

THE MANAGEMENT OF THE HYPERTENSIVE
PATIENT IN GENERAL PRACTICE

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INTRODUCTION.

Hypertension is not a new discovery. It and its associated heart, kidney and cerebral complications have been known for a considerable time. It is interesting to look back into history and see how the problem was recognised.

Although successful treatment is a recent development, study of the disease goes back much further, and disorders of the heart and blood vessels are frequently mentioned in ancient writings.

The Egyptians and Indians knew of heart disease before the birth of Christ. The embalmers of Ancient Egypt left the heart in position, although all other viscera were removed from the corpse; evidence of the importance they attached to the organ. The Ebers Papyrus, dated about 500 B.C. mentions the heart which is regarded as the principal vital organ. The Egyptians knew that the pulse could be felt in many parts of the body and that it was in time with the heart beat. The Aztecs of Mexico mentioned angina pectoris in their writings. A feature of Chinese medicine from ancient times has been diagnosis by palpation of the pulse which became elaborated into a complex pulse lore. Volhard quotes the Chinese physician Choun-You-J. who lived about 200 B.C. as follows:-"When the pulse upon depression is very firm and upon superficial palpation very tight/

tight, then the disease has its seat in the kidney". This is a rule which can still be applied to-day.

Many references to the heart and the consequences of high blood pressure are to be found in the Bible. Job (37.1) recorded the effect of fear on his heart during his sufferings. The Psalmist (119,70) and Isaiah (6.10.) mention the heart. The same effect and its significance for the hypertensive patient were noted by the Scottish Surgeon, John Hunter (1728-93), who said that his life was in the hands of those who would annoy him, rightly predicting that he would die during a fit of anger.

Apoplexy is a disease which has been known for centuries, but John Jakas Wepper probably first recognised haemorrhage as its cause in 1655. He described the case of a monk aged about 45 years, who died from cerebral haemorrhage. Wepper himself had extensive aortic atherosclerosis, and medical history shows many instances of cruel co-incidences where a physician has died from the disease he studied.

Coronary artery disease, so often a consequence of hypertension, was described by Krehl in 1740, and its relation to angina pectoris by Jenner and by Fothergill some years later. Morgan (1746) appreciated the relationship between cerebral vascular disease and apoplexy and was the first to recognise the hereditary factor in apoplexy.

3.

Blood pressure was first determined accurately by an English theologian, Stephen Hales (1677-1761). He was the outstanding English physiologist of the 18th. century. The signs of left ventricular hypertrophy, which had been recognised for many years, were described in 1819 by Laennec.

Richard Bright mentioned thickening of the large renal arteries in the diagnosis which bears his name, and by 1836 had studied one hundred cases of renal disease. Johnston (1852) described renal arteriolar sclerosis, believing muscular hypertrophy to be its cause. Arterial hypertension was shown to be the link connecting renal diseases with cardiac hypertrophy by Traube in 1856.

To help him in his studies of eye accommodation and colour vision, Hermann von Helmholtz designed the first ophthalmoscope in 1851 and had "the great joy of being the first to see a living human retina". The instrument was considered at first merely an ingenious gadget; its very real use was quickly appreciated, however and to-day the state of the retina in hypertension has become almost a field of study on its own.

In 1853 Vierordt, Professor of Physiology at Tübingen, demonstrated the first sphygmograph which could trace the pulse beat. He also attempted to measure the blood pressure by adding weights to his instrument.

Augustus Waller (1816-1870) first recorded the electrical impulses of/

of the heart.

The first sphygmomanometer was designed by Herisson (1834) applying the idea that the amplitude of the pulse could be used to measure systolic arterial pressure. Various improvements were made, and along with the development of the sphygmomanometer came a widening of the field of knowledge in hypertensive disease.

The first sphygmomanometer which could be used in medical practice was introduced by von Basch in 1880. This instrument has since been hailed as a blessing by some and as a curse by others, but has undoubtedly added enormously to our knowledge of hypertension. Previously blood pressure could only be estimated by testing the pulse, but with von Basch's instrument a reasonably accurate determination could be made without inconvenience.

Improved sphygmomanometers were designed by Riva-Rocci (1896) and Recklinghausens (1901) who used the idea of an inflated cuff. In 1905 Korotkoff realised that the sounds heard over the artery distal to the cuff could be used as indices of systolic and diastolic pressures. Meanwhile the first cardiograph had been constructed, a further addition to the physician's armamentarium.

A great deal of work was done during the latter half of the nineteenth century on the relationship between cardiac hypertrophy and hardening of the arteries. The theory was advanced that high blood pressure/

pressure might be due to intra-arterial tension, although increased heart-action was considered the primary cause at the time. Most clinicians associated hypertension with chronic Bright's disease until Mahomed (1874-1881) first recognised the condition later named "essential hypertension" by Janeway (1904). Mahomed also advanced the idea that hypertension causes the renal vascular affections found at necropsy. Allbutt (1895) recognised "hyperiesia" as a condition independent of chronic nephritis and arteriosclerosis. He believed that elevated intra-arterial tension might cause both arterial and arteriolar disease, which has only recently been proved experimentally. Huchard (1893) advanced the idea of a generalised angiosclerosis involving heart, arteries, veins and capillaries.

The pressor properties of extracts of suprarenal medulla were discovered by Oliver and Schaefer in 1895. Nine years later Vaquez advanced the theory that hypertension results from increased secretion of adrenaline.

So, within a century, more progress had been made than in the previous thousand years. True, the journey was far from over. But instruments were available for accurate study of the condition; the way was paved for the search for treatments.

The end of the nineteenth century saw the beginning of a trend towards specialisation in medicine. In the field of cardiology

Walter/

Walter Holbrook Gaskell (1874-1914) studied the innervation of the heart. Sir Lauder Brunton noticed the effect of nitrites in the relief of pain in angina pectoris. Estimation of blood pressure was first used as a routine procedure by Potain of Paris, and in this country by Allbutt.

By 1902 James Mackenzie, blessed with a rare blend of genius and industry, had amassed a considerable volume of knowledge on cardiac disease - the fruits of nineteen years of careful study. He was first attracted to the study of heart disease when a young patient of his died suddenly and unexpectedly of cardiac failure during childbirth; then Mackenzie realised how little was known of this type of disease. At the age of fifty-four he gave up his practice in Burnley and entered the sacred precincts of Harley Street. Working incredibly hard and accepted as the foremost heart specialist of his time, he spent ten fruitful years; then as suddenly as he had come, he left London to return to general practice.

Throughout his life Mackenzie had great respect for the general practitioner and the service he could render to medicine, asserting that "medicine will make but halting progress while all fields essential to the progress of medicine will remain unexplored, until the general practitioner takes his place as an investigator". Financial troubles soon compelled a return to London, however, where he contended with a busy practice, attacks of angina and his desperate desire/

desire to finish the books on which he was recording his life's work. He designed the Mackenzie Ink Polygraph which simultaneously recorded the jugular vein beats and the radial pulse, thus relating ventricular and auricular action. Mackenzie was knighted and elected Fellow of the Royal Society for his work. Angina killed him in January, 1925, at St. Andrew's and closed a lifetime of achievements.

A further invention followed in 1903, when William Einthoven produced the first electrocardiograph. Although greatly improved equipment now enabled blood pressure to be studied accurately, little further significant progress was made towards a satisfactory treatment during the early part of the present century.

As early as 1914 Crile combined unilateral adrenalectomy with ligation of the thyroid and cervical sympathectomy in an operation for hypertensive disease. When the adrenal cortical hormones became available it was possible to try total, or almost/total, adrenalectomy where necessary.

In 1922 a case of pheochromocytoma was investigated and reported on by Liebbe; five years later the first operation was successfully performed by Mayo. Although suggested by various earlier authorities, sympathectomy as a treatment for hypertension was initiated by Rowntree and Adson in 1925. Subsequently more extensive operations were devised by Adson, Peet, Smithwick and others.

The/

The first cardiac catheter was inserted in a living person in 1928. W. Forssman after practising on a cadaver, inserted a catheter 30 c.c. into himself. Although he felt no ill-effects, a friend who was present persuaded him to stop. A week later, alone, he increased the distance to 65 c.c., and reached the heart. An example of thoughtful courage easy to underestimate.

Although of little practical significance because of the difficulty of assessing direct pressure, it was realised that a comparison of direct and indirect values would give a useful check on the accuracy of the methods in general use. Wolf and v. Bonsdorff achieved such a comparison in 1931. Direct measurement was made by piercing the brachial artery with a needle connected to a manometer by a saline-filled lead tube. Indirect measurement was made before this operation, and again after it by a different technique. In less than half the cases examined was the indirect measurement within 5 mm. of the direct value.

During the past two decades the treatment of hypertension, both medical and surgical have made rapid strides.

Among factors still to be fully investigated is the role of hormones in the regulation of blood pressure. Selye (1950 and 1951) and other workers have studied the relationship of adrenal hormones to electrolyte balance and the changes brought about by stress.

So/

So the hypertensive patient to-day is in a better position than ever before. Pioneer work by physicians and scientists over many hundreds of years has produced a fund of knowledge and a variety of treatments which offer real hope to many patients for whom nothing could have been done in the past. Perhaps comparable progress will now be made in preventing the condition.

The incidence of hypertension in the population has probably increased, as more people now reach the age when it is more common. The result is, that in countries such as our own, hypertension has become one of the major diseases. The number of patients with this condition seen in general practice is now high.

Fluctuations in the blood pressure can often not be explained. The blood pressure tends to be higher in the physically untrained person than in the trained athlete. It is often found to be high in obese, plethoric, sedentary individuals. The blood pressure is often found to be higher at the first consultation, than at subsequent ones; particularly in the nervous individual. Yet, hypertension is not characteristically associated with prolonged anxiety states or thyrotoxicosis, but is found often in the emotionally stable and apparently physically fit person. The patient often has no symptoms and his raised blood pressure is found at a routine examination.

It is the family doctor who sees the patient in the early stages of/

of the condition and who is therefore able to study the early symptoms and signs of the disease. He has the best opportunity to notice the appearance of complications. Almost invariably it is he who treats the patient in the final stages of the illness.

The management of the hypertensive patient in general practice involves not only the use of drugs but also the taking into account of other factors which can influence the course of the disease. The family doctor is in a very favourable position to see the genetic, familial, environmental, nutritional and occupational factors which may influence the disease.

The treatment of hypertension is not easy. The patient has to learn to live with, and adapt himself to, his disease. In each practice there are many patients with a mild degree of hypertension who have no symptoms and have no need of treatment. In each practice however, there are a few patients who are ill, sometimes desperately ill, with a high blood pressure. These patients need all the resources of modern medicine and sometimes modern surgery. In the treatment of severe hypertension, a large number of effective remedies are now available. Considerable care is required in deciding which one should be used for a particular patient. It is with these patients that the family doctor requires help and advice from his hospital colleagues. Some of the remedies are powerful, their effect difficult to control, and require the fullest co-operation between the/

the patient and all his doctors.

This thesis on the management of the hypertensive patient in general practice is based on observations made by myself in general practice in an industrial town in Central Scotland. The emphasis throughout is on the diagnosis of hypertension and the management of the hypertensive patient in general practice, making reference to the help received from my colleagues in hospital.

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MAIN THEME(a) FORMS IN WHICH HYPERTENSION IS ENCOUNTERED.

The family doctor encounters hypertension in three ways.

It is most often found in a patient who has come seeking an explanation of symptoms which are causing anxiety. These symptoms may have been present for months or even years; the visit to the doctor being precipitated by the symptoms becoming worse. The diagnosis is made when the doctor takes the patient's blood pressure in the course of his examination. This group includes most of the patients who are found to have hypertension.

The second group are those patients whose hypertension is found as a result of a routine medical examination. In men, this examination is usually for insurance purposes. In women, it is usually part of ante-natal care.

The third group of patients is the smallest. These patients present with sudden and often serious illness. They may have had no previous symptoms or the symptoms may have been so slight or of such recent onset that the patient did not think it necessary to seek medical advice. The first indication of their hypertension is a vascular disaster, or it may be a cardiac asthma or a hypertensive encephalopathy. Of the ninety six cases of hypertension I have studied/

studied in the past six years, two presented as cardiac asthma and one as a hypertensive encephalopathy.

(b) FACTORS AFFECTING HYPERTENSION.

The aetiology of hypertension remains obscure. However there are several factors which seem to influence the disease and the family doctor is in a favourable position to study them.

The genetic factor seems to be important. In a study of untreated hypertension Leishman (1959) showed that in hypertension the male sex had an unfavourable prognosis. In his series of cases which were watched over the period of time from 1946 to 1959, not a single male survived whose diastolic blood pressure was initially found to be over 130 mms. Hg. The greater tolerance of women for high blood pressure was evident. Even in cases of malignant hypertension, the average duration of survival of the female was twice as long as that of the male. It is not known why women withstand hypertension better than men. Newman et al (1959) in a study of treated hypertension also found a comparative immunity of female patients to the complications of hypertension.

This has been confirmed in observations in my own practice. During the past six years in my practice there have been twenty eight men and sixty eight women who merited the diagnosis of hypertension. Sixteen of the men and nine of the women have had a serious illness/

illness directly attributable to the hypertension.

The familial factor is also understandably important. Ayman (1934) found that where one parent had hypertension, the incidence in the children (in later life) was about 30%. Where both parents had hypertension it was about 45%. Thus, the absence of a family history of such illness in a patient with hypertension suggested to him that there should be a particularly careful search for some underlying cause. An interesting controversy on the aetiology of essential hypertension was started by the publication of a paper by Morrison and Morris (1959) which purported to show that essential hypertension was inherited as a simple dominant. This evidence was challenged by several workers, among the chief of whom were Oldham, Pickering, Roberts and Sowry (1960). These authors had, in earlier papers, proposed the view that essential hypertension was not a specific disease entity, but was rather the result of a gradation which is probably inherited polygenically in the same fashion as, for example, height. It is important that this controversy should be settled one way or the other as soon as possible because of its effect on future work, but at this stage it would be unwise to forecast which view will prevail.

In my own experience I have found the family history to be of great importance. It has been particularly striking in two families.

One of my female patients, aged forty years, is the sole survivor of a family of three sisters and one brother. One older sister died of a myocardial infarction and the other older sister and older brother both died of cerebral haemorrhage. All three who died were hypertensive, and the surviving sister is at present under treatment for hypertension.

In another family there are two brothers and two sisters. One of the sisters has hypertension but has had no serious complications. Both the brothers have had myocardial infarctions. One brother has had two infarctions and he has hypertension.

The personal habits and way of life of patients suffering from hypertension deserve consideration. Most hypertensive patients require advice in adapting their way of life to suit their raised blood pressure. Even the severest grade of hypertension will show a fall in the blood pressure at times of complete rest or during sleep. Yet it has been my own finding that hypertension is not necessarily found in patients who are emotional, or are being subjected to environmental or occupational factors which cause stress and anxiety. I have often found that it is the emotionally stable person, who has a peaceful home life and who is happy at his work, who suffers from hypertension. I do not think that environmental or occupational factors are important as causes.

What/

what is important is that hypertensive patients should have advice on their mode of life. This, I feel, can best be given by the family doctor, who knows the domestic and occupational background of his patients. Though there is no evidence that essential hypertension is primarily a psychological disorder, emotional stimuli usually cause a higher rise in the blood pressure of people with hypertension than those whose blood pressure is normal. Most hypertensive patients feel better and have a lower blood pressure when under the care of a sympathetic and understanding family doctor.

Diet may have some influence. It is interesting to note that the Eskimos and the Sikhs who have a large protein intake and the Chinese and the Hindus who are largely vegetarians, rarely suffer from hypertension.

Many hypertensive patients over-eat. If this is associated with obesity, then it is wise to reduce their intake of food sufficiently to reduce their weight. My impression is that male hypertensive patients who are over-weight, are more likely to have complications, and also have a shorter expectancy of life. It is also my impression that most women with hypertension are over-weight.

It is therefore difficult to assess the importance of obesity in women, though a reduction in weight is usually accompanied by a fall in blood pressure. The fact that they have a greater tolerance to hypertension also makes it difficult to assess the influence of/

of obesity in prognosis. It is of interest to note that Leishman (1959) who, was making a comparison of treated and untreated hypertension, made the following observations.

When he first started he noted that the absence of obesity was probably a bad prognostic sign. This was later reconsidered and he thought that it was fairly evident that the preponderance of patients of normal weight among the fatal cases was biased by cases of malignant hypertension, who are rarely over-weight. When cases of malignant hypertension were excluded the presence or absence of obesity seemed much less important since 38% of the patients who died had been over-weight compared with 48% of those still living.

In the more serious cases of hypertension, reduction in sodium intake is known to be of value. Gilchrist (1956) suggested that even in malignant hypertension nearly half the patients will show a regression of papilloedema and an improvement in eyesight when the sodium content of the diet is reduced to 200 mgs. a day. In pre-eclamptic toxæmia it has been known for several years that reduction of the sodium intake has a beneficial effect on the illness. In my own practice of domiciliary midwifery I have no doubt of the usefulness of sodium restriction. It is of interest here to note that I have a clear impression that pre-eclamptic toxæmia is much commoner in obese women than in those of normal weight.

(c) DIAGNOSIS.

Hypertension is a common cause of premature death; its diagnosis is therefore important. It is equally important to differentiate the two main divisions of essential hypertension and secondary hypertension. Essential hypertension may be described as a condition with the symptoms and signs of hypertension without any underlying cause. It has been my finding that the younger the patient is, the more thorough should be the search for some underlying cause, especially if there is no family history of hypertension. Secondary hypertension is most commonly due to renal disease, particularly I have found in women, to chronic pyelonephritis. Other renal conditions are rare and include glomerular nephritis, polycystic kidneys, tuberculosis of the kidneys and obstruction of the renal artery. In my own practice, out of the total of ninety six patients, who over the past six years have merited the diagnosis of suffering from hypertension i.e. whose resting blood pressure is constantly 160/100 or higher, only one had a rare renal condition. He had bilateral polycystic kidneys and died of coronary thrombosis. Occasionally the hypertension is due to other rare causes, such as coarctation of the aorta, a phaeochromocytoma or

or Cushing's syndrome. In my own practice I have not had the opportunity of seeing such a case. It follows therefore, that each family doctor does not see many rare causes.

I divide my approach to the problem of diagnosis into four sections:-

1. THE PATIENT'S HISTORY AND SYMPTOMS

These are often difficult, misleading and bizarre. Sometimes it is difficult to decide whether they are directly attributable to hypertension, or whether they are due to other causes such as cerebral atheroma or an anxiety state. They cannot be directly related to the height of the blood pressure and I have often found a patient with severe hypertension as judged by the height of the blood pressure, who has no symptoms. Conversely a large number of symptoms can be found in a person whose blood pressure rise is not severe. In most cases, however, the hypertension is found because the patient seeks advice for symptoms which are related to hypertensive cardiovascular disease. The commonest symptoms are headache, breathlessness, angina and visual disturbance. Occasionally it is an acute illness such as a cerebro-vascular disaster. In patients with malignant hypertension, headache can be severe. If the patient thinks he has hypertension he tends to exaggerate his symptoms. Because

Because of this, symptoms are not a satisfactory criterion to judge the severity of the illness and the response to treatment. I have found occasional difficulty in the differential diagnosis of the patient who also has chronic bronchitis and emphysema and who may have attacks of bronchial asthma. A history of renal infection, renal pain and frequency of micturition should suggest pyelonephritis. This condition may be missed when the symptoms are not severe.

2. THE BLOOD PRESSURE.

A solitary reading is useless. At the first consultation, the patient is often anxious and apprehensive and this puts the blood pressure up. The diastolic reading is the most important as this represents the permanent load carried by the heart and blood vessels. I have found from my own experience, that I can get a 10-15 mms Hg. variation in the diastolic pressure and a 30 - 40 mm. Hg. variation in the systolic pressure, at separate times during an examination. This is presumably caused by excitement and apprehension of the patient. I regard as abnormal, a blood pressure taken in a resting position which is constantly 160/100 mms. of Hg. or higher. I take the diastolic pressure to be the level at which the sounds disappear.

I have found that with different techniques, I can get

get different blood pressure readings in the same person. The pressure varies of course with posture. It is also varied with the number of times the cuff is inflated, as the more often the reading is taken, the more anxious and apprehensive the patient becomes. The size of the arm may also be important. It is said, than an obese arm can give a reading 15 mms. higher than it should be. Reduction in weight and therefore in arm girth is usually accompanied by a fall in blood pressure. It has occurred to me to doubt whether this fall in blood pressure is real, or whether it is associated with the reduction in arm girth.

As a result of these observations I feel that the height of the blood pressure is not necessarily directly related to the severity and therefore to the prognosis of the disease. I place little reliance on a single blood pressure reading. The significance of the readings should be assessed in broad perspective.

3. CLINICAL SIGNS.

These are the effects which the raised blood pressure is having on the various organs of the body. From the general practitioner's point of view, the signs which he can look for can conveniently be put into three groups. These are the effect the raised blood pressure has on the heart, the fundi of the eyes and the kidneys.

In established hypertension the heart is usually found to be enlarged. The enlargement is due to either hypertrophy alone, or to hypertrophy plus the dilatation of failure. The impulse at the apex is found to be further out and down than is normal.

The retinal picture is very important and finally decides the category of the hypertension.

The renal findings are very useful. My own approach to this aspect of the problem is to look for the presence of albumin, casts, cells or bacteria. The culture of a mid-stream specimen of urine is useful, both in male and female. I very rarely resort to catheterisation in general practice. I do not think it is really necessary if the mid-stream specimen is properly collected. Next, a properly conducted specific gravity test and an estimation of the blood urea are done. I consider that these tests are quite sufficient, since they will show whether there is any renal failure, or whether the patient has a chronic pyelonephritis. A blood urea level of above 100 mgs. per 100 ml. suggests a high degree of renal failure.

The retinal grading along with the efficiency of the heart and kidneys are therefore the important factors in determining whether treatment is necessary, and if it is, what kind of treatment would be best.

4. FURTHER EXAMINATIONS AND TESTS.

Further more detailed examinations may be necessary. The two most important are intravenous pyelography and electrocardiographic examination. It is at this point that the family doctor requires to seek the assistance of his hospital colleagues. It is my opinion therefore, that the family doctor can take the investigation, and assessment of the severity of hypertension a considerable distance, up to the point of these detailed investigations.

(d) HOSPITAL HELP AND CO-OPERATION.

A most important help to the general practitioner is access to good laboratory facilities. This makes a great difference to his ability to diagnose, assess the severity of, and treat the condition.

In my own area, the general practitioners are very fortunate in having this facility. In many areas, it is unaccountably denied them.

It may be necessary to refer the patient to a hospital specialist. In my own experience the two main reasons for seeking the opinion of a colleague in hospital are:-

1. The investigation of the young person with hypertension and
2. When the patient's hypertension is of such a serious degree

degree that ganglion blocking drugs are thought to be necessary.

In my own opinion, it is only very rarely and for compelling reasons that these drugs should be commenced out of hospital. When such an opinion is sought, it has been my experience that the family doctor does get real help from his hospital colleague. The main thing being sought is an opinion. It is of little use to receive a series of biochemical and X-ray reports without a qualifying assessment of their meaning to the particular patient. That they should be accompanied by the opinion of a consultant with regard to treatment goes without saying. Unfortunately it sometimes happens that this assessment and opinion is given not by a consultant, but by one of his junior staff. This is unfortunate for two main reasons. Firstly, the patient is disappointed. He has been told by his family doctor that he is being sent to see a consultant, who may actually be named. When he does not see the person he was expecting to see he feels disappointed and thinks that he has not been considered important enough to be seen by a consultant. He has probably been looking forward with eagerness to the consultation. For him, it is an important matter and a big event in his life. Secondly it is annoying to the family doctor to receive an assessment of his patient from someone who may be much his junior in years and experience. This was not the opinion he was seeking.

In my opinion it is completely wrong that patients referred for a consultant's opinion should not be seen by a consultant. In this respect, if it does occur, the family doctor does not get the real help he is seeking.

Fortunately, in my own area this rarely occurs. It has been my experience that the family doctor does get real help from his consultant colleagues. It is of great advantage for him to know the hospital consultants personally. He can then discuss his cases with them. This state of co-operation is one to be constantly striven for. From the patient's point of view, only good can come out of such a state of affairs.

(e) HOSPITAL RESOURCES AVAILABLE TO FAMILY DOCTOR.

The resources available to the family doctor vary from area to area. As I have said, access to a good laboratory greatly helps. To be able to interpret the findings obtained in a sensible and useful way is, of course, essential. It is in matters such as these, that to be able to discuss a case fully with a consultant colleague is of such great value.

I feel strongly that it is very important that the family doctor should have access to, and be encouraged to use, the laboratory facilities of his local hospital.

(f) RESULTS OF TREATMENT AND PROGNOSIS.

Widespread evidence exists that modern medical treatment greatly improves the prognosis of patients with hypertension. However, the treatment often imposes a strain on the patient, and side effects may be troublesome. This particularly applies to the ganglion-blocking drugs. Symptoms due to postural hypotension are common, and constipation can be troublesome. The hypertensive patient who needs treatment, will as a rule, tolerate these side effects; it is however, undesirable to impose them unnecessarily.

From the family doctor's point of view, with regard to treatment, the important thing is that he is responsible for the day to day management of the patient. He sees the results of treatment in a way that his hospital colleagues never can. By his knowledge of the patient's family background he is able to observe the effect that the patient's improvement or deterioration is having upon the family circle. It is the family doctor's responsibility to advise the patient with regard to his work. He has also to treat the patient for any intercurrent illnesses, and this may require temporary modification of the hypertensive treatment. Almost invariably it is the family doctor who treats the patient in the terminal phase of his illness.

Fortunately, the necessity to treat hypertension with

with ganglion-blocking drugs is, in my experience, rare. Out of ninety six hypertensive patients I have treated, only three required treatment with these drugs. Two have died. One was a middle-aged lady who had a malignant hypertension following eclampsia. The other was a young man who had malignant hypertension secondary to bilateral polycystic kidneys. I have no doubt in my mind that the treatment of hypertension in suitable cases is both necessary and justifiable. It reduces and sometimes abolishes the patient's symptoms. It therefore makes his home a happier place. It often enables the patient to continue at his work and allows him or her to continue as an active member of the community. It enables a housewife to continue to be busy and active in her own home.

In patients with malignant hypertension the outlook seems poor in spite of treatment. Degenerative changes in vital organs, particularly the kidneys, means there is little or no hope of reversing the process.

From my own experience there are four main factors which influence the prognosis.

These are:-

- (a) Sex - the male sex has a much worse prognosis.
- (b) Family history - a family history of hypertension gives a worse prognosis.

(c) High diastolic blood pressure is a bad sign.

(d) The state of the retinae is highly important.

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REPORT ON HYPERTENSION IN GENERAL PRACTICE.(A) EXTENT OF THE PROBLEM.

Hypertension is a common cause of premature death. It is now one of the major diseases in civilised countries such as the United Kingdom and the United States of America. In the United States of America it has been estimated that directly or indirectly, one fifth of all deaths are due to the condition. Improved diagnostic techniques and longer expectancy of life, presumably account for part of the high incidence of this condition to-day.

The extent of the problem and the prevalence of the disease can be judged from the figures abstracted from my own practice. In my practice of 4,600 patients there are at present 96 who merit the diagnosis of hypertension. Of these 28 are men and 68 are women. This may not seem a large number but compared with other important medical conditions which require continuing supervision and treatment, it is comparatively high. In my own practice the number of diagnosed diabetics is 17 and the cases of pernicious anaemia number 10.

Patients suffering from hypertension require regular and careful supervision. If they are on drug treatment, their supervision becomes even more exacting. The extent of the problem

problem facing the general practitioner can therefore be big.

When a chart is made of the patients in my practice who have been diagnosed as suffering from hypertension in the past six years, the following is obtained:-

<u>AGE WHEN DIAGNOSIS WAS MADE.</u>	<u>MALE.</u>	<u>FEMALE.</u>	<u>TOTAL.</u>
21 to 30 years	3	4	7
31 " 40 "	1	3	4
41 " 50 "	2	7	9
51 " 60 "	13	22	35
61 " 70 "	8	25	33
71+	<u>1</u>	<u>7</u>	<u>8</u>
<u>TOTAL</u>	<u>28</u>	<u>68</u>	<u>96</u>

These figures lend confirmation to two suppositions that all family doctors are inclined to have. Firstly, there are more women than men suffering from hypertension at any given age group. Secondly, it is a disease which mainly affects the older age groups.

(B) MANIFESTATION OF HYPERTENSION AS SEEN BY A GENERAL PRACTITIONER.

Headache, giddiness, angina of effort and a variety of ill-defined complaints such as restlessness and irritability are the symptoms most commonly associated with hypertension. Sometimes

Sometimes it is difficult to decide whether the symptoms are directly attributable to hypertension or whether they are due to cerebral atheroma or psycho-neurosis. They cannot be solely related to the height of the blood pressure. A high blood pressure is often found in patients who are apparently in good health and have no complaints. A multitude of symptoms can be obtained from someone whose blood pressure is not much raised.

In those cases where the symptoms are attributable to the hypertension, I have found that the response, to treatment which lowers the blood pressure, is very satisfactory. In patients with malignant hypertension in particular, headache may be very severe and develop before the patient is aware that he has hypertension. The response to treatment in these patients, as regards relief of symptoms, can often be very gratifying.

However, because of the difficulty in analysing them, I have found that subjective manifestations can really have no precise bearing on the severity of the condition or in assessing the results of treatment. Their real value lies in prompting the practitioner to take the patient's blood pressure.

Amongst my own patients I have found that there are certain symptoms which do occur frequently and which lead me to take the patient's blood pressure. From the patients studied over the

the past six years I have found the following incidence of presenting symptoms. The three most common are, headache, giddiness, angina and breathlessness on effort.

	<u>MALE.</u>	<u>FEMALE.</u>	<u>TOTAL.</u>
Headache	4	21	25
Giddiness	6	10	16
Angina & breathlessness	15	12	27

I have found that the other three ways in which hypertension was most commonly found are:-

1. Ante-natal care.

2. Accidental finding at an insurance examination.

3. Sudden onset of serious illness in someone who was not previously complaining. Such illness is usually a cerebral disaster or sudden heart illness. Seven of my cases presented this way. There were three men, one with a myocardial infarction, one with cardiac asthma and the other with a hemiparesis. There were four women, one with cardiac asthma and three with a haemiplegia.

(C) CAUSES OF HYPERTENSION OTHER THAN IDIOPATHIC.

It has to be decided whether the hypertension is essential or secondary to some other cause. The prognosis in essential hypertension is related more to the effect of hypertension on

on vital organs than to the height of the blood pressure itself. I think that unrecognised mild chronic pyelonephritis in women is probably more common than is realised. The original infection almost certainly occurs in pregnancy. Hypertension presumably ensues in a number of these women and probably accounts for the considerable percentage of women in middle age who have hypertension. It is my practice to treat cases of pyelonephritis in pregnancy energetically and carefully. Apart from this group, the largest number of patients who cannot be classified as essential hypertension, is undoubtedly the group in which hypertension is associated with other symptoms and signs of pre-eclamptic toxæmia. The cause of this illness is still obscure. Other causes are rarer and in my own practice I have found only one. He was a patient who suffered from bilateral cystic disease of the kidneys.

(D) RECOGNITION OF THE ESTABLISHED DISEASE PROCESS.

For practical purposes, a blood pressure which is constantly above 160/100 mms. of mercury I regard as abnormal at any age. This, of course, does not imply that it is of serious significance, and that treatment is required. Nor does it imply that the patient should be told of the finding. A blood pressure

pressure of 160/100 is unlikely by itself to cause symptoms, or to be associated with objective evidence of hypertensive disease.

Whether hypertension is significant, can often be decided only after a period of observation.

A rise in the systolic blood pressure without a corresponding rise in the diastolic pressure may occur with anxiety, aortic incompetence or thyrotoxicosis. However, it is most frequently attributable to atherosclerosis decreasing the elasticity of the aorta and its main branches. As a rule, systolic hypertension does not require treatment with potent hypotensive drugs. In fact it is likely that the lowering of the blood pressure in a patient with atherosclerosis makes him liable to cerebral thrombosis. The diastolic pressure is far more important and it is with it that the prognosis and treatment are mainly concerned.

Because of the difficulty in analysing subjective manifestations, they are not a satisfactory criterion on which to base the diagnosis of the established disease process of hypertension. The disease process is recognised by a careful examination of the various systems of the body.

Repeated examination of the blood pressure may show that slight hypertension, found under the excitement and apprehension of an initial medical examination, readily disappears. On the

the other hand, persistence of the diastolic pressure at levels of 100 mms. Hb. or more, merits further investigation, particularly in young patients. The full examination of these patients may require facilities which are not usually available to the family doctor. It has to be decided whether the hypertension is essential or secondary to some cause. If essential hypertension is the correct diagnosis, then a search for the complications of hypertension is important, because of their bearing on prognosis and the need for treatment. The prognosis in essential hypertension is related more to the effect of hypertension on vital functions than to the height of the blood pressure itself. These effects help to establish the diagnosis of the disease process and in turn influence the decision to which grade a particular case belongs to.

The recognition of the established disease process therefore does not depend only upon the finding that the patient has a high blood pressure. Evidence of hypertensive disease in other organs must be sought.

1. As regards the heart, whether there is left ventricular hypertrophy, left ventricular failure, congestive heart failure or associated ischaemic heart disease.
2. As regards the retina, whether there is papilloedema, haemorrhages, exudates or arteriolar changes.
3. As regards the kidneys, whether there is evidence of renal

renal disease, of impaired renal function or of renal failure.

4. As regards the brain, whether there has been a major vascular accident or recurrent minor strokes or mental changes.

Changes occur in the blood vessels of all people right through life. This takes the form of a sclerosis of the vessels. This shows as a hardening and narrowing of the vessels. Changes occur in hypertension, and the result depends upon what stage of involutionary sclerosis the person's blood vessels are at. This has a direct bearing on the classification of the disease.

I classify the disease into three groups:-

1. Late in life the arterial tree shows well marked involutionary sclerosis. The blood vessels' reaction to hypertension is therefore very small. The arterial tree is well protected. This constitutes what I call the benign group.
2. In middle age the arterial tree is not so well protected, and changes occur more frequently in other organs. This constitutes what I call the severe benign group.
3. Early in life, the vessels are virtually unsclerosed. The vessels therefore show greater changes, and these changes can be seen well in the fundi. This is the group of

of malignant hypertension.

In the mild benign group there are sometimes no symptoms at all. Symptoms such as morning headache and vertigo are usually slight. Individual blood pressure readings vary considerably of course, but readings between 150/100 and 200/120 might be expected. There might be some slight arterial narrowing in the retina. Renal function should be normal. This mild benign type is often regarded as needing either no treatment at all, or only general measures such as rest and mild sedation.

In the severe benign group a patient would experience symptoms such as fatigue, headache, dyspnoea and renal impairment, of sufficient severity to cause real discomfort. The retinal vessels would show definite sclerosis and possibly exudates, cotton wool patches or haemorrhages. Definite retinitis would be in evidence. Renal function would probably be impaired with some evidence of proteinuria and haematuria. The blood pressure readings would be in the region of 180/110 to 230/140. Patients in this group often show a most gratifying response to treatment.

Malignant hypertension often runs its course in a comparatively short time. Sometimes in a matter of a few months only. It is rarely longer than two or three years. It is associated with severe headache, weakness, loss of weight, dyspnoea

dyspnoea and confusion. Blood pressures in the region of 240/130 to 300/180 may be recorded. The retinae will show papilloedema and renal function will deteriorate progressively. Drastic treatment is called for.

It is customary to grade the retinal changes according to severity, as follows:-

Grade 1. General narrowing of the arterioles with varying calibre and increased light reflex.

Grade 2. Further reduction in the arterio-venous ratio and constriction of the veins where they are crossed by the arterioles.

Grade 3. The appearance of exudates and haemorrhages.

Grade 4. The appearance of papilloedema.

Broadly speaking, grades 1 and 2 are found in the patient suffering from mild benign hypertension; grade 3 in the severe benign case and grade 4 in the malignant hypertension.

(E) TREATMENT.

1. DISCUSSION OF TREATMENT.

An important principle in the care of patients with hypertension is to assess as accurately as possible the severity of the disability and to adapt treatment accordingly. It can be as important not to treat or not to over-treat, when symptoms and signs are trivial, as it is to employ an intensive routine when the condition is severe.

It has to be decided whether the hypertension is essential or secondary to some other cause. If the hypertension is secondary to some other cause, it is necessary of course, to deal with this cause if possible. If essential hypertension is the correct diagnosis, then a search for the complications of hypertension is important. This is because of their bearing on prognosis and on the need for treatment. Therefore the condition of the heart, kidneys, ocular fundi and brain is particularly important. If function is significantly impaired then measures to lower the blood pressure are necessary.

The patient's safety depends upon the state of his arteriolar walls. To gauge his vascular state and decide on the appropriate treatment, if any, information of the greatest importance is obtained by direct inspection of the retinae. Simple studies of renal concentrating power, heart size, electrocardiographic examination of the heart, and the height of the blood pressure itself, are valuable aids in the assessment of the severity of the arterial disease. They are however, secondary to examination of the fundi.

Consideration however, must be given to the efficiency of the heart and kidneys. Either of these, after taking the brunt of the elevated pressure for years, may begin gradually to show signs of failure, or even suddenly fail. Left ventricular failure,

failure, particularly in an acute form is sometimes the way in which the patient's condition is brought to the notice of his family doctor. Increasing breathlessness on effort is a very common symptom of the patient when he is first seen. Among my ninety six patients studied over the past six years, twenty seven have complained initially of disabling breathlessness on effort, and two actually presented as cardiac asthma. Cardiac asthma is an urgent indication for treatment.

There is also little doubt of the importance of albuminuria in a person suffering from hypertension. The appearance of albuminuria, like retinopathy, has an ominous significance. These two distinct phenomena have a remarkably similar clinical meaning. They are not necessarily associated with excessively high blood pressure. Occasionally uraemia has been known to appear without the development of retinitis.

The interpretation of electrocardiographic abnormality appears to be more difficult. Leishman (1951) suggested that "strain pattern" changes appeared in the electrocardiogram whenever the relationship between the ventricular muscle bulk and coronary artery blood was disturbed. He noted that there did **not** seem to be any close relationship between this finding and the severity of the hypertensive state.

The retinal grade, and the efficiency of the heart and

and kidneys, are therefore the basic factors in determining suitable treatment. An account must also be taken of the age of the patient. More vigorous treatment is required and is justified, in younger patients than in the elderly, whose arteries show well marked involutinal sclerosis. Degenerative changes in vital organs may be so advanced that therapy is useless. This applies particularly to the state of the kidneys. If renal function is impaired there is little or no hope of reversing the process. Hypotensive drugs aggravate uraemia. A sudden fall in the blood pressure of elderly people may prove upsetting to them and occasionally has proved fatal.

These considerations lead me to the conclusion that patients are best selected for treatment on the basis of their vascular state as it affects the fundi, and the heart and kidneys. This is preferable to basing treatment on casual blood pressure readings. The blood pressure can vary from day to day, if not from hour to hour, but the changes in the vessel walls and the effects they produce are constant. In the hypertensive patient, the state of the walls of his arteries and arterioles is more important than the height of his blood pressure.

The family doctor, who has access to good laboratory facilities, can therefore make this selection. The age and sex of the patient are the first facts to consider.

Then a study of the patient's back-ground and his family history is done. The family doctor is best placed to do this. Repeated readings of the blood pressure are necessary. The patient is less likely to be excited and apprehensive in the presence of his family doctor than in the presence of a strange doctor. I then examine the patient's heart to see if there is any enlargement. I then examine the fundi. I then examine the urine for albumin and the specific gravity. A specimen is then sent to the laboratory for examination for casts and cells; a centrifuged specimen is really necessary for this. Simple renal function tests can be done if necessary, such as the renal concentration and the renal dilution tests.

Some patients have a significantly high diastolic pressure but no evidence of functional impairment of the heart, kidneys and fundi are seen. Some authorities advise treatment for these patients as a measure to prevent the appearance of damage to organs. Others are of the opinion that the condition may remain unchanged for years and hesitate to start treatment. I am inclined to the opinion that if they have persistent symptoms such as headache or dizziness and are showing symptoms of anxiety they are better treated with a mild sedative. Certainly, if these patients are not treated, they must still be carefully watched for the appearance of impairment of organs.

Symptomless, uncomplicated hypertension is a difficult problem. The statistics provided by life assurance companies (Dublin et al 1949) and Bechgaard's (1946) follow-up study of over 1000 patients with hypertension have shown clearly that life expectancy diminishes with even small rises in the blood pressure and that the excess mortality is due mainly to cardiovascular and renal disease. From such data it has been argued (Stewart 1947) that hypotensive therapy should be given to symptomless patients. However, other authorities suggest that treatment of such hypertension will not necessarily improve the prognosis.

A rise in the systolic pressure with a normal diastolic pressure is a finding I note to be common in elderly people. I find the prognosis to be good, presumably due to the blood vessels being well involuted. The effect on other organs appears to be very small. These patients rarely require treatment and then only with mild sedation.

To summarise the above observations, I think that the following three groups of patients should be treated.

1. All patients showing hypertensive retinopathy; that is grade 3 and grade 4 changes.
2. Those patients who have had attacks of left ventricular failure or angina, or who have had transient cerebro-

cerebro-vascular episodes. These patients may not necessarily have hypertensive retinopathy.

3. Those patients who are seriously disabled by symptoms such as breathlessness or headache, associated with a persistently high diastolic pressure.

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(E) 2. WHAT DOES ONE HOPE TO ATTAIN BY TREATMENT.

There is as yet no actual evidence that in patients whose only abnormality is a moderately raised blood pressure, treatment will prevent complications in later life. Because of the long course of benign essential hypertension such evidence cannot in any case be available for many years. It is obvious from observations of my own patients over the past six years, that in many such patients the blood pressures varies little, if at all, from year to year. In a few it can actually decrease.

However widespread evidence exists that modern medical treatment greatly improves the prognosis of those patients whose prognosis would be poor. In those patients whose condition requires treatment with powerful hypotensive drugs, perseverance with the treatment can impose quite a burden on the patient because of the troublesome side effects. While these are burdens which the patient who really requires treatment can well tolerate, it is obviously undesirable to impose them unnecessarily.

A.W.D. Leishman (1959) studied 211 patients with diastolic pressures initially more than 100 ms. Hg. over a period of about thirteen years, or until their death. They were not given any treatment. One half (106) of these patients died. This represented 66% of the men and 39% of the women, a further

further indication of the resilience of the female sex in this condition. Also with the exception of 14 of these patients, all died before they were 60 years old.

By suitable treatment it is hoped to alter this depressing picture, particularly for the male sex, who have a depressingly high mortality rate.

Hypotensive drugs are now well established in the treatment of arterial hypertension. In the malignant type, their value has been clearly demonstrated (Morrison 1953; Harington and Rosenheim 1954; McMichael and Murphy 1955; Smirk 1957).

More recently two important papers have described the results of treatment in malignant hypertension. Firstly, Dustan, Scheckloth, Corcoran and Page (1958) reported on the course of 84 patients who had been under treatment with potent hypotensive drugs. 33% survived for 5 years and 26% for 6 years. These figures are a substantial gain over previous figures for untreated cases. Renal failure was an important cause of death. Cerebral haemorrhage was the most common atherosclerotic complication and was associated with poor control of the blood pressure. The most favourable outcome was found in patients who received treatment before there was extensive vascular changes. The second report was from Harington, Kincaid-Smith and McMichael (1959) who reported on an improved expectation of life

life in 82 patients with malignant hypertension. This improvement was by a factor of 6 - 8 times compared with previously reported untreated series.

Benefits of treatment were most pronounced in retinitis and in heart failure. Improvement in the electrocardiogram was seen in one third of the cases, but reduction in the cardiac size occurred less frequently. Renal function was not influenced and patients with neurological complications did not derive much benefit from treatment.

One of my main hopes in treatment is to allay the patient's apprehension and fear. By their manner, attitude and personality, some doctors are able to accomplish more than others for their patients. It is important for the doctor to establish a bond of trust with the patient, and to re-assure and encourage him. It should be explained to him that serious complications are not common, and that the condition can be comparatively benign. It should also be explained that suitable treatment is available when it is required. A great deal can be attained by this initial approach to the patient's illness, and it can also make the subsequent use of appropriate drugs easier.

It is important not to be misled by the blood pressure readings. I never comment much on isolated readings. The level of the mercury seldom co-relates with the patient's state of health. However, I feel that it is important to take the patient's blood pressure at each visit. He expects it to be done and I am sure that the simple taking of the

the blood pressure has some therapeutic effect. It symbolises to the patient continuing interest in his condition on the part of the doctor. The patient cares little about the state of his retinal vessels or the efficiency of his kidneys. He is, however, intensely interested in the height of his blood pressure. This is the crux of the problem to him. I do not think that taking a patient's blood pressure at regular intervals makes him more anxious. On the contrary, I find him more re-assured and satisfied, when it is recorded.

Occasionally, I find it necessary to try and re-organise a patient's life. By doing this, I hope to attain better health for him. A routine of life which includes long hours of sleep, a short mid-day rest, quiet week-ends and good holidays, is much to be desired. Even in the severest cases of hypertension, the blood pressure will temporarily fall during sleep. Therefore it is important to make sure that the patient gets adequate rest during the night; if necessary with the help of sedatives. For the burden which is being thrown on the cardiovascular system to be relieved even for a few hours is of great benefit.

The benefits of treatment seem to be more pronounced on retinitis and heart failure. The most florid vascular lesions of the young patient with malignant hypertension regress to a

a state comparable to that seen in elderly subjects (Kincaid-Smith MacMichael and Murphy 1958).

Harrington (1959) reported on a series of 83 patients with malignant hypertension treated with ganglion-blocking drugs during the period 1951 to 1958. The results in this group were compared with a control series previously reported from the same hospital in which they were working. The expectation of life of the treated patients was increased by a factor of six to eight times that of the control series. Prolonged survival was particularly seen in those patients whose renal function was normal or only slightly impaired at the start of the treatment. Death was most frequently due to uraemia. Heart failure, as a cause of death, was considerably reduced in the treated group. The benefits of treatment were again most pronounced on retinitis and on heart failure. Improvement in the electrocardiogram was seen in a third of the cases. Reduction in the size of the heart occurred less frequently. Renal function tended to remain stationary or to improve slightly in those patients with an initial blood urea level below 80 mgs. per 100 mls. where renal impairment was more severe than this, progressive deterioration was the rule. Patients with neurological complications did not derive much benefit from treatment. Accompanying atherosclerosis

atherosclerosis was a limiting factor in the success of treatment, particularly in older patients.

Leishman(1959) compared the progress of 211 untreated patients with 73 patients treated by lumbo-dorsal sympathectomy and 118 patients treated with ganglion-blocking drugs. These cases were regularly followed from 1946. Half of the untreated cases died, and a study of these cases confirmed that high diastolic pressure, male sex, and the presence of albuminuria or retinopathy, were particularly unfavourable features. Changes in the electrocardiogram did not appear to influence prognosis. Except in malignant hypertension, the mortality rate among treated patients was never higher than one third of the untreated cases.

These reports suggest that life can be extended and health improved by suitable treatment in selected patients.

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(E) 3. THERAPEUTIC AGENTS AVAILABLE & MODE OF ACTION.

In the treatment of hypertensive vascular disease, a great variety of effective remedies are now available. There are now so many, that a great deal of care is required in deciding which one to use for any given patient. They range from simple remedies to powerful drugs which are difficult to control. Occasionally, a surgical operation may be indicated, which may be either palliative or with a view to cure. Treatment varies from patient to patient, and must always be adapted to the requirements of the individual. The dose of the chosen drug must be under review at regular intervals. No single remedy is uniformly successful.

When hypertension is due to an adrenal tumour or bilateral adrenal hyperplasia, removal of the tumour or sub-total adrenalectomy is usually indicated and is often curative. Hypertension which is associated with renal disease seemingly confined to one kidney, may or may not be abolished by nephrectomy or the reparative procedures for renal artery stenosis. Residual hypertension after these surgical procedures may be due to residual renal disease caused by the previous hypertension. Fortunately, increasing use of differential renal function tests will probably make for greater accuracy in selecting patients likely to benefit from operation.

Co-arctation of the aorta is amenable to excision followed

followed by end to end anastomosis or insertion of a natural graft or artificial prosthesis. The optimum age for operation is between 10 and 20 years, and although patients of 40 years have been operated upon successfully, some surgeons regard 35 years as the extreme upper age limit for surgical repair (Flavell 1957).

Since the powerful hypotensive drugs have become available, the operation of lumbo-dorsal sympathectomy has been used less and less in the treatment of hypertension. Very occasionally the operation may be indicated in young patients suffering from severe hypertension who have either not responded to hypotensive drugs, or for one reason or another, are unable to tolerate treatment with any of them. In certain hands it has been a most successful treatment. Leishman (1959) had a satisfactory fall in blood pressure in 80% of the patients who underwent this operation. This good result was attributed to extensive dorsal denervation.

The rarity of such operations nowadays is shown by the fact that in my own practice, none of my cases of hypertension have had a cause which could be remedied or palliated by surgery.

The medical management of hypertension has always presented difficult problems. These have been complicated rather than simplified by the introduction of the new potent drugs. These substances can have serious side effects which can interfere with

with their successful use. Fortunately, the vast majority of patients suffering from hypertension require only mild sedation. In my own practice out of ninety six patients requiring medical treatment for hypertension seventy have required mild sedation only. My personal choice is for phenobarbitone alone, or phenobarbitone and theobromine. This therapy, combined with adequate rest and relaxation, and the reduction of weight where advisable, is usually sufficient. This applies particularly to the elderly of both sexes and to the majority of middle-aged women who require treatment.

When further treatment is thought necessary, but the reduction in blood pressure required is not great, then treatment with a chlorothiazide or flumethiazide derivative or a rauwolfia preparation, is necessary. Sometimes, a combination of both drugs may be required.

RESERPINE. Many reports have claimed that reserpine, the active alkaloid of rauwolfia serpentina, is a great help in the treatment of hypertension. In laboratory animals and in man, reserpine lowers the blood pressure, slows the heart rate, increases the intestinal movements, constricts the pupil, and exerts a sedative action on the central nervous system. In therapeutic amounts reserpine lacks significant peripheral action.

action. The effects of reserpine observed clinically, after systemic administration of therapeutic amounts, are due to activities within the central nervous system.

The fall in blood pressure is due to lowering of the peripheral resistance by vasodilatation. The cardiac output does not fall significantly. The central origin of this hypotensive action is confirmed by the observations that reserpine abolishes pressor reflexes, the pathways of which traverse the central nervous system.

An interesting property of reserpine, is the interval before the onset of its action. Even after intravenous administration there is an interval of one hour or more before the onset of its actions which are long-lasting. It is very insoluble, and the delay probably represents the time required for an adequate concentration to reach the receptors. The smaller the dose, the longer is the latent period. This characteristic delay is evident in the organ bath, where the action of reserpine persists after the fluid containing the drug has been washed out. These findings re-inforce the view that the drug has an intracellular site of action. Another, though less likely explanation of the delay in action, is that it represents the time required for a metabolic transformation.

The central sedative action of reserpine is not the cause

cause of its effect in lowering the blood pressure. However, this central action is a useful adjunct, and reserpine has been used in the treatment of mental disease. On the other hand, it can cause mental complications, notably depression in hypertensive patients. The side effects noted during reserpine treatment include nasal stuffiness, flushing of the skin, headache, diarrhoea, muscle pain and rigidity and mental depression. Amongst my own patients, nasal stuffiness was complained of in nearly all taking the drug and mental depression gradually became a serious problem.

When I first started to use reserpine for the treatment of hypertension, I used it in doses of 0.5 mg. to 1 mg. daily. The results as regards fall in the blood pressure were certainly good. As time went by, it became obvious that many of the patients being treated, were showing mild depression. Even when the dose of the drug was lowered to 0.25 mgs. daily this persisted. Then two patients became quite severely depressed and the drug had to be stopped. I latterly used the drug only in doses of 0.25 to 0.5 mg. daily and even with this dose, many patients showed depression. I have now virtually ceased to use the drug.

It is claimed that other alkaloids of raulwolfia retain the hypotensive properties of reserpine but have fewer side effects. In clinical practice however, the results both with rescinnamine

rescinnamine and deserpedine have been disappointing. (Fife et al, 1960., Cranston et al., 1960). Two recent reports on methoserpidine are more encouraging (G.P. Trial 1961; Holt 1961) and this drug may prove to be better than reserpine. I had the privilege of taking part in this G.P. trial.

CHLOROTHIAZIDE. was synthesised by Navello and Sprague (1957) It is a non-mercurial diuretic agent which has greatly simplified the treatment of many hypertensive patients. Its hypotensive effect is not completely understood, but it is partly dependent upon its powerful diuretic and saluretic actions. The principle action of the drug is to cause marked increase in the excretion of sodium chloride and water. This causes a considerable electrolyte and water diuresis. Potassium excretion is also increased, but to a lesser extent than that of sodium and chloride. There may be some increase in bicarbonate excretion initially.

Chlorothiazide diminishes re-absorption of sodium chloride by the renal tubules, and the resulting increase in electrolyte excretion is accompanied by an increase in urine volume. The onset of action is usually within two hours, following oral administration, with the maximum effect at about four hours.

It is now established that chlorothiazide has an important place in the treatment of hypertension whether or not there is associated cardiac failure and oedema. The first reports

reports describing the effectiveness of the drug in the treatment of hypertension appeared in late 1957 and early 1958. It may be possible to control hypertension with chlorothiazide alone, or with the addition of a sedative such as phenobarbitone, or mild hypotensive agent such as reserpine. The drug enhances the effect of ganglion-blocking agents, with the result that a much lower dose of these drugs may be required, thus reducing their side effects. Its use also allows more latitude in salt intake, and severely salt restricted diets are not necessary.

The effect of the drug seems to be, in part, determined by the severity of the hypertensive disease. Finnerty et al (1959) found it to be ineffective in eleven patients with severe hypertension, and in twelve out of thirty patients with moderately severe hypertension.

Chlorothiazide has a potentiating effect on the action of ganglion-blocking drugs. A reduction in plasma volume is thought to be the main factor leading to the increased sensitivity to ganglion-blocking drugs. It may sometimes even lead to postural hypotension. This was corroborated by the work of O'Donnell (cited by Smirk, 1957.) He showed that in patients on strict dietary sodium restriction, postural hypotension was closely related to a reduction in the plasma volume and he found that

that the postural fall in pressure could be abolished by infusion of salt-free dextran. O'Donnell observed also that the increased postural sensitivity to ganglion-blocking drugs in patients on a salt-free diet correlated with a diminution in plasma volume, and he confirmed a report of Freiss et al (1951) that the extent of the postural fall in blood pressure after the taking of hexamethonium was greatly increased by small venesections.

Patients taking chlorothiazide continuously may require small daily supplements of potassium chloride, particularly where severe cardiac or renal disease co-exists. The action of digitalis may be enhanced. Occasionally chlorothiazide causes nausea and vomiting, but hydrochlorothiazide does so less often (Smirk et al.1960).

The results of recent trials (Fife et al., 1960, Smirk et al 1960 and Juel-Jensen and Pears 1960) indicate that a satisfactory fall in blood pressure can be obtained in about one third of hypertensive patients taking oral diuretics alone.

I have found drugs of the chlorothiazide and flumethiazide groups to be of great value in the treatment of hypertension. I have used them on their own in the severe benign group of hypertensives and also for the treatment of the hypertension and oedema associated with pre-eclamptic toxæmia. I have found no side effects of any consequence.

GANGLION-BLOCKING and ADRENERGIC-BLOCKING DRUGS.

If neither reserpine nor chlorothiazide alone proves capable of reducing the blood pressure then they can be given together. If this treatment fails, one of the more powerful hypotensive drugs will be necessary. The controversy on the treatment of hypertension has not disappeared with the introduction of drugs which solely block adrenergic fibres. Kitchin et al (1961) state that "drugs with a selective action on the sympathetic nervous system are not yet established as the best method of lowering the blood pressure, and interest in new ganglion-blocking agents continues". There are, however, big advantages to patients, of drugs which do not block the autonomic ganglia, and which produce their hypotensive effects solely by their action on adrenergic fibres.

A variety of ganglion-blocking drugs are now available. Hexamethonium was the first to be used, but is now no longer used because of its side effects. Methonium compounds act by blocking the transmission of both sympathetic and parasympathetic impulses through autonomic ganglia. The sympathetic effect is dominant and this causes a release of neurogenic vasoconstriction tone. When given by mouth, varying absorption can occur and this can result in dangerous postural hypotension and even on occasion can cause paralytic ileus. Other ganglion-blocking drugs at present

present available are pentolinium ("Ansolysen"), chlorisondamine ("Ecolid"), mecamylamine ("Inversine") and pempidine ("Percloysin").

The two most often used are mecamylamine and pempidine. A recent small clinical trial by Sinclair (1961) indicates that there is little difference between these two drugs. Both are effective hypotensive agents but blood pressure control is not easy with either of them and side effects are common and troublesome. The most serious side effects can be caused by the drug blocking the parasympathetic as well as hypothetic ganglia.

Two adrenergic-blocking drugs are available, bretylium ("Darenthin") and guanethamide ("Ismelin").

For long-term treatment, adrenergic-blocking drugs are to be preferred, mainly because their side effects are less disturbing. However there is still a place for parenteral preparations of ganglion-blocking drugs in the emergency treatment of such hypertensive crises as acute pulmonary oedema or cerebral encephalopathy (Bauer et al, 1961). Of the two adrenergic-blocking drugs, bretylium and guanethidine, recent reports (Bauer et al, 1961., Lancet (1961) 1, 91., Blanshard et al. 1961.) favour guanethidine. Compared with bretylium, it is longer acting, its absorption is more complete and predictable, and drug tolerance is much less of a problem, so that usually fewer tablets need to be taken. (Evanson and Sears 1966, Dollary, Emslie-Smith and Milne

Milne 1960, Bauer et al. 1961)

With guanethidine, as with all the powerful hypotensive drugs, hypotensive symptoms, such as giddiness, and nausea are fairly common. They are most liable to occur when a patient gets up suddenly from a sitting or a lying down position.

They may also appear during exertion, or when the action of the drug is potentiated by hot weather, excessive sweating, diarrhoea and in other conditions which tend to cause sodium depletion (Bauer et al. 1961). These symptoms may be reduced by rising from the reclining to the erect position slowly, by avoiding sudden exertion - particularly during hot weather, and by prompt treatment of disorders liable to cause sodium loss.

A form of hypotension said to be peculiar to guanethidine treatment (Bauer et al. 1961) is confined to the early morning and characterised by marked fatigue, lack of energy, and muscle weakness. It appears to be uninfluenced by any measures other than a reduction in the dose of the drug, which may not always be compatible with satisfactory treatment.

Other side effects of guanethidine which have been reported include myalgia, nasal stuffiness, soreness of the eyes, parotid pain, mental depression and diarrhoea. The drug is also reported to cause fluid retention, an added reason for giving

giving the drug in combination with Chlorothiazide, especially when heart failure is associated with the hypertension.

I have had recourse to use the more powerful hypotensive drugs on three occasions only. One was with a man in the malignant phase of his hypertension, which was secondary to bilateral polycystic disease of the kidneys. Another was in a woman in the malignant phase also, the hypertension being secondary to severe eclampsia. The third was a woman with severe benign hypertension whose symptoms were severely disabling. From a general practitioner's point of view, the place these drugs have in the treatment of hypertension is small. They are required very rarely. The vast majority of hypertensive patients never require to receive such therapy.

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(F) PROGNOSIS.

The prognosis in essential hypertension is related more to the effect of hypertension on vital organs, than to the height of the blood pressure itself. If the function of the heart and kidneys in particular, is significantly impaired, then the prognosis is not so good. Because the prognosis is influenced by many factors, consequently the effects of blood pressure reduction are dissimilar in individual patients.

G.A. Perera (1955) found in 500 patients with hypertension that the average age at onset was 32 years and at death 52 years. The common cause of death was cardiac failure. Once papilloedema developed, the outlook was poor. McMahon found that more hypertensives with papilloedema had progressive renal deterioration and were dead within a year.

Leishman (1959) described the progress of 211 untreated patients with hypertension, regularly followed since 1946. He compared them with the progress of 73 patients treated by lumbo-dorsal sympathectomy and 118 patients treated with ganglion-blocking drugs. Half of the untreated cases died. The number of deaths in the treated cases was only one third of the untreated cases.

Many other doctors have reported improved prognosis with the

the use of ganglion-blocking drugs, either by themselves or in combination with other drugs, such as serpasil. These reports include those of Smith (1957) Dustan et al (1958) Kincaid-Smith, McMichael and Murphy (1958).

The most convincing evidence of benefit is to be seen in the regression of pathological changes in the renal arteries and arterioles. Even the most severe vascular changes seen in the young patient can improve, (Kincaid-Smith, McMichael and Murphy 1958).

Harrington et al (1959) reported on a series of 83 patients where hypertension was severe enough to justify the use of ganglion-blocking drugs, during the period 1951/58. The results observed were compared with a control series previously reported. The expectation of life of the treated patients was increased by a factor of 6 to 8 times that expected from the control series. Prolonged survival was particularly seen in those patients where renal function was normal or only slightly impaired at the start of treatment. Death was most frequently due to uraemia. Heart failure as a cause of death was considerably diminished in the treated group.

The two clinical factors I have found to give an unfavourable prognosis are, male sex and high diastolic blood pressure. Females outnumber males approximately two to one in those cases I have studied. In spite of this, there have been six female deaths

deaths and eight male deaths during the period of time the cases have been studied. Ten deaths were due to cardio-vascular disease, three were due to cerebral thrombosis and one was due to renal failure. There have been no cases of death due to congestive cardiac failure; this is accordance with many recent reports.

Fifteen of my patients have had cardio-vascular or cerebral accidents and survived. These have been eight males, and seven females. This again emphasises the relatively poor prognosis of the male sex. The vast majority of females have no complications from their hypertension. Uncomplicated hypertension in the female has a good prognosis.

The success of treatment is dependent to a large degree upon the patient's intelligence and his willingness and ability to co-operate. The treatment can be difficult and occasionally unpleasant. The evidence, however, suggests that it is worth it. (Hodge et al. 1961).

The prognosis in hypertension, as a result of modern understanding and treatment, is now much better in terms of improved health and the extension of a useful busy life.

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SUMMARY and CONCLUSIONS.

Hypertensive disease has been recognised for many centuries. References to the heart and the consequences of high blood pressure are to be found in many ancient writings.

The incidence of the condition has probably increased. There is a relatively high incidence of the condition in relation to other important diseases, such as diabetes mellitus and pernicious anaemia. This is demonstrated by the incidence of these diseases in my own practice.

The family doctor is well placed to study the condition. He sees the patient first and is able to observe the early signs and symptoms of the illness. It is usually he who is first aware of the complications of the illness and it is almost certainly he who supervises the medical and nursing care of the patient in the terminal phases of the illness. Management of the patient suffering from hypertension involves not only drug treatment but many other factors. These factors are discussed.

In this thesis, a description is given of the ways in which a family doctor encounters hypertension, and the various factors which influence the disease. Diagnostic methods are discussed with particular reference to the resources available to the family doctor. The results of treatment as seen by the family doctor are

are described.

The extent of the problem with reference to one general practice is described. In this practice of 4,600 people, there were ninety six patients who merited the diagnosis of hypertension. The manifestations of the condition seen in this practice are described. Cases other than idiopathic encountered in this practice are described, thereby illustrating the rarity of these cases. The recognition of the established disease process is discussed and the grades which are recognised are described.

The treatment of the condition is discussed from the point of view of the family doctor. It is shown, by reference to my own practice, that the treatment is nearly always along simple lines. It is only rarely that the powerful ganglion-blocking drugs are required. It is also shown that the prognosis, particularly in women is good.

Hypertension is no more a disease entity than a skin rash, a fever or anaemia. It is a measurable manifestation of an illness which has widespread effects on the body. The factors which influence the disease are numerous, and these factors may undergo qualitative and quantitative change at various stages, even in the same patient. The family doctor is uniquely placed to study this complex but interesting illness.

SIX TYPICAL CASES.CASE 1. MR. ROBERT SNEDDON. Aged 33.

Five years ago, this young man was found to have hypertension while undergoing a medical examination for life insurance. His blood pressure was estimated at regular intervals over the subsequent few months. It was found to range between 165/115 mms. Hg. and 200/140 mms. Hg. He was completely free of symptoms.

His family history was interesting. His father died at the age of 45 years from a myocardial infarction. His mother was known to suffer from essential hypertension.

His general condition was satisfactory. The cardiac rhythm was regular. The apex impulse was normal and the heart sounds were of good quality with no murmurs. The heart was not clinically enlarged. The arterial pulses in the legs were present. The fundi were normal and the urine contained no sugar or albumen.

He was referred to hospital for further investigation. X-ray of his heart and lungs were normal. The ECG showed no abnormality apart from early left ventricular hypertrophy. An I.V.P. was normal.

There seemed no doubt that this young man had essential hypertension. No treatment was thought to be necessary. However, he has been seen at regular intervals at my own consulting rooms and at the cardiology department of the hospital he is attending.

His blood pressure remains high, but he remains well and has no symptoms. He continues to lead an active, busy life, with no restrictions on his activities. There are no signs of cardiac failure. His fundi now show grade 1 changes. No hypertensive therapy is thought to be required yet. There is little doubt, however, that the future is fraught with uncertainty and that he will eventually require hypotensive therapy. He is an intelligent and sensible young man with a University education, and has been given a complete insight into his condition. He is grateful for this and for the interest and care which is being taken of him. He is not emotionally disturbed by his regular physical examinations.

CASE 2. MRS HELEN SNEDDON. Aged 65 years.

This lady was the mother of case 1. Twelve years ago she suffered from a series of epistaxes. She was found to have hypertension, the average reading being around 200/100 mms.Hg. There was no relevant recent past history. There were no medical notes of her pregnancy, so it was not known whether she had pyelitis or hypertension at that time. The urine did not contain albumen or sugar. The retinae showed grade 1 changes only.

She was advised to restrict her activities but no drug treatment was thought to be necessary. She remained well, apart

apart from occasional attacks of slight giddiness until one year ago, when she had a further series of epistaxes. Her blood pressure was around 240/100. She tended to become breathless on moderate exertion. There were no signs of cardiac failure and the heart sounds were of normal rhythm with no murmurs. The fundi showed evidence of grade 2 changes.

This lady was not greatly upset by her symptoms. She led an active life within the restrictions indicated to her. Her blood pressure remained high, but she herself felt well. Her only treatment was with theobromine and phenobarbitone. Unfortunately she took a severe pneumonia. During her convalescence she had a myocardial infarction and died.

Case 3. MRS ELIZABETH HARVEY. Aged 62.

In 1951, at the age of fifty six years, this lady was found to have hypertension. It was discovered while she was being examined for a possible thyrotoxicosis. She had no symptoms suggestive of hypertension and there was no relevant past history. The blood pressure was around 260/130. She subsequently required no active treatment for her thyroid gland. No treatment was thought to be necessary for her high blood pressure. There was no evidence of renal disease and the fundi showed only grade 1 changes.

It was not till four years later that she began to have headaches and slight breathlessness on effort. I commenced her on serpasil and this caused a satisfactory improvement in her symptoms along with a slight fall in her blood pressure. The blood pressure fell to around 200/100 mms.Hg. She actually continued on this drug for six years before it had to be stopped because of slight depression.

Since then, treatment has been with theobromine and phenobarbitone with a barbiturate sedative at night. She continues to be quite well. Her fundi show the beginnings of grade 2 changes. The heart is slightly enlarged but is in sinus rhythm and there are no murmurs. The urine is free from albumen.

This woman is not greatly incapacitated by her high blood pressure. She leads a full active life, within the limitations of exercise suggested to her. I do not think she requires any other drug treatment, and I see no reason why she should not continue to keep reasonably well in spite of her hypertension.

This patient illustrates the remarkable tolerance which women have to high blood pressure. She is representative of a considerable number of such female patients who have this condition.

Case 4. MRS MARGARET HILL. Aged 58.

This lady was seen eight months ago with the complaints of headache, dyspnoea and a choking sensation on exertion. Her symptoms had been present, in gradually increasing severity for the past three years.

She had a past history of pyelitis of pregnancy. Her father had died from a cerebral haemorrhage.

Examination revealed her blood pressure to be around 230/110. The urine was free of albumen and the fundi showed grade 1 changes, The heart was clinically slightly enlarged. It was in sinus rhythm with no murmurs. There was no evidence of heart failure.

As her symptoms seemed to be causing her some distress, I commenced her on bendrofluazide with supplementary potassium.

The result has been very gratifying. Her symptoms have diminished considerably and her blood pressure is now around 180/90. She feels much better and I intend to keep her on her present treatment. The prognosis in this lady's case is almost certainly very good.

Case 5. MR. MALCOLM FRASER.

Eight years ago this patient began to have dizziness, headaches and pain in his chest. He did not seek medical advice

advice for one year until he suddenly lost the power of his right hand and right leg. He slowly recovered from this over a period of several weeks.

Examination at this time revealed his blood pressure to be around 230/120 mms. Hg. His fundi showed grade 2 changes. The urine contained considerable amounts of albumen. The ECG was normal. Both kidneys were palpable and were eventually found to be polycystic. At that time his blood urea was 55 mgs% and the urea clearance test was 90% of normal. Treatment with hexamethonium compound was attempted in hospital, with little effect.

He actually married about this time and he continued to work at his fairly heavy job in a local iron foundry. By doing so he was able to obtain a house owned by the foundry.

He continued in this way for three years, but by then his symptoms had become much worse. He had shown remarkable adaptability to his illness. He had been rarely absent from his work and had maintained his wife and child in their home. His occupancy of his house depended on his continuing to work in the foundry and this he was now finding to be beyond even his courage and fortitude.

This state of affairs posed a difficult problem and therefore the help of the Social Medical Department of the local infirmary was sought. He was successfully placed in a lighter occupation

occupation and a new house was obtained for him from the local authority. This undoubtedly helped to prolong his life.

At this time treatment was commenced with rauwolfia and mecamylamine. These drugs did not lower his blood pressure but seemed to alleviate his distressing symptoms.

During the following year his eyesight began to deteriorate and he began to have quite severe angina of effort. In May of 1960 he had a myocardial infarction. He made a protracted recovery from this and he was no longer able to work because of severe angina of effort. His wife sought employment and he looked after the house and the child. In October of that same year he had a second and fatal myocardial infarction.

The story of Mr. Fraser's illness describes the many aspects of the problem of treatment. Treatment does not only involve the use of drugs in an attempt to lower the blood pressure. The patient must be assisted to maintain a reasonable working life as long as possible. He must be helped to earn a wage to maintain his home.

The family doctor has to co-operate with his hospital colleagues on drug treatment. He has to co-operate with his colleagues in Social Medicine to enable his patient to obtain suitable work. In the final stages of the illness he needs the

the co-operation of the patient's family and the services of the District Nursing Association. In the end, it is the family doctor who has to accept full responsibility for the treatment of the final stages and to ensure that the victim of the illness dies with dignity and without undue suffering and distress. It is he who has to support the relatives in their time of stress and tribulation.

Case 6. MR. JAMES HENDRY. Aged 58.

Ten years ago this patient developed rheumatoid arthritis. While under treatment for this he was found to have hypertension. At that time the blood pressure was 200/110 mms. Hg. He had no symptoms which might have suggested this possibility. There was no relevant past history. Chest x-ray and blood urea were normal. A sodium amytal sedation test was carried out and this showed no significant deviation from the normal response.

No treatment was considered necessary and he remained free of symptoms. Two years ago he was found to have a peptic ulcer. During this time he remained at his work in an iron foundry. The work was fairly heavy.

However, five months ago, he suddenly started to have cardiac asthma. He would not admit to any increase in breathlessness

breathlessness before this event. His blood pressure was found to be 200/110. The heart was not significantly enlarged and was in sinus rhythm. There was an aortic diastolic murmur. The femoral pulses were present. The E.C.G. showed changes of right bundle branch block. The fundi showed grade 2 retinitis. There was no albumin in the urine.

He was started on bendrofluazide and supplementary potassium. Since he started treatment he has kept well and has had no recurrence of the nocturnal dyspnoea.

In spite of the fact that this man has had a significant increase in the height of his blood pressure for at least ten years, he has kept remarkably free of symptoms until recently. In my experience, it is unusual for a man in his age group who suffers from hypertension not to have some symptoms caused by the raised blood pressure. He is an example how people of his age and sex can live quite happily with a high blood pressure. They can even work at a fairly heavy job.
