

Section of Urology

President—A. CLIFFORD MORSON, O.B.E., F.R.C.S.

[October 26, 1933]

The Relationship between Genito-Urinary Hæmorrhage and Diseases of the Vascular System

PRESIDENT'S ADDRESS

By A. CLIFFORD MORSON, O.B.E., F.R.C.S.

ABSTRACT.—The diseases of the vascular system which cause hæmorrhage from the genito-urinary tract are :—

- (1) Those in which changes are noted in the blood and capillary endothelium, and
- (2) Those in which alterations of a pathological nature are taking place in the walls of both large and small blood-vessels, but in which there is no change in the blood itself.

In the first group are the purpuras; in the second arteriosclerosis, hyperpiesis and atheroma.

This paper is confined to a discussion of the latter group of diseases in relation to genito-urinary hæmorrhage.

Little attention has been paid to sudden loss of blood from the kidney, bladder, or genitalia in support of a diagnosis of a vascular lesion, other than angioma. Hæmorrhage in these cases may be purely renal, vesical, or penile.

Investigations consist of examination of the superficial arteries, estimation of the blood-pressure, examination of the blood and cystoscopy. Surgical lesions must be excluded by the usual well-known methods.

A careful record has been kept of fifteen cases of arteriosclerosis in which hæmorrhage from the genito-urinary tract has been the predominant manifestation of the disease. Details are given of nine patients with renal, one with vesical and three with urethral hæmorrhage. Two cases of thrombosis of the penis are also included.

From a study of the literature here the cases of urethral hæmorrhage and thrombosis of the penis, recorded as due to arterial disease, appear to be unique.

RÉSUMÉ.—Les maladies du système vasculaire qui produisent des hémorragies de l'appareil génito-urinaire sont :

- (1) Les maladies où l'on observe des altérations du sang et de l'endothèle capillaire, et
- (2) Celles où des altérations pathologiques ont lieu dans les grands et petits vaisseaux, mais sans affection du sang lui-même.

Le premier groupe contient les purpuras, et le second l'artériosclérose, l'hyperpiëse et l'athérome.

Cet ouvrage ne parle que du second groupe dans ses relations avec les hémorragies génito-urinaires.

On s'est peu occupé des soudaines pertes de sang d'origine rénale, vésicale ou génitale comme soutenant le diagnostic d'une lésion vasculaire en dehors de l'angiome. L'hémorragie dans ces cas peut être purement rénale, vésicale ou pénile.

L'étude de ces cas consiste en l'examen des artères superficielles, la détermination de la pression sanguine, l'examen du sang et la cystoscopie. Les lésions chirurgicales doivent être exclues par les méthodes ordinaires bien connues.

Quinze cas d'artériosclérose chez lesquels les hémorragies de l'appareil génito-urinaire étaient le symptôme prédominant ont été soigneusement rapportés. Détails sur 9 cas d'hémorragie rénale, 1 cas d'hémorragie vésicale et 3 cas d'hémorragie uréthrale. Deux cas de thrombose du pénis sont inclus.

D'après une étude de la littérature sur ce sujet, les cas d'hémorragie uréthrale et de thrombose du pénis, attribués ici à une maladie artérielle, semblent être uniques.

ZUSAMMENFASSUNG.—Die Krankheiten des Gefässsystems, die Blutungen in dem Urogenitaltraktus bedingen, sind :

- (1) Krankheiten in welchen Veränderungen im Blut und in dem Capillarendothel beobachtet werden, und
- (2) Krankheiten in welchen pathologische Veränderungen in den grossen und kleinen Gefässen stattfinden, aber ohne Veränderungen im Blut.

Zu der ersten Gruppe gehören die Purpurakrankheiten, und zur zweiten die Arteriosklerose, die Hyperpiesis und das Atherom.

In dieser Arbeit handelt es sich nur um die zweite Gruppe in ihrer Beziehung zu den urogenitalen Blutungen.

Man hat plötzliche Blutungen aus den Nieren, der Blase und der Genitalien als Unterstützung für die Diagnose von Gefäßlesionen, mit Ausnahme von Angiomen, wenig berücksichtigt. In diesen Fällen kann die Blutung rein renal, vesikal oder penil sein.

Untersuchung der oberflächlichen Arterien, Blutdruckmessung, Blutuntersuchung und Cystoskopie werden als Forschungsmethoden vorgenommen. Chirurgische Läsionen müssen nach den bekannten, üblichen Methoden ausgeschlossen werden.

15 Fälle von Arteriosklerose wurden sorgfältig aufgezeichnet, in denen Urogenitalblutungen die vorherrschende Erscheinung waren. Bericht über 9 Fälle mit renal-, 1 Fall mit vesikal- und 3 Fälle mit urethral-Blutungen. Zwei Fälle von Penisthrombose werden auch mitgeteilt.

Nach Untersuchung der Literatur scheinen die Fälle von Urethralblutung und Penisthrombose, die hier als Folge arterieller Krankheit mitgeteilt sind, ohne gleichen zu sein.

IN the study of the causation of symptoms and signs of disease the urologist must never lose sight of the fact that the genito-urinary apparatus is extremely sensitive to both physiological and pathological changes in other systems. This paper is concerned with the effect of certain diseases of the blood-vessels upon the genital and urinary organs, and when it is appreciated, as often it is not, that, next to the heart, the kidney is the most vascular organ, it will be understood how quickly its function may be disturbed by changes in the blood-vessels. The penis too, as a genital organ, is entirely at the mercy of a normally regulated vascular mechanism for the carrying out of its sexual duties. If confirmation is needed of the intense vascularity of the kidney, the student of urology should take the first opportunity of examining the remarkable specimens which Duncan Morison has collected to demonstrate the anatomy of the renal blood supply.

The diseases of the vascular system which cause hæmorrhage from the genito-urinary tract are:—

- (1) Those in which changes are noted in the blood and the capillary endothelium, and
- (2) Those in which alterations of a pathological nature are taking place in the walls of both large and small blood-vessels, but no changes in the blood itself.

In the first group are the purpuras; in the second, arteriosclerosis, hyperpiesis, and atheroma.

In his Presidential Address to this Section six years ago, Frank Kidd [1] gave an account of purpura of the urinary tract. He recorded twenty-four personal cases, some of which were complicated by hæmorrhage from the bowel and gums, others by painful swellings of joints, and others by attacks of petechiæ or bruising of the skin. Kidd considers that this condition is sometimes due to a peculiar type of streptococcus and accuses the teeth and tonsils of harbouring the organism.

The different forms of purpura are grouped by Tidy [2] under the heading "hæmorrhagic diathesis." This disease is distinguished from other causes of so-called essential hæmaturia by changes in the blood. These changes are diminution in the number of platelets, alteration in the bleeding and coagulation times, and failure of clot retraction. In a few cases enlargement of the spleen is noted. The hæmorrhage is considered to be due to an increased permeability of the capillary endothelium. Apart from hæmaturia, there may be abdominal colic, joint pains, urticaria and petechiæ in the skin. It is not intended to add any further observations to those made by Kidd. This paper will be confined to a discussion of the as yet unexplained hæmorrhages from the genito-urinary tract which by careful observation can be proved to be due to certain diseases of the blood-vessels, namely arteriosclerosis, hyperpiesis and atheroma.

The wise urologist will be he who studies all those diseases in which genito-urinary symptoms often predominate.

C. MacLaurin [3], in his delightful book "*De Mortuis*" tells us that arteriosclerosis, high blood-pressure and chronic Bright's disease—all more or less names for the same thing, or at any rate for cognate disorders—form one of the great tragedies of the world. They attack the very men we can least spare. They are essentially "the diseases of statesmen" and may we also add, of the erudite of the medical profession.

Arteriosclerosis means simply arterial hardening and the term has been applied to a number of pathological arterial conditions. We, as urologists, are not concerned with the purely medical aspect of diseases of the arteries, but it is essential that we recognize their presence in relation to the genito-urinary tract, not only as a primary condition, but also one which may be complicating a surgical lesion.

Bleeding from the nose and rupture of a cerebral vessel have been recognized as indications of arterial disease for a generation or more, but little attention has been paid to sudden loss of blood from the kidney, bladder or genitalia in support of a diagnosis of a vascular lesion, other than angioma. Hæmorrhage in these cases may be purely renal, vesical, or penile. Commonly the hæmaturia occurs but once, particularly if it is coming from the kidney, but it may be so severe as to simulate the bleeding which is met with in growths. Experience has shown that in the case of the bladder and urethra the attacks of bleeding are more frequent, being probably due to the repeated contractions of the bladder and alteration in size of the penis. Thus a greater strain is placed upon individual arteries.

METHODS OF INVESTIGATION

It is unnecessary to stress the importance of excluding, without any shadow of doubt, the presence of a surgical lesion in a case of hæmaturia suspected to be due to arterial disease. Both excretory and instrumental pyelography suffice to give accurate information of anatomical alterations in the kidney, and cystoscopy will produce evidence of the presence or absence of a surgical lesion of the bladder and prostate. Bacteriological examination of the urine is essential to satisfy the urologist that the cause of the hæmorrhage is not infective in origin. Having dismissed the idea of a primary lesion in the genito-urinary tract as the cause of the hæmaturia, it is the duty of the clinician to examine the vascular system. Firstly, the superficial arteries of the body must be palpated for evidence of changes in their walls. Secondly, the blood-pressure must be estimated. Thirdly, there must be a careful examination of the blood. Fourthly, cystoscopy is needed to demonstrate alterations in the arteries of the bladder, and lastly, the urologist will be well advised to seek the aid of the cardiologist in his investigations of pathological changes in the heart and peripheral vessels. The examination of the superficial arteries should be routine whenever the urologist is investigating a case of hæmaturia, or has to come to a decision with regard to the need for an operation. The estimation of the blood-pressure is also a valuable aid to diagnosis, but arteriosclerosis may occur with a blood-pressure within normal limits; therefore a negative finding does not exclude arterial disease as the cause of hæmaturia. Reference has already been made to the changes in the blood in cases of hæmorrhagic diathesis. This examination, as a means of differential diagnosis, is necessary in all cases.

It would seem that the use of the cystoscope in determining whether a patient is suffering from arterial disease has never been stressed. The ophthalmoscope is a valuable aid to diagnosis in many diseases primarily unconnected with the eyes. Likewise cystoscopy often presents the clue to the accurate interpretation of the cause of a genito-urinary symptom due to a nervous or vascular lesion.

When a patient is suffering from arteriosclerosis, definite changes in the vesical blood-vessels can be noted. The arteries beneath the mucous membrane of the bladder stand out more prominently than the normal and are more tortuous. Also there is distinct pallor of the mucous membrane between the vessels. During an

attack of vesical hæmorrhage the bleeding points, surrounded by patches of ecchymosis, are readily distinguished (see coloured plate).

A careful record has been kept of fifteen cases of arteriosclerosis in which hæmorrhage from some part of the genito-urinary tract has been the predominant manifestation of the disease. The number seen during the past fourteen years greatly exceeds 15, but only those will be considered in which the subsequent course of the illness has been investigated. Of this total of 15, there were 9 patients who suffered from renal hæmorrhage, 1 vesical, 3 urethral and 2 developed thrombosis of the penis.

RENAL HÆMORRHAGE

Case I.—Male, aged 52, seen in 1926 on account of severe attack of right renal colic and hæmaturia. Cystoscopy showed blood pouring out of right ureter. The urine drawn off from the left kidney was normal, but the specimen from the right side, apart from containing much blood, showed the presence of hyaline and granular casts. Further investigation was refused by the patient; thus pyelography could not be performed. So severe was the hæmorrhage that the right ureter eventually became blocked with clot.

A tentative diagnosis of growth of the right kidney was made and nephrectomy was recommended. This case was seen in consultation with Sir John Thomson-Walker, who agreed with the diagnosis and insisted on immediate operation.

At operation what appeared to be a normal right kidney was removed, though the pelvis and ureter were filled with clot. Microscopic examination did not reveal any gross changes in the kidney other than thickening of the walls of some of the blood-vessels.

During convalescence the superficial arteries were examined, and found to be also thickened. The Wassermann reaction was markedly positive. The blood-pressure was raised. Active antisymphilitic treatment was carried out. This case therefore proved to be one of arteriosclerosis of syphilitic origin, with involvement of the right kidney.

Letters have been received from this man on each anniversary of his operation. He remains in excellent health.

Case II.—Male, aged 43, seen in 1925, on account of intermittent attacks of hæmaturia over a period of ten months. Marked arteriosclerosis and high blood-pressure. History of syphilis. An instrumental pyelogram showed a filling defect in the pelvis of the right kidney, which at operation proved to be due to a small growth of the squamous-cell type. The mucous membrane of the pelvis showed patches of leucoplakia.

This patient enjoyed good health for four years and then died from uræmia, due to arteriosclerosis of syphilitic origin.

Case III.—A doctor, aged 62, with a history of one attack of hæmaturia. Marked arteriosclerosis. Investigation of the urinary tract did not discover any surgical lesion. Complained of headaches. This patient had cerebral hæmorrhage two years ago which has left him with a left-sided hemiplegia.

Case IV.—A. P., aged 36, admitted to St. Peter's Hospital on account of a severe attack of hæmaturia with pain in the right loin. Complete investigation of urinary tract revealed no cause for the bleeding. Arteriosclerosis present. Right kidney explored and small piece of cortex removed for microscopic examination. Apart from a round-cell infiltration no other changes were recorded by the pathologist. Patient is now 44, has a high blood-pressure and well-marked arteriosclerosis and is old for his years.

Case V.—H. K. M., a youth, aged 19, seen in 1930 on account of painless hæmaturia. No surgical lesion to account for bleeding. Cystoscopy showed blood-vessels very prominent and definitely arteriosclerotic. Radial arteries thickened. Systolic blood-pressure 140. Patient is now under the care of Dr. Simpson of Cambridge who reports another attack of hæmaturia. Systolic blood-pressure 162. Blood urea 31 mgm. %.

Case VI.—Major H., aged 50, seen in 1924 on account of attacks of hæmaturia with pain in left loin. Complete examination of urinary tract. No surgical lesion. Blood-vessels of bladder prominent. Arteriosclerosis. The doctor reports that the patient is in good health and has had no further hæmaturia.

Case VII.—A. W. H., aged 60, seen in 1932, pain in left loin and hæmaturia. Simple enlargement of prostate with residual urine. Headache and loss of concentration. Systolic

PLATE



W. THORNTON SHIELLS.

The appearance of the bladder in a case of vesical hæmorrhage due to arteriosclerosis. Note the bleeding points and prominent arteries. The patient was aged 41, and died from a cerebral hæmorrhage a few months after this drawing was made.

blood-pressure 180. Well-marked atheroma. Suprapubic prostatectomy was performed. During convalescence the patient had two cerebral hæmorrhages from which he recovered.

Case VIII.—Commander N., aged 34, seen in 1933 on account of attacks of renal colic and hæmaturia. Refused full investigation of urinary tract. Intravenous pyelography gave no clue as to cause of symptoms. Superficial arteries thickened and systolic blood-pressure 180. Diagnosis: arteriosclerosis.

Case IX.—Mr. Z., aged 58, seen in 1932 on account of right renal hæmorrhage. Urinary tract fully investigated. Nothing abnormal discovered apart from prominent blood-vessels of the bladder wall, systolic blood-pressure 144. Complains of much headache. Well-marked arteriosclerosis. Doctor reports that there has been no further hæmaturia and that patient remains in fair health.

Comments.—The number of cases is small, but there is sufficient evidence to show that hæmorrhage from the kidney due to arteriosclerosis is a serious phenomenon. It would appear that the disease is slowly progressive. In only two cases was it possible to discover the cause of the arteriosclerosis, which proved to be syphilis.

BLADDER HÆMORRHAGE

Only one case of this type has been closely studied. Another patient from St. Peter's Hospital has failed to answer inquiries.

Case X.—The case which has been followed up was of a man, aged 38, who was admitted to the Whipps Cross Hospital on account of painless hæmaturia. He had well-marked arteriosclerosis and a raised blood-pressure. There were no changes in the blood. Cystoscopy showed prominent blood-vessels and bleeding points (see illustration). No surgical lesion of the kidneys. Patient died of cerebral hæmorrhage a few months after admission to hospital.

URETHRAL HÆMORRHAGE

The bleeding in these cases occurs during coitus and until six years ago was considered to be a good example of "malade imaginaire." A reference to the literature reveals that the three cases now recorded are the first to be described as due to a definite organic lesion. The writer during the period when he was in charge of an out-patient department saw at least half a dozen patients who complained of loss of blood in semen, but they were dismissed after the usual routine examination of the urethra, bladder and genitalia as suffering from anxiety neurosis.

Case XI.—The first case to cause suspicion that the symptoms had an organic basis was that of a man, aged 35, who presented himself for examination, six years ago, because of occasional attacks of hæmorrhage during coitus. He was in an obviously nervous state and it was suggested that possibly the bleeding came from his wife. A note was made that his radial arteries were thickened. It was agreed by the wife that she should be examined. Nothing abnormal was found in the vagina or pelvic organs. In spite of the patient's story there was scepticism as to whether he had not made a mistake in his observations. However twelve months later this man brought his pyjamas stained with blood to the consulting room in order to prove he was not imagining his symptoms. It was then decided to examine carefully the vascular system. All the superficial arteries were clearly sclerotic and the systolic blood-pressure raised. The urine showed evidence of changes in the kidneys, hyaline and granular casts being present. Two years later he died from uræmia.

It is now possible to piece together the sequence of events in the medical history of this patient to show that as a young man he had suffered from arterial disease, that the strain of coitus on occasions caused rupture of a blood-vessel of the urethral mucous membrane, and that the uræmia from which he died was the result of arteriosclerosis.

Case XII.—The second case to be followed up to its termination was that of the editor of a well-known London paper, a man, aged 45, who had a severe hæmorrhage into the prepuce during coitus. It was already known that he was suffering from arterial disease and had a high blood-pressure. He also gave a history of urethral hæmorrhage. This man eventually died from cerebral hæmorrhage, having previously been found unconscious in his office in Fleet Street.

Case XIII.—The third case was that of a man, aged 50, who complained of symptoms closely resembling those of the patient who died of uræmia. Hæmorrhage from the urethra during coitus was at times profuse. He had well-marked arteriosclerosis, a high blood-pressure and evidence of chronic nephritis, the urine containing casts and albumin. This patient is still alive, having been under medical observation for the past eighteen months.

Comments.—These three recorded cases of urethral hæmorrhage are a further example of the danger of strain and excitement to a man suffering from arteriosclerosis. The bleeding can be so severe as to cause considerable anxiety, and distress is a prominent feature. The frænum of the prepuce in all three cases was intact.

THROMBOSIS OF THE PENIS

Though, strictly speaking, these cases differ clinically from hæmorrhages in the genito-urinary tract due to vascular disease, yet they should be included in the discussion because the same causes operate in both.

Thrombosis of the corpora cavernosa is always described as producing in the penis a condition of priapism. This description is entirely erroneous. In priapism the whole organ is enlarged, whereas in thrombosis of the corpora cavernosa the distinguishing feature is the absence of swelling of the glans penis.

There are three diseases which may lead to clotting of the blood in the cavernous spaces of the penis. They are malignant disease of the left kidney, lymphatic leucæmia and arteriosclerosis. It is with the latter only that we are concerned in this paper. These cases, fortunately, would appear to be rare, only two cases having been observed, but a study of the literature reveals that a considerable number have been described in which the cause is stated to be unknown. Probably more accurate observation would have cleared up the mystery.

Case XIV.—The first case to be carefully investigated was that of a man, aged 35, who was admitted to the Whipps Cross Hospital with the whole of the penis, apart from the glans, swollen and hard. The enlargement extended back to the bulb. The history was that the swelling had been of gradual onset, a period of three days having elapsed before it reached its full size. During this time repeated coitus had failed to produce any change in the organ. On admission the patient was in considerable distress and complained of difficulty in micturition. There was no pain. The medical officer believing the condition to be due to a nervous lesion tried the effect of spinal anæsthesia, with a negative result. Leucæmia was then excluded by an examination of the blood. The Wassermann reaction was negative. Marked thickening of all superficial arteries was noted. The systolic blood-pressure was 145. The urine was normal.

In three weeks the penis had resumed its natural size and the patient was then discharged.

It is now over twelve months since this patient was in hospital. Every effort has been made to trace him, but letters remain unanswered.

Case XV.—The second case is of more recent date and is also that of a patient from Whipps Cross Hospital. His age is 45 and he has an exactly similar history to that of the first patient. Again the medical officer thought he was dealing with a nervous lesion and injected stovaine into the spinal theca, with an unsatisfactory result. The patient was obviously suffering from arteriosclerosis, the radial arteries being hard and tortuous. The Wassermann reaction was negative as was also the examination of the blood for leucæmia. The systolic blood-pressure was 130. Urine, normal. The patient discharged himself from hospital one week after admission with no change in the size of the penis. This was at the beginning of July of this year. Three months later in answer to a letter he presented himself for examination. The history was that the penis had become normal in size three weeks to a month after the onset of the swelling. He stated that he was enjoying good health apart from occasional headaches. His systolic blood-pressure was now 140, ten points higher than in July. Definite thickening could be felt along each corpus cavernosum. The patient stated that he was impotent. Sexual desire was strong, but there was no response in the penis, evidence that the nervous mechanism controlling coitus was intact but the vascular system defective.

There is no successful treatment for these cases. Applications of evaporating lotions to the perineum were tried in the first case, but absorption of the clots in the

corpora cavernosa apparently occurs without the need for artificial aid. Incisions into the penis have been advocated. This treatment is an excellent example of a futile surgical procedure which brings the art of surgery into disrepute.

GENERAL CONCLUSIONS

The diagnosis of arteriosclerosis as a cause of genito-urinary hæmorrhage is made, partly by a process of exclusion, but chiefly by accurate observation of the condition of the patient as a whole. Investigation of the urinary passages only in a certain number of cases of hæmaturia will not suffice to reveal the cause, and the urologist should never be satisfied until this is accomplished.

Arteriosclerosis, with or without hyperpiesis, may occur at all ages, and therefore it is more than likely that many of the cases of unexplained hæmaturia in young children are due to a vascular lesion. It is to be regretted that our ignorance of the causes of arteriosclerosis is so profound, and a matter for still further regret that with one exception there is no known cure. This exception is syphilis. Lead, gout, alcohol and a strenuous life are all textbook explanations of the sclerotic changes in the walls of the arteries. No physician can cure gout, nor can he stop a man with a brilliant brain from using it. Hence MacLaurin's term "the diseases of Statesmen."

The discovery of the cause of hæmaturia is of paramount importance, and if the hæmorrhage is coming from the kidney and is so severe as to threaten life the only treatment is nephrectomy.

With so little evidence before us, it would perhaps be unwise to dogmatize as to the successful course which research will pursue in the elucidation of the causation of arteriosclerosis, but one may be permitted to prophesy that one day this will be added to the growing list of deficiency diseases.

I have to acknowledge with thanks the assistance which my friend Mr. C. Hope Carlton has given me in the study of the literature.

REFERENCES

- 1 *Proceedings*, 1928, xxi, 1105 (Sect. Urol., 19); *Lancet*, 1928 (i), 897.
- 2 *Brit. Med. Journ.*, 1930 (ii), 1073.
- 3 MACLAURIN, C., "De Mortuis," 1930.

POSTSCRIPT.—Since this paper was written a further case of arteriosclerosis, with attacks of renal hæmorrhage, has come under observation.

The patient is a boy aged 16, who had his first attack of hæmaturia with pain in the back eighteen months ago. He was examined by a urologist, who made a complete examination of the urinary tract. Nothing abnormal was discovered, and the case was labelled with a diagnosis of unexplained hæmaturia.

A few weeks ago the patient was seized with another attack of renal hæmorrhage, with colicky pains in the right loin. For four months he has suffered from headaches. The radial, vesical and retinal arteries are thickened. The systolic blood-pressure is 160, blood urea 31 mgs. %. On examination the urine was found to contain blood only. Blood count and coagulation time were normal. There was no alteration in the platelets.

Discussion.—Mr. H. P. WINSBURY-WHITE: With regard to the President's point that chronic interstitial nephritis and arteriosclerosis are so intimately associated that they are probably the same disease, I had a case some years ago which certainly seems to support this view.

The patient was a man, aged 49, who, when I saw him, was suffering from a second attack of prolonged hæmaturia; bleeding had been copious and persistent for the previous ten days. There had been a somewhat similar attack six months before. The appearance of the patient suggested that the loss of blood had affected his general health. There were several striking signs of cardio-vascular disease. The patient looked much older than he was; his radial arteries were considerably thickened, and his pulse, even while he was in bed, varied daily between 90 and 120. He was passing about 80 oz. of urine per day on a normal intake of fluid. Cystoscopy and intravenous urography showed the right kidney to be at fault, but failed to throw any suspicion on the left side. On cystoscopy, blood was seen

pouring from the right ureteric orifice while the efflux from the left side was perfectly clear. Indigo-carmin injected intravenously appeared from the left ureteric orifice in five minutes, while none appeared from the right side after nine minutes. The intravenous urogram showed very poor function of the right side, while that of the left was good, without any deformity in outline of the calyces and pelvis. There were no casts in the urine, but there was definite evidence of infection of the urinary tract with coliform bacilli.

With the patient suffering from the effects of loss of blood, and with all the facts pointing to disease of the right kidney, and none casting suspicion on the left, who could have resisted the temptation to operate on the right kidney?

I have always made the rule in operating on a kidney for renal hæmorrhage when the bleeding is sufficiently severe to warrant such an operation, and in the absence of deformity of the pelvis or calyces, as shown by pyelography, to perform nephrectomy rather than to explore the kidney. My reason is that if a growth such as an angioma were present, but so small in size that it produced no visible deformity in the pyelogram, and no palpable deformity of the kidney when the organ was exposed at operation, it might easily be missed, although the kidney was split from end to end. After having made such an exploration and found no cause for the bleeding, one has still to decide the important question as to whether to preserve the kidney with the probability that the hæmorrhage will continue. Moreover, when one considers the risk of secondary hæmorrhage, such an exploration is, as a rule, by no means as safe an operation as a nephrectomy. Having all these considerations in mind, I removed the kidney in this particular case.

The microscopic structure of the kidney was of great interest. There was considerable arteriosclerosis; numerous bands of fibrous tissue could be seen passing through the renal substance; widespread hæmorrhages were apparent throughout the organ, not only in the interstitial tissue, but involving the glomeruli, the tubules, and in the submucous zones of the calyces and pelvis. The mucous membrane in the two last localities was uniformly thickened.

The patient ultimately recovered from the operation. Mr. Ralph Thomson has asked whether or not the President had observed that operation wounds in these cases of arteriosclerosis did not tend to heal more readily than other cases. I was particularly impressed with the fact that in this case the wound broke down for no apparent cause, although no important degree of sepsis was present. Although the patient had no hæmaturia, subsequently within a year of his operation œdema and signs of renal insufficiency developed. Death took place about six months later.

With regard to diagnosis, the President has mentioned the presence of organisms in the urine as an indication that the hæmaturia is most likely infective in origin. I would like to qualify that by calling attention to the fact that the infection may be only a complication occurring in a kidney already damaged by chronic vascular disease. This was apparently the sequence of events in my case.

Several features in this case indicate that special care is necessary in deciding whether operation or conservative treatment is advisable. It is easy to be wise after the event, but there is frequently the doubt as to whether a growth is present in the kidney, even though there are obvious signs of arteriosclerosis. Another important point is that the left kidney, although it showed no signs of insufficiency previously to operation, was quite unequal to the strain of carrying on the work single-handed; and another interesting point is that of the completely different ways in which each kidney gave evidence of its impaired ability to function. In the case of the right kidney there was the copious bleeding; in the case of the left there was no loss of blood, but there was inability to excrete fluids.

I am convinced that, if the decision can be definitely made that the cause of the patient's bleeding is due to cardio-vascular disease, no operation should be undertaken, even though the bleeding is unilateral and severe.

Mr. E. W. RICHES said that he had recently had three cases of unexplained hæmaturia in young people, their ages being seven, eleven and sixteen years respectively.

Complete investigations had been carried out on the lines indicated by previous speakers, and were all negative. In the first two cases the hæmorrhage was bilateral, but in the third it came from the right kidney only. This kidney was explored, and a piece taken for section, which showed hæmorrhage into the glomeruli, but no evidence of nephritis. A temporary nephrostomy was performed, the tube being retained for a fortnight. No further hæmorrhage had taken place, and it is now nearly a year since the operation.

He thought that the surgeon who removed an apparently normal kidney for unexplained hæmaturia must do so with considerable misgiving.