hypotension.

COURSE AND PROGRESS NOTES:

Shortly after admission, the patient became severely decompensated. Dyspnoea and orthopnoea increased, venous distension in the neck was marked, more so on the right.

There appeared signs of fluid in the right chest, the liver was hugely enlarged with its lower edge extending to the pelvic brim, both feet became persistently oedematous.

In spite of continuous rest in bed, proper digitalization and injections of salyrgan intramuscularly, in spite of repeated paracenteses and careful dietetic measures, the patient's condition had grown worse. The general appearance of the patient and the signs of severe congestive failure, along with the hypotension, suggested that there was involvement of the mouths of the coronary arteries by the luetic process in the aorta. The cough, hoarseness, and the pressure phenomena on the right side, suggested an aneurysmal dilatation of the aorta.

In association with this progressive cardiac failure, there developed a psychosis. The patient became completely irrational and quite disoriented as to time and place. He had absolutely no insight into his illness. His memory was extremely poor for recent events, he failed to recognize his nearest relatives. Was very irritable and resistive to care, declined food and medication, and refused to stay in bed.

He frequently woke up at night to see an indefinitely outlined figure at his bedside, with wavy hair and black eyes staring directly at him. The figure would appear stationary and disappear after a few minutes slowly stalking across the ward. During these hallucinations, his vision was good, and his eyes were normal on examination. Has had no hallucinations of sound or taste.

He considered the nurses and doctors his greatest enemies, regarded his confinement in bed as an attempt upon his life, and the administering of medicine as a certain attempt to poison him.

Appeared stuporous and drowsy during the day and took no interest in his surroundings. Was very restless and noisy at night, persisted in getting out of bed, so that he had to be restrained by nets.

His speech was incoherent, but never coarse or abusive. Became most unclean about his habits -- expectorated and urinated on the floor.

The temperature has been normal from the day of admission until death.

In spite of all active therapy, no sign of improvement was seen, on the other hand, the patient's condition turned from bad to worse, and during the last few days of his life he was comatous all the time. His psychic condition and comatose state were out of proportion to his cardiac damage. The patient finally died nine weeks after admission to the hospital and two months after the onset of his mental confusion.

Autopsy was not performed.

CASE 8.---- R.K., female, aged fifty-two, housewife, was admitted to the hospital on November 12, 1927, and died May 14, 1928.

She complained of praecordial pain, palpitation of the heart, shortness of breath, swelling of the ankles, and enlargement of her abdomen, - of ten years duration.

HISTORY:

The patient had been able to go about and do her usual housework up to 1924, when she began to have attacks of praecordial pain and palpitation, breathlessness on the slightest exertion, and had to sit upright in bed at night. These symptoms had progressively grown worse during the past three years but always improved with hospitalization.

About four months prior to admission to the Montefiore Hospital, she noticed swelling of her feet, enlargement of and pain in her abdomen.

She gave a history of severe joint pains fifteen years ago with, however, no fever or swelling.

Her habits were satisfactory.

There was no history of nervous or mental disease in her family.

PHYSICAL EXAMINATION:

This showed a fairly well developed, somewhat undernourished female, dyspnoeic and orthopnoeic, with acrocyanosis of the lips and cheeks, distended and pulsating veins in the neck.

The pulse was 70 beats per minute, fibrillating, the vessel-wall moderately sclerotic. The arterial blood pressure was 212 systolic and 110 diastolic.

The heart was markedly enlarged in all directions and showed signs of mitral stenosis and insufficiency. Cardiac action irregular in rate, rhythm, and force.

The lungs were clear; the liver enlarged to the level of the umbilicus, pulsatile and tender; the kidneys and spleen not palpable. There were signs of small amount of free fluid in the abdomen. Both lower extremities showed marked varicosities, no oedema present.

Examination of the nervous system was essentially negative. The mental status of the patient was normal on admission.

LABORATORY FINDINGS:

The blood Wassermann reaction was negative, blood chemistry normal. The blood count showed, - Hgb. 70%; R.B.C. 3900000; W.B.C. 6,400; polys. 74%; Lymphocytes 26%.

The urine contained a trace of albumin, few epithelial cells, and occasional w.b.c.

Roentgen examination of the chest failed to show any abnormality in the lungs. The heart was markedly enlarged in all directions.

An Electrocardiogram showed left ventricular preponderance and auricular fibrillation.

IMPRESSION:

- A. Chronic rheumatic cardiac valvular disease:
 - 1. Mitral stenosis and insufficiency.
- B. Cardiac hypertrophy and dilatation.
- C. Cardiac irregularity:
 - 1. Auricular fibrillation.
- D. Hypertension.
- E. Arteriosclerosis.
- F. Cardiac failure:
 - 1. Ascites.
 - 2. Chronic passive congestion of the liver.

COURSE AND PROGRESS NOTES:

With rest in bed and under maintenance doses of digitalis, the patient's condition had generally improved after admission to the hospital. She became less orthopnoeic, less cyanotic, the apex and pulse rates were well controlled, ascites diminished, and the output of fluid became greater than her intake. She was allowed up on a wheel chair for several hours a day. Digitalis was discontinued for several days.

Five months after admission, compensation of the heart suddenly failed, and her previous symptoms and signs returned with more marked severity than ever before. Dyspnoea and orthopnoea were pronounced, cyanosis intense, the veins in the neck were fully distended. The pulse was rapid and fibrillating, the heart generally dilated, with signs of mitral stenosis and insufficiency of the mitral, aortic, and tricuspid valves. She developed signs of fluid in the right chest and congestion of the base of the left lung posteriorly. The liver extended to the level below the umbilicus, was tender and pulsatile, and there developed a moderate amount of free fluid in her abdomen. The legs, however, were not oedematous. Her systolic blood-pressure fell from 212 to 168 mms. of mercury.

Coincidentally, the patient became mentally confused. She had no insight into her illness, was irrational and disoriented as to time and place.

Her memory was poor for recent events, as she could give no account of her illness and did not remember who and when they had brought her to the hospital. Had difficulty in recognizing her nearest relatives.

The neighbours in the ward stated that she would wake up at night to see imaginary figures at her bedside, would call them by names and talk to them. During these hallucinations, her vision was good and her eyes were negative on physical examination. She had no hallucinations of sound or taste, no delusions of any kind.

She paid no attention to what was going on in the ward, did not cooperate during examinations, but never refused food or medication.

She was often very restless, continually moving her arms, hands and feet about, mumbling and singing to herself quietly, and frequently making various grimaces. Slept only at intervals when under hypnotics.

Her speech was somewhat excessive, incoherent at times, but never coarse or abusive.

She was fairly clean about her daily habits. The temperature had been normal throughout her stay in the hospital.

Under moderate doses of digitalis and other diuretics the signs of congestive failure improved, but the psychosis remained till death.

The patient expired suddenly, six months after admission and two weeks after the onset of her mental complication.

No autopsy was performed.

ETIOLOGIC FACTORS.

Acute psychoses are comparatively rare in heart disease. I have seen numerous patients with the most hopeless cardiac breakdown, with dropsy, large livers, cyanosis, insomnia, and orthopnoea, who until their death maintain a perfect clearness of their mind.

Out of three hundred sixty nine patients with chronic heart disease who came under my observation at the Montefiore Hospital, only eight presented symptoms of psychoses. The percentage incidence, therefore, was 2.16%.

There were four cases with clinical evidence of mitral disease, one of aortic disease, and two cases with signs of tricuspid regurgitation in addition to the above.

Three cases were rheumatic in origin, four arteriosclerotic, and one luetic in origin.

So the occurrence of mental confusion in these cases was independent of the type of heart affection.

All the patients were between forty-three and seventy-two years of age. Two cases (25%) occurred in the fifth, two (25%) in the sixth, three (37.5%) in the seventh, and one (12.5%) in the eighth decades of life respectively.

The same number of instances appeared in men as in women, four (50%) in each sex.

In none of my cases was there a history of insanity or of any nervous disease in the family.

All the selected cases presented evidence of far advanced congestive failure at the time of appearance of their psychic complications. Inadequate nutrition of the brain and special centers, consequent on the disordered circulation, evidently played an important role in bringing about the psychoses in our cardiac patients.

Insufficient nutrition of the excretory organs, from failing circulation, had led to improper function of the liver and kidneys. These organs, therefore, were unable to properly deal with the waste products of body metabolism and, no doubt, gave rise to retention of toxic agents in the blood.

Generalized arteriosclerosis was found in all the patients. In only one of the two cases in which autopsies were performed did we gain permission to remove the brain and cord for examination. In this case, there was in addition to the generalized arteriosclerosis evidence of an associated cerebral arteriosclerosis. It is likely, that the same condition would have been found in the brain vessels of the other cases in which autopsies were not obtainable.

The systolic blood pressure readings ranged between 170 and 212 mms. of mercury. In one exception (7) the pressure was low: 56R., 84L.

The action of the accumulated waste products of long standing heart disease, in association with arteriosclerosis and high arterial blood pressure, had brought about a state of exhaustion in all the patients. This was shown by lack of energy and will-power to act, by the severe asthenia and marked exhaustion on the slightest effort. This condition undoubtedly played one of the most important roles in the onset of the mental aberrations under the present discussion.

One of the cases presented an additional etiologic factor, namely digitalis intoxication. The patient (case 4) had been under uncontrolled digitalis medication for a considerably long time prior to admission to the hospital. The psychic symptoms entirely disappeared after the drug was discontinued.

The occurrence of mental confusion in certain cases under digitalis may be explained on the assumption that digitalis, if given in overdoses, may by disturbing the cardiac rhythm through its action on the conducting mechanism, still further impair an already inadequate circulation.

CLINICAL FEATURES, SYMPTOMS AND SIGNS.

The usual picture is that of a male or a female, past middle age, who after having suffered from repeated attacks of cardiac failure, suddenly becomes mentally confused.

On examination, the patient presents the typical symptoms and signs of severe cardiac decompensation. There are marked dyspnoea and orthopnoea, intense cyanosis, irregular pulse, venous distension, and dilatation of the heart with signs of chronic valvular disease. One usually finds a unilateral or a bilateral hydrothorax, an enlarged liver with or without ascites, and oedema of the lower extremities.

Mentally, the patient exhibits a psychosis, the manifestations of which are varied.

A more or less constant feature is a state of confusion. The patient is irrational and disoriented as to time and place. Has no insight into his illness. Forgets what happened recently, though memory is clear for remote events. These patients often fail to distinguish one person from another and lack all interest in their surroundings. They are very irritable and non-cooperative, refuse food and medication, persist in getting out of bed in spite of rigid orders to stay therein.

Among the more important types of cardiac psychoses are hallucinations of sight, sound, and taste, and delusions of persecution, rarely delusions of grandeur.

The visual hallucinations take the form of an indistinct human figure standing at the bedside or stalking slowly across the ward. The auditory hallucinations consist chiefly of sounds or of voices as if someone was talking to the patient, while there is, really, no one there. The patient may experience an unpleasant or a strange taste in his mouth without anything to account for this sensation.

Delusions of persecution are very common. Some patients imagine that the neighbours in the ward are their worst enemies who want to get rid of them. Others accuse the nurses of neglecting them, while still others regard the administering of medicine as an attempt to poison them.

Under the influence of a delusion of persecution, the patient's attitude is more commonly a defensive than an offensive one. He gets out of bed and attempts to leave the ward quietly in order to escape from his enemy. He can usually be persuaded by gentle means to remain where he is, can be given an hypnotic and gotten back to bed, after the doctor or the nurse has convinced him that his belief is incorrect.

In this respect, the delusions of the sane as a result of cardiac failure differ fundamentally from the delusions of the insane. While the cardiac can usually be convinced that his suspicion is logically false, the insane patient will always try to convince you that his belief is true. Another important point to note, the cardiac, when a prey to suspicion, has no feeling of moral unworthiness, and therefore he has no delusions that he has committed a crime or a sin. The insane person, on the other hand, thinks that those around him believe he has committed some act either against religion, the law, or society.

Delusions of grandeur are comparatively rare, and I only know of one instance (case 3) that occurred in one of the patients I had studied at the hospital. He imagined himself to be the "superintendent" of the hospital, and I saw him going up and about the ward and giving instructions and orders to the doctors and nurses.

In some cases, the mental state is one of excitation. The patient suddenly becomes restless and very noisy so that he has to be restrained by nets in bed.

In other instances, the patient gets into a state of causeless depression and low spirits. He is constantly haunted by an intolerable fear of impending misfortune and seeks relief from his troubles by endeavouring to escape from his present surroundings. He retires to some obscure corner of the ward, away from everybody, and talks to no one. Has an intense desire to weep and very often he will burst out into tears when spoken to. He is unable to say why he weeps or why he is miserable.

Some patients develop dirty habits about them such as expectorating and urinating on the floor.

Speech is incoherent but never coarse or abusive. Insomnia is a constant symptom.

The above symptoms are usually progressive. Few patients recover from their psychoses, but the majority of cases terminate fatally within several weeks or months after the onset of the mental confusion.

PROGNOSIS.

The psychic disorders under discussion occurred during grave myocardial insufficiency.

One of the patients (case 2) recovered from his psychosis with the return of cardiac compensation under proper care and treatment, but died suddenly three months afterwards. Another one cleared up after digitalis medication was discontinued, and in her the psychosis never returned since (case 4).

So complete recovery from the mental breakdown took place in two (25%) of the eight cases. The rest of the patients had never regained their normal mental condition.

Five (62.5%) of the patients died within a period ranging from two to twenty weeks after the onset of their confusional state.

Thus, the prognosis as to recovery from the mental disorders as well as that in regards to life was of serious significance in our cardiac patients.

T A B U L A T E D D A T A

Case	Age	Sex	Hered. taint of Insan.	Heart disease.	Origin of Heart disease	Conges- tive Failure	Exhaus- tion	Digi- talis Intoxi- cation	Vascu- lar change	Blood Pres- sure	Insom- nia
1	55	Female	None	Mit. st. Mit. Ins. Aort. Ins. Tric. Ins.	Arteri- oscle- rosis	Marked	Severe	None	General Arterio sclero- sis	170/85	Yes
2	62	Male	"	Chronic Myocar- ditis	Arterio sclero- sis	"	"	"	"	172/90	Marked
3	66	Male	"	Mitral Insuf.	"	Moderate	"	"	"	188/90	"
4	72	Female	"	Mit. St. Mit. Ins.	"	Slight	"	Yes	"	175/80	"
5	69	Male	"	Mit. St. Mit. Ins.	Rheumat.	Marked	"	None	"	180/108	"
6	48	Female	"	"	"	"	"	"	"	190/100	Yes
7	43	Male	"	Aort. Ins.	Syph.	"	"	"	None peri- pheral	56/46R. 84/0 L.	"
8	52	Female	"	Mitr. St. Mit. Ins. Aort. Ins. Tric. Ins.	Rheumat.	"	"	"	Gen. Art erioscl erosis	212/110	"
T O T A L A N D											
8 cases 2.16%	58.4	4 males 4 fem.	None	Mit. 4 Aortic 1 M.A.T. 2 C.Myoc. 1	Art. scl. 4 Rheum. 3 Syph. 1	8	8	1	7	High 7	8

Mental confu- sion	Hallucinations			Daily Habits	Delusions		Excit- ation	Depres- sion	Speech	Recov- ery from psychos.	Psycho- sis till Death
	Sight	Sound	Taste		Perse- cution	Grand- eur					
Pre- sent	Pre- sent	None	None	Dirty	Pre- sent	None	Mild	None	Inco- herent	None	5 Months
Marked	"	"	Pre- sent	"	"	"	Marked	"	" Abusive at times.	With re- turn of cardiac compens.	3 Months
"	"	"	None	Clean	"	Pre- sent	"	"	Inco- herent	None	Alive
"	"	Pre- sent	"	"	"	None	Moderate	"	"	When Di- gitalis discon- tinued	Alive
"	None	None	"	Very unclean	"	"	"	Mild	"	None	"
Pre- sent	"	"	"	Clean	"	"	Acute Mania	Marked	Aphasia	"	2 Months
Marked	Pre- sent	"	"	Unclean	"	"	Moderate	None	Inco- herent	"	2 Months
Pre- sent	"	"	"	Fairly Clean	None	"	"	"	"	"	2 Weeks

A V E R A G E .

8	6	1	1	Clean 4 Dirty 4	7	1	8	2	Incohe- rent 8 Aphas. 1	2	10 Weeks
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SUMMARY AND CONCLUSIONS:

1. Serious psychoses occurring as complications of heart disease are not common.
2. All the patients under observation had suffered from advanced and recurring heart failure, and the development of the confusional state coincided with the period of severe decompensation. So the exciting cause of these psychoses, or at least a constant factor in them, is the presence of advanced cardiac failure.
3. These mental disturbances are independent of the type of heart affection.
4. All the patients were over forty years of age. The greatest incidence occurred in the seventh, the least in the eighth decade of life.
5. Both sexes were equally affected.
6. It might be safe to assume that these psychoses are determined, in some cases at least, by inadequate nutrition of the brain and special centers consequent on the disordered circulation.
7. Generalized and cerebral arteriosclerosis are of decisive importance in some cases, at any rate.
8. High arterial blood pressure, with one exception, was common to all.
9. Digitalis poisoning may be held responsible in unusual cases for the development of a psychopathic outbreak.
10. Exhaustion from long standing heart disease is another important factor in the etiology of the cardiac psychoses.
11. The most important and frequent manifestations of these disorders are:
 - (a) A state of mental confusion.
 - (b) Hallucinations of sight, sound, and rarely of taste.
 - (c) Delusions of persecution, rarely those of grandeur.
 - (d) A state of excitation.
 - (e) A depressive mood.
 - (f) Insomnia - a constant symptom.

12. The occurrence of psychoses in patients with far advanced and recurring cardiac failure is of grave prognostic significance.

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