Diagnosis and Treatment of Reversible Hypertension*

MODERATOR

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PANEL

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Dr. Winsor: The purpose of this conference is to discuss in detail certain of the problems in the diagnosis and treatment of hypertension due to pheochromocytoma and renal vascular abnormalities. Although the title refers to the diagnosis and treatment of reversible hypertension, time only permits the discussion of these two conditions. Furthermore, our panel is made up of unequivocal experts in the fields of pheochromocytoma and renal vascular hypertension, and for this reason we will focus our attention on these conditions.

The question of the advisability of lowering blood pressure in patients with hypertension can be answered in the affirmative, as it has been clearly shown that both men and women with malignant hypertension, as well as those with moderate (100 to 130 mm. Hg) and marked (131 mm. Hg or more) diastolic hypertension are benefited by ganglionic blocking drugs and sympathectomy. Also, patients with hypertension whose pressures have been lowered by medical means have a lower mortality rate, less cardiac failure, fewer cerebral vascular accidents, a lower blood urea nitrogen and higher glomerular filtration rate and renal plasma flow than do untreated control groups.

It would appear important to make an early diagnosis of pheochromocytoma or renal vascular hypertension because, in the early stages of these conditions, functional vasoconstriction of the arterioles is present, raising the total peripheral resistance, which, if present for a long period, results in organic changes of the vessels, such as intimal thickening and medial hypertrophy of the arterioles. It is probable that arteriolar constriction and increased arteriolar resistance increase the stretch of the smooth muscle of the arterioles, and these react to stretch by arteriolar constriction, thereby producing a progressive disease state.

The first question will be directed to Dr. Grace Roth who has had more experience in the diagnosis and handling of patients with pheochromocytoma than any other investigator to my knowledge. Dr. Roth, what are some of the important tests used to diagnose the presence of a pheochromocytoma?

Dr. Roth: A pheochromocytoma is a tumor of the medullary portion of the adrenal gland that secretes epinephrine or norepinephrine in varied but greater than normal amounts. It produces either sustained hypertension or paroxysmal hypertension frequently associated with bizarre symptoms during the attack, together with hypermetabolism and high blood sugar.

As aids in diagnosis of these tumors, pharmacologic and chemical tests have been introduced. For the pharmacologic tests, histamine and phentolamine hydro-
chloride (Regitine) have been used. Histamine is useful for patients with paroxysmal hypertension because it stimulates discharge of pressor substances from the tumor and produces attacks similar to those occurring spontaneously. For the patient with sustained hypertension, phentolamine hydrochloride is employed because it decreases blood pressure by blocking the pressor effect of epinephrine or norepinephrine if a pheochromocytoma is present.

The chemical tests consist of the determination of plasma catecholamines by the method of Weil-Malherbe and Bone and the measurement of urinary catecholamines by the method of von Euler and Flobing as modified by Sobel and Henry.

Dr. Winsor: Would you explain to us, in precise detail, the routine method which you employ in diagnosing a pheochromocytoma?

Dr. Roth: First, the pharmacologic tests. To carry out these tests correctly, certain prerequisites are necessary. The first is a reliable basal blood pressure. With the patient lying comfortably, repeated blood pressure determinations are noted for at least half an hour to obtain the correct basal value.

Before either the histamine or the Regitine test is carried out, the cold pressor test is performed. This test is done by first obtaining a good basal blood pressure while the patient is supine, then immersing one of the patient's hands, well above the wrist, in a pail 12 inches high containing water of 4°C., for one minute and measuring the blood pressure on the opposite arm at 15, 30 and 60 seconds during the immersion. The highest blood pressure during this painful stimulus indicates the lability of the blood pressure. This test is an integral part of the histamine test, since the response of the blood pressure two minutes after the intravenous injection of histamine must be compared to the rise obtained during the cold pressor test.

After the cold pressor test, when the blood pressure has returned to basal levels in the patient who has paroxysmal hypertension and a basal blood pressure of less than 170/110 mm. Hg, 0.05 mg. of histamine base in 0.5 ml. of normal saline solution in a tuberculin syringe is injected intravenously. The needle is left in the vein, the empty syringe is removed immediately, and a syringe containing 5 mg. of Regitine is attached for immediate administration if the blood pressure becomes alarmingly high.

Blood pressure is determined every 30 seconds for the next two minutes. It always decreases 30 seconds after the injection of histamine, or the histamine has not entered the vein. Immediately thereafter, the blood pressure increases rapidly and usually is maximum in two minutes. If a pheochromocytoma is present, the characteristic clinical signs and symptoms of a severe attack appear concomitantly with the increase in blood pressure which goes to well above the cold pressor level. Regitine, 5 mg., is injected two minutes after the histamine or before, if the rise in blood pressure makes it necessary.

Within one minute after the injection of Regitine, the clinical signs and symptoms of a severe attack will disappear and the blood pressure will decrease if a pheochromocytoma is present.

For the patient with sustained hypertension (a basal blood pressure of more than 170/110 mm. Hg), 5 mg. of Regitine is administered intravenously, not intramuscularly. If a pheochromocytoma is present, the blood pressure should decrease at least 35/25 mm. of Hg in the first three or four minutes after injection and then should return to the previous basal level in 10 to 15 minutes. Regitine will cause a decrease in the blood pressure of some particularly apprehensive patients during the first one or two minutes after injection in the absence of pheochromocytoma, but in the next minute the blood pressure returns toward the basal level and the test is considered negative for such tumors.
Dr. Winsor: What degree of accuracy do you believe you achieve with these techniques?

Dr. Roth: In carrying out these tests, great accuracy can be obtained if the following difficulties are considered: (1) reliable basal blood pressure is absolutely necessary; (2) the blood pressure should be recorded at 30 second intervals, as the timing is very precise in these tests; (3) a difference in the blood pressure of the two arms may be present in 10 per cent of normal individuals and in a higher percentage in patients with hypertension. To eliminate this source of error, the blood pressure is measured routinely in both arms. If any disparity is found, determinations are made simultaneously in both arms during the pharmacologic tests; (4) the most important difficulty is previous medication. Before any of these tests, administration of any sedatives or narcotics should be prohibited for at least 48 hours, and possible self-medication should be checked, or the pharmacologic tests may yield false positive results. In patients with paroxysmal hypertension, sedatives inhibit the rise of blood pressure during the cold pressor test. As a result, the increase of blood pressure during the histamine test may be greater than that during the cold pressor test, and thus may suggest the presence of a tumor that does not exist.

In patients with sustained hypertension, sedatives and tranquilizers may cause a fall in blood pressure typical of that produced by pheochromocytoma following the intravenous administration of Regitine, and this would be a false positive result.

On the other hand, various antihypertensive drugs may produce false negative results. Since most of these drugs act longer than sedatives, the difficulties are even greater. These drugs should be discontinued for eight to ten days before the test is carried out. Therefore, the ideal time to do the pharmacologic test is before any antihypertensive drugs are given. Disregard of these factors produces the inaccuracies of the pharmacologic tests.

As for the chemical tests, blood collected when the tumor is not secreting will contain small or normal amounts of epi-nephrine and norepinephrine in the plasma. However, if the blood is obtained before and at the maximal increase of blood pressure during a histamine test, the pressor amines are greatly increased in a patient with pheochromocytoma. Therefore, normal blood pressure and normal plasma pressor amines before histamine may give a false negative result. Certain conditions such as azotemia, jaundice and lymphoblastoma produce fluorescent substances other than pressor amines and may be measured in the blood and urine as such. There are drugs such as chlorpromazine (Thorazine) and tetracycline that cause the appearance of fluorescent substances other than pressor amines in the blood, and when reserpine is first administered, there may be increased amounts of pressor amines excreted particularly in the urine. An annoying side reaction to reserpine is nasal stuffiness. Many vasoconstrictors are used locally for this difficulty and also for vasomotor rhinitis and asthma. These substances produce high levels of catecholamines in the blood and increased amounts in the urine. Such increases have been interpreted as due to pheochromocytoma. After these drugs were discontinued, the chemical tests were negative. Therefore, previous medication is the greatest factor in the accuracy of these tests.

Dr. Winsor: Do you believe that all patients with an elevated blood pressure should be tested with these methods?

Dr. Roth: If the patient has a strong family history of hypertension and has had hypertension for a long period of time, unless there is a change in the symptoms with short, severe headaches, tachycardia and sensation of apprehension, these tests probably should not be carried out. However, if there is any question at all, these tests are simple and it would be better to do the tests. A young person, particularly with a recent history of hypertension, most likely should be subjected to the tests.
Dr. Winsor: Do you operate on all patients with pheochromocytoma? If not, what medical treatment may be employed?

Dr. Roth: Surgical removal of the pheochromocytoma is the most efficacious treatment for this tumor. The use of drugs would be only temporary, as there would be no inhibition of the growth of this tumor.

Dr. Winsor: What medical treatment and precautions do you suggest when operating on patients with pheochromocytoma?

Dr. Roth: Before operation, many active tumors are stimulated by the fall in blood pressure after the hypodermic administration of as little as 50 mg. of meperidine hydrochloride (Demerol) and 200 grains of phenobarbital (Luminal). Alarming high blood pressures may ensue that can be counteracted by an intravenous injection of Regitine, which should be at hand. With the induction of anesthesia, the blood pressure may rise again to excessive heights. It is the sudden rapid fall in the blood pressure which stimulates the tumor to secrete increased amounts of epinephrine and norepinephrine. During the operation the blood pressures are taken at minute intervals and Regitine is given when needed, in order that the level of blood pressure may be safe for the surgical procedure being performed. Whenever the tumor is stimulated by manipulation, the blood pressure may rise and Regitine may be necessary. When the tumor is removed, a sudden fall in the blood pressure takes place. It is wise to wait a few minutes before proceeding with the operation to determine whether the blood pressure will rise again. The fall of blood pressure after removal of the tumor may stimulate secretion from another tumor, if one is present, and this will increase the blood pressure. We have looked for and found additional tumors because of such observation. If the fall in blood pressure is maintained for several minutes, norepinephrine (levarterenol [Levophed]) is administered. The amount of norepinephrine required and the length of time that this substitution therapy is necessary varies from patient to patient. Little or no prediction can be made. It may be necessary to give norepinephrine at intervals from six to 72 hours, and in a couple of instances, none was needed.

Dr. Winsor: Thank you Dr. Roth. Your remarks have been very enlightening. Let us proceed with the discussion and direct our next question to Dr. J. P. Medelman who will give us additional information about diagnosis of curable hypertension. Dr. Medelman, what is the procedure of choice for the diagnosis of renal artery occlusive disease in patients with hypertension?

Dr. Medelman: When you come right down to it—in answer to such a direct question—one method stands out for visualization of the renal arteries. The percutaneous femoral aortogram is the method of choice in the type of cases we are discussing. There are three procedures applicable to this problem and the method to be used depends somewhat on the interests and experience of the roentgenologist doing the examinations. He must use his best judgment in regard to the particular patient concerned and also according to the facilities at hand.

Translumbar aortography may be satisfactory. However, the position of the needle is critical in relation to the renal circulation with a possible resultant misleading examination. In cases in which there is an absent unilateral femoral pulse, this method is preferable because insertion of a percutaneous catheter may be unsuccessful.

Intravenous aortography has a place, but for study of renal circulation there are the disadvantages of rather dilute contrast and unsatisfactory visualization of small vessels.

The percutaneous femoral method of renal aortography has several advantages. The proper level for injection is easily determined fluoroscopically. If done correctly from a technical point of view, it is quite safe as no more and frequently less contrast material need be used than for intra-
venous pyelography. A test injection may be done in percutaneous femoral aortography though this could conceivably be a disadvantage because of "flooding" the kidneys, rendering nephro-opacification less accurate. Streaming is avoided by this method. It provides for selective renal aortography if such is desired after viewing the results of the routine original injection.

Dr. Winsor: Are there alternative procedures for diagnosing renal artery occlusive disease?

Dr. Medelman: I have mentioned the three direct approaches but there are others. For instance, in a hypothetic case of a 25-year-old man with a blood pressure of 195/120 mm. Hg, in which it seems that renal hypertension is a possibility, there are preliminary and alternative things that may be done.

Plain films are of value. A disparity of as little as 1 cm. in kidney size may be significant, particularly if the transverse diameter of one is smaller.

Excretion urograms should be done. Unilaterally small pelvis, small calyces and the so-called "spastic" appearance are important. In about one third of such cases the affected kidney density becomes greater during the examination than on the normal side because of the greater reabsorption of water as the glomerulofiltrate passes down the nephron. Perhaps earlier films (taken within seconds after rapid injection of the contrast material) would be helpful in showing diminished opacification on the affected side because of diminished blood flow.

Nephrotomograms may be done, but in the hands of an experienced roentgenologist they are usually no more helpful than excretion urograms.

Tagged sodium iohiopurpurate (Hippuran) is of doubtful importance in diagnosis of this condition. Facilities for its proper utilization are limited and the accuracy of the method seems to be in dispute.

From the roentgenologist's point of view, the Howard test (selective volume and sodium determinations) and its modifications are physiologically interesting and no more than that. The procedures are complicated and expensive. My prejudice may stem from observing oliguria develop after such a test done on a patient in a St. Paul hospital two or three years ago.

Dr. Winsor: What lesions may one expect to demonstrate by renal aortography?

Dr. Medelman: Usually these are classified as intrinsic and extrinsic lesions. The intrinsic lesions include arteriosclerotic changes such as plaques and thromboses; fibromuscular subintimal hyperplasia which is relatively distal to the aorta and more prevalent in females than males; and the rare causes such as emboli, thromboangiitis, lues, and vascular abnormalities (cirrhotic angioma of the renal artery). The extrinsic lesions are aneurysm of the renal artery, scar tissue from any cause compressing the renal artery and the rare causes such as thrombosis of the aorta compressing the renal artery.

Dr. Winsor: Is there often other obliterative disease in patients with renal artery occlusive lesions?

Dr. Medelman: It seems that about one-third of these patients have bilateral renal disease and about one-half have arteriosclerotic changes in the aorta or iliac vessels. Sometimes these other lesions may be corrected concomitantly at surgery. We think that one can look forward to about 80 per cent cure or marked improvement in those patients shown to have renal hypertension of the type under discussion.

Although this is distinctly out of my field, we believe that bilateral renal biopsy material should be taken at surgery. The histology of the kidney with the narrowed artery may be normal because it has been masked from the hypertension while the opposite kidney may show severe hypertensive changes. If artery repair results in failure, subsequent nephrectomy on the opposite side may be expected to bring about success. We have seen this happen twice.

In conclusion of my part of the discussion, I should like to point out that the roentgenologist must realize the potential...
value of his examinations, that he should not describe function in general terms, and that he should be familiar with the clinical problem involved when doing renal examinations of any kind.

**Dr. Winsor:** Thank you Dr. Medelman. You have given us some very pertinent data which will be most helpful. Our next discussant will be Dr. John Moyer who will give us the benefit of his experience as an internist in the handling of patients with curable hypertension. Dr. Moyer, what types of renal disease produce hypertension, and which of these types would you consider curable?

**Dr. Moyer:** Nearly any type of primary renal disease can be associated with blood pressure elevation of variable grades of severity. However, the most common of these are glomerulonephritis, pyelonephritis, and renal arterial occlusive disease. I think that the most severe elevation in blood pressure is associated with vascular occlusive disease. Usually the degree of blood pressure elevation is not very severe in patients with pyelonephritis and chronic glomerulonephritis until the disease is very advanced and a major portion of the functioning renal mass has been destroyed. The causes of renal vascular occlusive diseases are outlined in Table 1.

**Dr. Winsor:** What diagnostic procedures do you use to differentiate the curable from the incurable types of renal hypertension?

**Dr. Moyer:** In brief, a complete kidney evaluation. The only way that the physician can be sure of the validity of his recommendations is to evaluate the kidneys individually and together from a functional as well as an anatomic point of view. This includes the routine laboratory tests, such as microscopic and routine urinalysis, in addition to a urine concentration test. When there is a suspicion of acute or chronic infection, cultures of the urine should always be done and the organism should be identified if present. When anatomic defects, particularly of the lower urinary tract, are expected, the patient should be cystoscoped. This should also be done when unilateral renal disease is expected. At this time the urologist may wish to do retrograde pyelograms and urinary function tests for each individual kidney, depending on the circumstances. It would be at this time that electrolyte excretion and urine concentration tests for each kidney would be done. Frankly, I avoid ureteral catheterization as a routine procedure because of the high incidence of subsequent upper urinary tract infection.

An intravenous pyelogram is always helpful as a screening procedure, but more often than not this is not definitive and aortography is indicated. Visualization of the aorta and the renal arterial system is by far the most important diagnostic test for differentiating surgically curable renal disease from noncurable disease, and particularly in differentiating the degree of renal involvement in the individual kidneys. This is particularly the case in patients who have obstructive disease of the renal artery.

**Dr. Winsor:** How successful do you believe the surgical treatment of renal artery occlusive disease is for the therapy of renal hypertension?

**Dr. Moyer:** I do not think that the results in the treatment of renal artery oc-
clusive disease are nearly as good as the original reports of some of the vascular surgeons would have us think. In the first place, atherosclerosis, which is the basic disease in most of the patients, is a generalized disease, so that these patients not only have atherosclerosis of the renal arteries, but the coronary arteries and the cerebral vessels are involved as well. As a result, many of the patients may die of a coronary artery occlusion or a cerebrovascular accident. Correcting the renal vascular lesion has little effect on the prognosis of these patients. By the same token, about 40 per cent of the patients with renal vascular atherosclerosis have bilateral disease, indicating that even in the renal arteries the lesion is not localized in nearly half of the patients. Under these circumstances, it is quite obvious that it won't be long until additional occlusive areas develop, even though the area of more advanced lesions was originally corrected.

In studying case histories and developing the chronologic order of development of the lesions in these patients, it is becoming increasingly evident that a significant number, if not the majority, of these patients have hypertension of long standing and that the vascular lesion was merely an associated finding in a patient with essential hypertension. Albeit, the development of the atherosclerotic lesion was probably hastened by the hypertensive process. It is quite obvious that correction of the vascular lesion, even though this complication has aggravated the degree of blood pressure elevation, will not cure the hypertension.

This then brings us to the smaller group of patients who truly have hypertension developing de novo from localized vascular occlusive disease of the renal arteries. Under these circumstances, and when the hypertension is of relatively recent origin, i.e., under three years, and when the lesion is well-localized, then if the vascular reconstructive surgery is done well, the hypertension should be cured in nearly all of the patients, that is to say 80 per cent or more.

**Dr. Winsor:** Would you outline the medical methods which you consider of significance in treating patients with renal hypertension?

**Dr. Moyer:** In its broadest sense, the answer to this question would be a medical treatise in itself. Consequently, I should exclude glomerulonephritis and diffuse pyelonephritis and thus confine my remarks primarily to unilateral renal disease and renal vascular occlusive disease.

The therapy of renal hypertension must be directed at the underlying pathology whenever possible. Removal of a unilateral pyelonephritis kidney, utilization of a bypass graft or endarterectomy for renal artery stenosis, and nephrectomy in cases of renal neoplasm may partially or completely control the accompanying diastolic hypertension. Likewise, antibiotic control may return blood pressure elevation toward normal in instances of active pyelonephritis.

Where specific therapy is not available, or when the blood pressure does not return to normal with specific therapy, adequate control of the blood pressure elevation may reduce or arrest the accompanying vascular deterioration. Drug regimens applied to the patient with essential hypertension may be effectively utilized in the renal hypertensive as well. In these instances, the blood urea nitrogen serves as a useful guide to define the lowest blood pressure limits compatible with glomerular function. When evidence of rising blood urea nitrogen is observed, the pressure should be allowed to increase slowly by decreasing the dose of the hypotensive agent until the BUN again decreases to pretreatment levels.

An effective program of drug therapy is to start the patient on 500 mg. of chlorothiazide (Diuril) twice a day, or 25 mg. of hydrochlorothiazide (Hydriul or Esidrix) given twice a day. Numerous thiazide derivatives are available and all seem to be equally effective. When the blood pressure is not reduced adequately, rauwolfia (Rauwiloid) may be tried after one week in addition to the chlorothiazide, starting with a dose of 8 mg. (4 tablets) a day. After
two weeks, the dose of rauwolfia is reduced to 4 mg. per day. This regimen is then continued for approximately one month in mild to moderately severe disease to test for maximum responsiveness. In addition to the antihypertensive effect of rauwolfia, it also decreases the incidence and severity of side effects of hydralazine (Apresoline) in those instances in which the latter compound is added to the therapeutic regimen.

Table 2—Comprehensive Therapeutic Regimen

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<tr>
<th>Initial Therapy</th>
<th>Adjuvant Therapy When Not Adequately Responsive To Initial Therapy</th>
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<tr>
<td>Hydrochlorothiazide*</td>
<td>Rauwolfia</td>
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<tr>
<td>Hydrochlorothiazide* +</td>
<td>Hydralazine and guanethidine</td>
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<tr>
<td>Hydrochlorothiazide*</td>
<td>Hydralazine and guanethidine</td>
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*May use other thiazide or phthalimidine diuretics with equally good results.

A number of side effects and untoward reactions have been encountered with the thiazide diuretics, but the over-all incidence has been low. Nausea, weakness, and fatigue (unrelated to electrolyte imbalance or hypotension) may occur, but it is rarely necessary to discontinue therapy because of these effects. Skin rashes (purpuric, maculopapular, or petechial) have been encountered in a small percentage of patients. Elevation of serum uric acid may also occur, and the appearance of “gouty attacks” generally necessitates discontinuation of these drugs or the co-administration of probenecid (Benemid). In addition, elevation of the blood urea nitrogen may occur in patients with renal failure, and the drug should be administered with great caution in patients with poor renal function, especially when the BUN is already elevated.

The various side effects encountered with the rauwolfia compounds include nasal stuffiness, increased hunger, dizziness, and excessive drowsiness. In addition, one must be particularly alert for the development of an agitated mental depression, the first symptom of which is likely to be insomnia during the early morning hours. The insomnia may be followed by a sense of impending disaster and even suicidal tendencies. The earlier manifestations of this depressive state, including the insomnia, will frequently improve with dextroamphetamine (Dexedrine); however, if the depressive symptoms progress, the drug must be discontinued.

When the response to chlorothiazide and rauwolfia is not adequate, hydralazine (Apresoline) can be added, starting with a dose of 25 mg. after each meal and at bedtime, but the doses should be given at least four hours apart. The dose is increased in 25 mg. increments about once a week until a maximum of 300 mg. per day is given. Significant coronary artery disease is a contraindication to hydralazine, since this compound increases cardiac output much as epinephrine does and thus may precipitate a myocardial infarction. When the patient is not responsive to this drug, it should be discontinued in preference to a more effective drug. Because of the potential side effects, hydralazine should not be continued when it fails to produce the desired therapeutic results. When the hydralazine given in combination with chlorothiazide and rauwolfia is effective in bringing the blood pressure down to normal, then a trial of rauwolfia withdrawal should be tried after the pressure has been normal for six to eight weeks. If the pressure rises again, the rauwolfia should be reinstated.

Hydralazine (Apresoline) should not be used as the sole antihypertensive drug in the treatment of hypertension of renal origin because of its associated side effects. The major untoward effects encountered with hydralazine include headache, palpitations, and increase in anginal symptoms. This is particularly important to remember in patients with hypertension due to renal arterial occlusive disease, since most of them have coronary artery disease as well. The total dosage of hydralazine generally should not exceed 300 mg. per day. The latter recommendation is made because iatrogenic lupus erythematosus sometimes caused by
this drug has generally occurred in patients receiving more than 300 mg. daily, although it has been reported in patients receiving as little as 100 mg. per day.

Guanethidine (Ismelin) is the most promising of the newer antihypertensive agents. The drug possesses a hypotensive potency similar to that of the ganglion blocking compounds, but with a rather unique mechanism of action. The latter consists of an inhibition of the peripheral release of catecholamines from the postganglionic sympathetic fibers. The blood pressure reduction obtained is predominantly a postural one; however, guanethidine produces a significant hypotensive response without the associated side effects due to parasympathetic blockade. The only untoward reaction of consequence is diarrhea, which is usually mild.

The antihypertensive effectiveness of this compound is further enhanced by the concomitant administration of a thiazide derivative. When given in combination with one of the thiazides, the dosage of guanethidine required to obtain a significant response varies from 25 to 150 mg. per day, with an average dosage of 40 to 50 mg. daily. Blood pressure reduction may not occur for 24 to 48 hours following the initiation of oral therapy, but may subsequently persist for four or more days after the drug is stopped. This new antihypertensive agent appears to hold particular promise for those patients with the more severe degrees of diastolic blood pressure elevation and is usually used in place of ganglionic blocking agents.

Dr. Winsor: We are indebted to Dr. Medelman for describing the radiologic methods of choice employed in the diagnosis of renal vascular hypertension, and it appears that the percutaneous femoral method of renal aortography, as he describes, has several advantages over previous methods.

We are indebted to Dr. John Moyer for giving us an internist's point of view for the treatment of renal vascular hypertension and for describing criteria which will aid in better selection of these patients for surgical therapy. Also his outline for the progressive stepladder approach to the medical management of these cases is a significant contribution.

We are indebted to Dr. Roth for the exact working details of the performance of the Regitine, histamine and other pharmacologic tests used in the diagnosis of pheochromocytoma.

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SURGICAL PROBLEMS RAISED BY BRONCHOPULMONARY ASPERGILLOMA

LeBRIGAND and associates present a report on 97 cases of aspergilloma. Hemoptysis remains the most frequent symptom and most severe complication. It occurred in 72 of the 97. Difficulties met in surgery and in the postoperative period are important, but do not militate against operation. From exeresis to pneumotomy, the surgical risk may be reduced in function of the respiratory capacity. The medical management with amphotericin-B will be limited to the inoperable cases strictly. Various products secreted by Aspergillus fumigatus are active antibiotics against Gram-positive and negative bacilli, but less active against acid-alcohol-fast germs. However, they would explain the balance between the bacterial and fungous flora of the sputum. The toxicity of some of these products explains perhaps partly the hemorrhages seen in the cases of aspergilloma.


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ERRATUM

Attention is directed to the misplaced headings of columns 3 and 4 of Table 3 in the article, "Treatment of Mycotic Infections: Hydrocortisone in the Control of Amphotericin-B Toxicity" on page 218 of the February issue of Diseases of the Chest. Column 3 represents the total dosage (mg.) of amphotericin and column 4 represents the total dosage (mg.) of hydrocortisone.

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ANNOUNCEMENT

The Subspecialty Board examinations in Pulmonary Disease will be given in Chicago, June 26, 1962. For information, please address Dr. William A. Werrell, Secretary-Treasurer, American Board of Internal Medicine, 1 West Main Street, Madison 3, Wisconsin.