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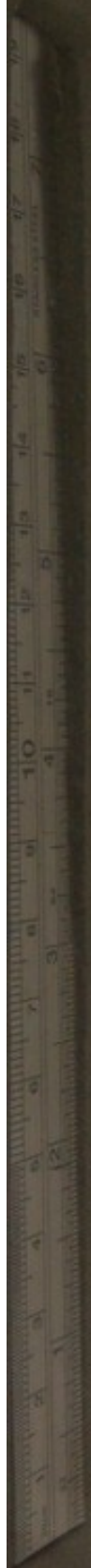
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HEMATURIA

A Study from the Practitioner
By VICTOR COX FARRAR
New York

Hematuria or hematuria is defined as blood in the urine or as the act of urination in quantity or as a factor on which it is, therefore, strictly speaking, a symptom. The source of such striking momentous possibilities for the patient must be settled with care. It is always extravasation, intense congestion, erosion, or rupture of microscopic vessels some tract whose focus and extent is investigated.

The varieties of hematuria are: the color of the blood passed, the range, the causes, the local source of the blood to the act of urination, initial, or recurrent.

For the purpose of this study, hematuria means one that appears in the urine or appears only in the urine. Concurrent hematuria, although the blood is well mixed with the urine. Terminal bleeding, which is practically blood free, occurs when the bladder is full of urine brings the blood to the surface of the blood.

The condition of the blood or microscopic in amount, red, dark, fluid or clotted, or coagulated.

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HEMATURIA.*

A Study from the Practitioner's Standpoint.

BY VICTOR COX PEDERSEN, A. M., M. D.,
New York.

Hematuria or hematuria may be briefly defined as blood in the urine or as blood associated with the act of urination in quantity sufficient to discolor the urine or be a factor on microscopical examination. It is, therefore, strictly speaking, a symptom, but one of such striking moment and of such far reaching possibilities for the patient that its cause and source must be settled without delay. Its significance is always extravasation of blood through intense congestion, erosion, or rupture of microscopic or macroscopic vessels somewhere in the urogenital tract whose focus and extent must be immediately investigated.

The varieties of hematuria relate to the condition of the blood passed, the activity of the hemorrhage, the causes, the local origin, and the relation of the blood to the act of urination, which is, as explained later, initial, concurrent, or terminal.

For the purpose of this paper the term, initial hemorrhage, means one that either actually precedes the urine or appears only in the first flush of it. Concurrent hemorrhage, also called total, means that the blood is well mixed with all specimens of urine. Terminal bleeding means either that the urine is practically blood free and that the symptom occurs when the bladder is empty or that the last flush of urine brings the blood with it.

The condition of the blood may be macroscopic or microscopic in amount, recent and red or old and dark, fluid or clotted, or comprise only the coloring

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matter, in which case it is known as hemoglobinuria or hematinuria.

The activity of the bleeding may be acute, sub-acute, and chronic in development, scanty, moderate, or copious in amount, intermittent or remittent, and recurrent or persistent in course.

The causes fall into the commonplace classification of traumatism, genital disease, urinary disease, systemic infection, and parasites, particularly entozoa. This classification of the causes may be simple, but the designation of a definite etiology is often fraught with the utmost difficulty and uncertainty.

The local origin of hematuria may be at any histological point of the anatomical subdivisions of the urogenital tract, hence may be renal, ureteral, vesical, prostatic, or urethral. Here again the recognition of the precise bleeding point or tissue may sometimes defy our best efforts.

This paper intrinsically deals with blood in the urine from the standpoint of the general practitioner and will state, it is hoped, a few of the broad facts concerning this symptom.

The clinical diagnosis of hematuria includes, not only an exhaustion of all the time honored older means of recognition, but also a judicious application of cystoscopy, ureteral catheterization, urethrascopy, radiography, and any other means suggested by a given case. The laboratory diagnosis of hematuria is an essential detail of this important topic, but space forbids more than mention of the fact that minute amounts of blood are detected only with the microscope or with such procedures as the guaiacum test (Almen's), liquor potassæ test (Heller's), and the spectroscope, as examples. Let us, therefore, rather consider laboratory investigation as slightly beyond the limits of this paper.

The clinical diagnosis of hematuria must embrace determination of the cause and the focal point of the bleeding, so far as practicable. The broader causes of urogenital hemorrhage are slightly the

easier of these two questions, in that a carefully taken history will almost invariably give a direct or indirect "lead" to the answer. Remote or recent traumatism is usually obvious in itself and its sequels or definite in its history. Genital disease comprises the various infections, especially the gonococcal, yet even here the difficulties begin. Urinary disease is frequently still more uncertain. Systemic conditions such as malaria, scurvy, and hemophilia show hematuria in various association with the chills and are commonly very easy to recognize as a cause, just as are the exanthemata in childhood. Hematuria in natives and travelers through the tropics almost invariably suggests the entozoa causing filariasis and similar entozoic conditions.

Each of these various factors will receive incidental attention as it comes up in the course of this paper. We are, therefore, directly involved with the main subject—the source of the hemorrhage in the several urogenital organs.

Renal hemorrhage always means nephritis, lithiasis, ulceration, especially tuberculous, neoplasm, or trauma. The nephritis may be acute, due to any of the well known causes of this condition. In delicate children a severe attack of any of the children's infectious diseases usually has hematuria, which, although microscopic in degree as a rule, is not rarely macroscopic. The course of either condition should be known and followed. Similarly in adults, acute nephritis of both the infectious and idiopathic types may in its onset be hemorrhagic. The intoxication of the underlying disease is the agent at work.

Chronic nephritis may be a cause of hematuria more frequently than is commonly supposed, but almost invariably of the type which shows exacerbations and occurs either during the chronic nephritis of purely medical or essentially infective origin. Consonant with the character of the disease such hematuria is apt to be prolonged and profuse and to appear *pari passu* with the relapses of the disease

toward acute character. As a rule pain is absent, but it may be present, due to the congestion which precedes its appearance. Tenderness and enlargement of the kidney follow the same law as the pain. Activity in common experience increases the bleeding, while repose and inactivity may decrease it, but are more often without effect, as one would expect when viewing such a kidney in the hand after death. The urine of these cases is during the quiescent nonhemorrhagic intervals that of chronic nephritis with or without exudation or that of chronic infection with organisms more or less abundant. Thus one sees variations in the low specific gravity, number, character, and size of the casts and the quantity and type of albumin. In the active periods the bleeding usually masks all these findings. Cystoscopy reveals a normal bladder in the truly medical nephritides or changes in the ureteral mouths in the presence of infection. Thus some of these chronic cases pass into the category of surgical cases.

Congestion should be reckoned as nephritis for the purposes of this paper, and may be of hemorrhagic degree and of recurrent appearance such as is found in extreme displacement of the kidneys. Venostasis as in hydronephrosis and perhaps in advanced hepatic disease is another picture of congestion and may be hemorrhagic. Bangs (*Medical News*, February 11, 1905) reports a case of hydronephrosis in which bleeding was the diagnostic symptom. Varices of the kidney are usually congenital, occasionally acquired anatomical defects and self evidently fruitful causes of hemorrhage.

Lithiasis usually adds to the preexistent chronic infection and inflammation of the kidney, pelvis, and ureter, the traumatism due to the presence of the stone, hence bleeding usually follows attacks of pain indicating change in the position of the stone.

Tuberculosis of the kidney determines hematuria as soon as ulceration sets in and is in fact the type *par excellence* of ulcer as a cause of this symptom. In the same category belongs neoplasm of

the kidney with necrosis and erosion of bloodvessels; but the engorgement due to the infiltration of tuberculosis and new growth may also cause hemorrhage. It matters little whether the type of the tumor is hypernephroma, cancer, or sarcoma.

The nonoperative or medical causes of hematuria embrace the various manifestations of acute and chronic nephritis; while the operative factors are lithiasis, tuberculosis, neoplasm, traumatism, and hydronephrosis. On the borderline are the congestive cases, especially those of movable kidney.

The diagnosis of the fact and focus of renal bleeding, with or without ureteral bleeding, or ureteral hemorrhage without kidney involvement, does not permit in the light of modern methods the application of any rules, respecting, for example, the character, quantity, and color of the blood. The absence of the following data on laboratory investigations is without value as a negative proof of renal hematuria. Their presence on the other hand is very frequently helpful. Such data are cylindroid clots pointing to the ureter as their source, clotted blood casts of the ureter of unmistakable size, renal blood casts, and renal casts with densely adherent red cells.

Pain in the kidney zone without, before, during, or after the bleeding is not more than suggestive, because vesical conditions may so alter the course and calibre of a ureter as to excite referred pain in a normal kidney.

The diagnosis really depends on objective examination with cystoscopy, ureteral catheterization, and radiography. Urinary segregators are of doubtful reliability. Cystoscopy is competent to decide as a rule in a few moments whether the bladder or the ureter and kidney are the source of the blood. If all three are involved, as is sometimes true in tuberculosis, ureteral catheterization is unavoidable. Ureteral catheterization is also necessary to determine the source of small hemorrhage from the kidney with a normal bladder. If the quantity

of blood is large and the bladder washed until the medium is clear, the blood is seen to spurt out of the ureter like smoke puffs. Ureteral as distinguished from renal bleeding might be diagnosticated by using a small catheter and taking specimens from the canal at four or five levels until clear urine from the pelvis is reached. If, however, the bleeding proceeds from the ureteral pelvis, such a procedure would fail in the presence of what would then be clinically renal hemorrhage, so that such a distinction would be of theoretical rather than practical importance.

Neoplasm as a source of renal hemorrhage requires the earliest possible recognition while the tumor is impalpable, insensitive, and nonadherent, because when it is palpable, tender, and fixed, it is commonly beyond operative intervention. Renal sarcoma occurs in childhood, carcinoma in midlife, and hypernephroma and the mixed neoplasm of Wilms at almost any age. Hemorrhage is least frequent with sarcoma. In the other neoplasms it is active, precipitate, and profuse, earlier from the renal pelvis than from the parenchyma, commonly increased by exercise and motion and unaffected by repose, with a urine devoid of nephritic elements and rarely containing tumor detritus. Ureteral colic due to clots is not the rule, and pain and discomfort are not present in the operable stage in any marked degree. Cystoscopically the mouth of the ureter is normal. The diagnosis should be made so early that there is no cachexia from hemorrhage and no rise in temperature or absorption from the cancer.

The importance of a complete diagnosis in renal hemorrhage is illustrated by the following case of hypernephroma, operation, and death nearly a year after I had examined it and made a diagnosis of syphilis of the bladder with hemorrhage, without, however, ureteral catheterism. Active antisyphilitic measures seemed to have stopped the hemorrhage and improved the urine and bladder, and the general health. After rather a long period of com-

fort the man disappeared from view and treatment, as do most syphilitics whenever their general condition is bettered. In due course the hemorrhages returned more or less incessantly, and in the care of a colleague after another diagnosis with ureteral catheterization, hypernephroma was determined and operated on. At this time the kidney showed enlargement, while at my investigation no focal kidney conditions were subjectively or objectively present. It is likely that if I had made a complete analysis of the case, as I should now do in a similar patient, I should have recognized the tumor in a far earlier and more operable condition than it was a year later. This incident carries its own lesson.

Renal lithiasis as a cause of hemorrhage should also be diagnosticated in its earliest possible degree—in the aseptic rather than the septic stage, as in the latter operative intervention is much less valuable. Unlike neoplasm, lithiasis may occur at any age, even in childhood, and is not uncommon in adolescence and midlife. Careful history usually records excess of crystals or the passage of gravel and calculi in the urine. The bleeding as a rule is not profuse, painless if without clots, painful if with clots, and excruciating if accompanying the passage of a stone down the ureter. Anything causing a stone to move in its bed in kidney or ureter will either excite or increase the blood, while rest in bed is usually followed by prompt and pronounced disappearance of at least macroscopic blood. When infection is added to the lithiasis, pain of more or less constant or remittent type appears, together with enlargement and tenderness of the kidney previously free from these signs. The urine is of the "attrition" type, due to the rubbing of the stone about in its bed and resulting in exfoliation of epithelium, increase and thickening of the mucus, the presence of pus in varying quantities, microscopic in the aseptic and macroscopic in the infected cases, and finally crystals due to those

changes in the urine from which the stone originally arose. Thus it is sometimes possible from these crystals to suggest the character of the stone.

The diagnosis of the hematuria of renal lithiasis rests materially on radiography, which should never be omitted in doubtful cases, is advisable in all cases, and in expert hands rarely fails to give some result except in pure uric acid stones, and even in these, changes in the kidney shadow may be highly important.

The choice of operation for these cases is the period before infection sets in, hence the importance of early and thorough going diagnosis.

When the results of radiography are not consonant with clinical and cystoscopic indications, it is best to have another sitting. I recently reported a case of lithiasis of nearly two years' duration in which a first x ray examination was negative, while a second and third were positive and more and more conclusive of stones in the kidney, ureter, and bladder.

Renal tuberculosis with hematuria is being recognized more and more frequently through improved procedures in diagnosis. Bleeding may be an early and prominent symptom or appear after the establishment of pyuria, which is rather commonly the fact. The lesion, like tuberculosis elsewhere in the body, has little respect for age, but rather favors the earlier than later half of life. In quantity the blood is small and intermittent with long or short periods of absence, or copious and persistent with little or no remission. Either or both kidneys may be affected and are congested, palpable, and tender, and show more or less discomfort and pain, rather constant with exacerbations, especially after pyuria appears and during actual bleeding. The tubercles are usually in the walls of the pelvis of the ureter or on the surface of the papillæ of the kidney, projecting into it so that ulceration in eroding blood-vessels produces bleeding directly into the ureter with little or no signs of blood casts from the

tubules. Another form, however, has the tubercles scattered along the depth of the tubules so that on gross examination they are not or at most very little in evidence. They may, nevertheless, cause bleeding by local hyperemia or ulceration into the tubules. These cases are difficult to diagnose after nephrectomy, excepting with full pathological analysis. The urine in tuberculosis of the kidney is of the desquamative type due to the chronicity and usually superficial character of the lesions, hence beside the blood the urine shows abundance of epithelium from the pelvis and the ureter with, sooner or later, pus containing altered epithelial cells as well as white blood cells. The one great diagnostic point is the discovery of the tubercle bacillus in the urine. The morphology must be proved by inoculation into the peritoneal cavity of guineapigs for death in a few weeks, usually from four to eight, or into the thigh for deposits of the disease in the lymphatic glands of the groin, which usually occurs in about fourteen days, so that a much earlier decision may, in this way, be reached.

As in the preceding causes of renal hematuria, the earlier the diagnosis is made the better, as at this stage there is very great value in the use of bacillus emulsion in ascending doses, beginning at 0.0001 gramme twice a week and increasing an equal fraction at each dose, until at the end of a year the patient is receiving large doses. No dose or rate of repetition must be followed which results in a reaction, as such overdose may not only hinder the progress, but, if marked, increase the susceptibility rather than the resistance of the patient. All known methods of hygienic treatment should be included in this management.

The significance of renal hemorrhage to the patient's life is illustrated by a case which I recently saw in consultation. The woman had been allowed to pass blood in her urine for nearly six weeks in noticeable and even large quantities before consenting to consult a surgeon. By this time she was very

anemic and weak and not a good operative risk. Cystoscopy revealed jets of nearly pure blood from the right kidney every few seconds, so that in a brief period the bladder had to be washed and distended again. The left ureter was small and seemingly normal. Nephrectomy was undertaken as the one thing possible to save the woman, but her strength had so wasted that she died within ten hours of the operation. No obvious lesion was discovered on gross pathology, but tuberculosis was the final diagnosis reached. My own opinion was that it was a general tuberculous infection of the kidney, too severe and recent for the formation of tubercles. The case was in the hands of the surgeon too short a time for the guineapig and other tests of the urine for the bacilli.

Premature and promiscuous nephrectomy for tuberculosis seems no longer justifiable, except in the presence of persistent, dangerous hemorrhage and obvious failure of the expectant and bacterin management. A large number of urologists, however, believe in early operation. An essential part of the operation is the removal of the largest possible length of the ureter in the midst of abundant protection of the wound and thorough cauterization of the remaining stump in order to prevent focal inoculation of the raw surface.

Cystoscopy in hematuria due to tuberculosis of the kidney, even in the early cases, is characterized by unmistakable thickening in the wall of the ureter, whereby both occlusion and tortuosity occur, so that catheterism is difficult or impossible. The meatus is patent, inelastic, inactive, elevated, and hyperemic—"golf hole" ureter is the term applied to it. Almost always tubercles may be found in the cystoscopic field close to it, in various stages of development and relation.

The importance of early cystoscopy in suspected tuberculosis is shown by the following case of a young man in my hands, who noticed pyuria for three months and then pain, for which he consulted

me. Cystoscopy showed a thickened, almost impassable, ureter, a "golf hole" retracted ureteral mouth, pearllike tubercles around it, and purulent urine emanating from it. Bacilli were in the urine. Benefit is being secured and I hope operation avoided by the Trudeau method, which is the patient's election of treatment rather than operation.

Hematuria of renal origin from causes other than those specified, may proceed from hydronephrosis, especially during the periods of acute urinary abstraction with circulatory interference; from movable kidney during the moments of extreme prolapse, also through circulatory effects such as kinking and pressure; from cystic kidney at the moment of rupture of multiple cysts into a common cavity with venostasis and bleeding, or at the moment of rupture of a large cyst into the pelvis with erosion of a bloodvessel. Careful physical examination and radiography commonly establish the diagnosis in hydronephrosis and movable kidney combined, obviously with attention to uranalysis, while sudden changes in the characteristics of a kidney enlargement, associated with previously unknown constituents in the urine, will suggest cysts and their rupture. Animal parasites, particularly *Ecchinococcus* and *Distoma hæmatobium* (bilharziosis) in patients from parts of the globe where these diseases are frequent, are a potent cause of renal hemorrhage. Uranalysis will reveal the daughter cysts and the hooklets of *ecchinococcus* and the ova in bilharziosis.

Ureteral hemorrhage is an undoubted entity, but is frequently diagnosticated only by its persistence after a nephrectomy. Its distinction from renal hemorrhage of the same side rests on careful ureteral catheterism at levels of every five centimetres or so with a catheter sufficiently small to allow the blood to escape around it and the untainted urine through it. If the urine is still bloody when the pelvis of the kidney is reached, gentle lavage should be performed until clear return fluid

is obtained if possible. If soon after this the urine is again bloody, no differential diagnosis may be reached, as in that case the bleeding is either directly at the outlet of the pelvis or so high in the ureter as to backset into the pelvis or from the kidney itself. Radiography will distinguish lithiasis, and with the aid of argyrol or collargol may indicate kinks, strictures, points of pressure, deformity, and thickening—as bleeding from the ureter proceeds from the same general conditions as elsewhere in the urogenital tract, namely, the congestion of kinks, strictures, and pressure, the special infections such as tuberculosis, the common manifestations of lithiasis, and finally primary neoplasm.

Hematuria due to vesical conditions means, as elsewhere in the urogenital tract, change in the mucosa always circulatory and not infrequently organic in character. The essential causes are the same as those previously enumerated for the kidney and ureter—namely, congestion, infectious and noninfectious inflammation, varicosities, lithiasis, papillomata, traumatism, chemical, thermal, and instrumental (usually synonymous with and therefore properly classified under simple inflammations), ulcers, simple, tuberculous, typhoid, and cancerous, rupture by traumatism or by pathological change, as in spinal disease, and finally retention of extreme degree, which, when suddenly relieved in its entirety, not uncommonly causes hemorrhage into the bladder. It is probable that this is also one mechanical explanation of hemorrhage in hydronephrosis which, when at its limit, may rapidly evacuate itself and hemorrhage ensue. The previous pressure on the walls produces paresis and partial occlusion, and when rapidly removed permits the inrush of blood to set up the hemorrhage in both bladder and hydronephrosis. A practical point, therefore, is never to draw off more than half the contents of a very full bladder at the first entrance, so as to avoid this purely mechanical condi-

tion. The remainder left in the bladder may be withdrawn after an hour or two without such accident.

Vesical hematuria possesses no definite symptom complex from which the diagnosis of cause may always be made minutely. On a broad basis, however, certain clinical facts are of help, especially the age of the patient, the presence and absence of pain, and the special features of urination. The matter of age involves the other two data completely.

Pain in infancy and childhood suggests lithiasis most commonly, and less commonly sarcoma of the bladder wall. Radiography and, under a general anesthetic, bimanual examination, and in older children cystoscopy are inevitable. Pain from adolescence to early midlife is most frequently seen in the acute cystitis of gonococcal, tuberculous, and typhoid infections, and much less frequently in stone and neoplasm. Pain in later midlife and the earlier advanced years is an indubitable herald of benign or malign neoplasm and early prostatism with stone; while the last condition is the one first to be thought of in late life. The pain is present before urination when the bladder as a whole is irritable, as in the infections and ulcers, and stone during agitation. It is manifest during urination in much the same circumstances, while terminal pain occurs when the bladder sinks down on abnormal contents or strains its diseased walls respectively, as in stone, ulcer, and neoplasm.

Hemorrhage from the bladder may or may not accompany the pain. The two symptoms occur together in varying degrees from time to time with all the usual causes enumerated, especially the infections, ulcers, stone, and neoplasm after even minute necrosis. Hemorrhage without pain, however, may occur in neoplasm and congestion.

The function of urination may be profoundly altered in the presence of vesical hematuria, as nearly all the causes of the latter disturb the bladder

in its continence and capacity sooner or later. Thus we see pollakiuria or great frequency of urination more or less in all forms of vesical disease, most particularly in tuberculosis, ulcer, neoplasm, and stone. The other conditions are a little more apt to pass into a period of relative inactivity, while these four are steadily progressive and always produce cystitis in a short time, and through their own pathological processes maintain such cystitis in a high degree of severity. Hence it follows that dysuria, strangury, and tenesmus commonly indicate the more serious vesical lesions.

Bimanual examination in children has already been spoken of, but is not of much service in adults, except in cancer of the prostate and sometimes of the bladder. Its chief function is to estimate the distention and thickness of the bladder walls.

Radiography, however, with or without distending the bladder with fluids opaque to the x ray is important.

Uranalysis and consideration of the hemorrhage itself is important. The bleeding is never initial, i. e., in the first glass only. It is invariably concurrent or total, well mixed with the urine, and most commonly of all, especially in early cases, terminal, appearing either with the last flush of urine or after it when the bladder is making a final effort at evacuation. Accompanying such bleeding, as previously stated, we always have more or less numerous symptoms of cystitis.

Cystoscopy is, after all, the last resort in cases of vesical hemorrhage. In the acute infections it is contraindicated until after subsidence has begun. It permits diagnosis of the bleeding points of varices and the various kinds of hyperemia, commonly of the actual presence of stone and its attrition type of cystitis, also of ulcers, tuberculosis, papilloma, and neoplasm, and frequently even of the exact site, extent, and nature of rupture of the bladder. In this connection be it noted that a large hemorrhage means extraperitoneal intravesical

rupture, while a smaller hemorrhage means intraperitoneal extravesimal rupture. A distinction between the two may be made with the aid of the catheter to see how much blood and urine are in the bladder and with rectal examination for fluctuation in the pelvic peritoneum.

Where a careful diagnosis of hematuria may lead is exemplified by the discovery of two stones in the bladder of an old man by cystoscopy and radiography. He gave a few symptoms, ascribed by his family physician to enlargement of the prostate, which on rectal examination and exploration of the bladder with the catheter, was found to be obviously hardly enlarged enough to account for his suffering. There had been one very slight attack of bleeding and no classical symptoms of stone. The cystoscope revealed two calculi about the size of birds' eggs, lying close together in the retroprostatic pouch in the midst of fairly normal mucous membrane. Litholapaxy relieved the disease. The patient is now being watched for changes in the prostate.

The importance of vesical hemorrhage is illustrated by the following case, referred to me a few days ago.

CASE. H. C. U., United States, white, forty years old, married, salesman, venereal disease denied. Sexual habit moderate. Had been bleeding off and on from the bladder for nearly four years; cause unknown; no emaciation, fever, or pyuria; bleeding excited by constipation, catharsis, and diarrhea; during attacks of bleeding, urine always colored, especially at the end of the function; no gravel or stones; pain in the penis occasional and sharp; frequency every four hours by day, every eight hours by night; urgency moderate and occasional both with and without the bleeding, likewise tenesmus; degree of hemorrhage constant for the past four years without great increase; amount a few drops after urination, never a glassful; persisted for a day, rarely more; recurred every four or five days each month, so that in each week he had blood for a day or so and in each month for a week or so; bleeding intermitted sometimes in a given day; effort to evacuate all urine brought blood exactly like constipation; riding in railway trains and automobiles did not provoke the bleeding.

Pedersen: Hematuria.

Cystoscopy done in June, 1912, was said to have been negative, but cystoscopy done by the writer recently showed a large papilloma back of the right ureter slightly near the middle line and another larger papilloma on the left side completely hiding the left ureter and encroaching upon the trigonum and neck.

This patient should have been cystoscoped four years ago when the bleeding first began. The cystoscopy of June, 1912, must have for some reason failed of thoroughness and final diagnosis. These papillomata were the size of the end of the thumb and required three cystoscopic fields for their examination.

Prostatic and urethral hematuria is always initial, occasionally concurrent, and rarely terminal. It is in suspected urethral cases that the Wolbarst five glass test is of particular merit unless the hemorrhage is copious enough to overcome the distinctive features of the test. The causes of these types of hemorrhage are exactly as elsewhere in the urogenital systems, except for the new element of congestion due to hepatic disease, abdominal tumor, extensive hemorrhoids, and urethral stricture. Blood is often seen in the products of prostatic massage, in the semen after intercourse or emissions, and at once suggests the prostate and the seminal vesicles as its source. Blood after an erection without intercourse or emission usually comes from a stricture, but may also proceed from the prostate by congestion. Blood following gentle instrumentation denotes dilatation of a stricture or irritation of granulations or even papillomata of the urethra. If the results of animal experimentation may be applied to man in their entirety, hematuria due to such drugs as turpentine and cantharides and possibly hexamethylenamine is seated rather in the bladder than in the kidneys or urethra. Acute posterior gonococcal urethritis frequently causes terminal bleeding, occasionally of copious degree.

Tuberculosis of the urogenital tract is so common a condition that the picture of its bleeding

should be fairly definite. It is, sooner or later, a constant symptom, particularly as the case gets older, because then the erosions of the tubercles appear. The quantity of blood lost is rarely as free or sudden as in neoplasm, because in the latter the process extends oftener to the depth of larger vessels than does tuberculosis as a rule. Its onset is usually a few terminal drops, almost always accompanied with varying degrees and relations of pain, tenesmus, spasm, and strangury, all augmenting with the duration of the lesion and typical of tuberculous cystitis. Large clotted masses of blood within the bladder are very rare in tuberculosis. The clots are rather frequent and small, if present at all. While the bleeding as a symptom is constant in tuberculosis, sooner or later, the act of bleeding itself comes and goes, so that there may be longer or shorter periods without hemorrhage, during which, however, a highly irritable cystitis is present.

From what has been said in this contribution it is hoped that the great importance and the grave possibilities of even minute urogenital hemorrhage have been made clear. It is quite safe to say that no bleeding is so scanty, but that it merits immediate and prompt investigation, because it may be the earliest sign of conditions essentially progressive and incurable excepting with the aid of surgical intervention practically at the moment of the earliest possible diagnosis. Such intervention may be removal of the offending lesion or at least adequate and energetic, well balanced treatment. The rule to follow is, therefore, that given hemorrhage, it must be traced to its source and cause without delay.

45 WEST NINTH STREET.

