

# CLINICAL SIGNIFICANCE OF HEMATURIA WITH ILLUSTRATIVE CASE REPORTS

CHARLES C. HIGGINS, M.D.

Department of Urology

**H**EMATURIA, or the presence of blood in the urine, is one of the more frequent symptoms of disease of the urinary tract.

It would seem obvious that this phenomenon would impress the physician and the patient with the necessity for an immediate, complete examination to ascertain the cause of the bleeding.

However, in most instances unfortunately the hematuria is intermittent in character, and when the bleeding subsides a false sense of security is established. The patient assumes he is well, that the bleeding was not of serious importance because of its spontaneous disappearance, and as his general health does not seem impaired, he appears justified in such presumptions. However, to the physician, the cessation of bleeding is not an indication that its significance can be disregarded or minimized or its importance lessened, and a delay in complete urologic investigation should not be permitted. Unfortunately in many instances the physician and the patient minimize the gravity of this symptom, and a surgical cure is no longer possible when the diagnosis is finally established.

The presence of blood in the urine, if only on one occasion, means the presence of organic disease in the genito-urinary tract. If this conviction is sustained by the physician, it will permit the establishment of an early diagnosis while the lesion is amenable to surgical treatment; to procrastinate, thereby deferring urologic survey, may result in the development of far advanced lesions beyond the hope of medical or surgical cure.

How frequently is this viewpoint disregarded? Kretschmer<sup>1</sup> in a review of 933 cases of hematuria stated that the average duration of hematuria, or the average time which elapsed between the initial attack and the time of examination was 2.39 years.

In 694 cases of cancer of the bladder I reviewed a few years ago,<sup>2</sup> hematuria was the initial symptom in 73.5 per cent. A diagnosis was established by cystoscopic examination in 10.8 per cent within 1 month after the attack of hematuria; 32.1 per cent within 5½ months; 51.7 per cent within 1 year. Thus the estimation revealed that, in 48.3 per cent, a cystoscopic study was not performed until more than 1 year had elapsed from the onset of hematuria.

Debenham<sup>3</sup> in a review of 742 cases concluded that papilloma and carcinoma of the bladder are the commonest causes of hematuria in men. Inflammatory conditions of the urinary tract contribute most frequently to hematuria in women.

*Hematuria as a presenting symptom:* In men there is a 50 per cent chance that hematuria is due to a papilloma or carcinoma of the bladder, in women the

cause is as likely to be inflammatory as neoplastic. When hematuria is the only symptom in a male patient there is a 2 to 1 chance that it is due to papilloma or carcinoma of the bladder. In women, the most common cause is renal calculi.

MacKenzie<sup>4</sup> presented a review of patients with the complaint of hematuria who entered the Royal Victoria Hospital in 1932. He stated that 20.24 per cent of the patients admitted to the Department of Urology passed urine containing blood. In 75 per cent of the cases the blood was caused by either tumor, infection, calculus or nephritis. In 96 per cent of the cases with hematuria, a causative lesion was found within the urinary tract and more than 40 per cent of these lesions were neoplastic.

Cahill,<sup>5</sup> in 1942 in a review of cases from the J. Bentley Squier Urological Clinic, stated that close to 40 per cent of the patients with hematuria had neoplasms involving some part of the urinary tract. Only about 13 per cent of the patients with upper urinary calculi complained of blood in the urine at some time or other. Bleeding in some form occurred in bladder tumor in 85.7 per cent. He concluded that hematuria is a grave symptom, and in the majority of cases is associated with tumor, infection or calculus.

Van Duzen,<sup>6</sup> in a review of 500 cases of hematuria, estimated the source of bleeding as follows: urethra 38 cases; prostate 59 cases; bladder 82 cases; ureter 75 cases, and kidney 172 cases.

Classification:

- I. Hematuria in general disease.
  - A. Acute fevers: Tonsillitis, scarlet fever, rheumatic fever, etc.
  - B. Chronic infections: Endocarditis, malaria.
  - C. Blood dyscrasias: Purpura, leukemia, hemophilia, polycythemia vera.
  - D. Deficiency and dietary disease: Scurvy, liver deficiency.
  - E. Diseases of unknown etiology: Hodgkin's disease, hypertension or arteriosclerosis with renal involvement, periarteritis nodosa.
- II. Hematuria due to intrinsic disease of the urinary tract.
  - A. Renal.
    1. Calculi or crystals.
    2. Nephritis.
    3. Tumor: Capsular, parenchymal, pelvic.
    4. Infection: Acute or chronic including tuberculosis.
    5. Anomalies: Polycystic disease, horseshoe kidney, nephroptosis, etc.
    6. Trauma.
  - B. Ureteral.
    1. Calculi.
    2. Infection.
    3. Stricture.
    4. Tumor.
  - C. Vesical.
    1. Tumor.
    2. Infection.
    3. Calculi or foreign bodies.
    4. Ulcer.
    5. Trauma.

- D. Bladder neck.
    - 1. Tumor.
    - 2. Prostate including seminal vesicles.
  - E. Urethral.
    - 1. Infection.
    - 2. Stricture.
    - 3. Tumor.
    - 4. Consequence of instrumentation.
- III. Hematuria associated with extra urinary pathology.
- A. Acute appendicitis.
  - B. Diverticulitis of the colon.
  - C. Neoplasm of the colon, rectum or pelvic structures.
  - D. Acute or chronic salpingitis.

This classification is by no means exhaustive. Practically every disease of the urinary tract at some time or other may be accompanied by hematuria. The tabulation, however, illustrates the extensive investigation frequently essential to determining the etiologic factor producing blood in the urine.

A carefully elicited history is of utmost importance. Is the hematuria initial in type? If so it probably originates in the anterior urethra. Terminal hematuria arises from the posterior urethra or bladder. When the blood and urine are well mixed, the hematuria is usually of bladder, renal, or ureteral origin.

When associated with interruption of the urinary stream, hematuria suggests a tumor of the bladder neck. A history of recent laryngitis or tonsillitis implies an infection may be the source of bleeding. Pleurisy or a chronic cough and night sweats provoke a suspicion of tuberculosis.

Many other diseases such as purpura, hemophilia, and polycystic renal disease may be suspected from information volunteered by the patient.

The physical examination may reveal the presence of an enlarged spleen or indicate that one or both kidneys are palpable.

The vaginal and rectal examination may disclose the presence of a malignant lesion which explains the source of the blood.

Complete laboratory study, cystoscopy and pyelography usually suffice to establish an accurate diagnosis.

The diagnosis of essential hematuria should be made only rarely. Close cooperation between the internist and urologist is frequently essential to determine the cause.

The following case histories are presented to illustrate the similarity of symptoms and to re-emphasize the gravity of blood in the urine.

### Case Reports

**Case 1.** A farmer, 31 years of age, entered the Cleveland Clinic complaining of blood in the urine which he had observed on two occasions in the preceding 3 months. The bleeding was not profuse, and the blood was completely mixed with the urine. The condition persisted for 2 days on each occasion and subsided spontaneously. There were no other symptoms and physical examination was normal. Retrograde

pyelography revealed a tumor at the upper pole of the left kidney. A nephrectomy was performed, and the final diagnosis was hypernephroma of the kidney.

This patient evidenced no symptoms aside from the two manifestations of mild hematuria. The diagnosis was established early in the course of the disease. Pain and tumor, indicative of a renal neoplasm, were absent. The gross specimen revealed no evidence of involvement of the veins and the patient has a reasonable chance for a cure.

**Case 2.** A 52-year-old accountant entered the Clinic complaining of pain in the right side and a persistent cough. The pain was constant, dull, aching, and boring-like in character with an occasional acute exacerbation. He stated that 6 months previously he had observed blood in the urine for 1 day. He consulted a physician a week later at which time the urine was clear. A specimen was secured, and he was told he had ruptured a vessel in his bladder. Medication was prescribed and since that time blood has appeared in the urine on only one occasion.

A mass was palpable in the region of the right kidney. The retrograde pyelogram diagnosis was hypernephroma of the right kidney and the roentgenogram of lungs revealed extensive metastasis. The lesion was obviously inoperable. The presence of a urinary tract disease was indicated by the detection of blood in the urine 6 months previously. The clinical significance of hematuria was disregarded and the patient was not given the benefit of a cystoscopic survey. When this was eventually secured the tumor of the kidney was inoperable. This case forcefully illustrates the necessity of cystoscopic study in a patient who has passed or is passing blood in the urine.

**Case 3.** A 57-year-old man entered the Clinic complaining of blood in the urine. The first attack of hematuria occurred 7 years previously and lasted 3 to 4 months. Two years ago blood was again observed in the urine and this time it persisted for 3 months when it again subsided spontaneously. At the time of our examination, hematuria had been present for 6 months, but was not associated with other urinary symptoms. The patient's diet had always been deficient in fruit and vegetables. Complete examination, including pyelography, failed to disclose an organic lesion. A diagnosis of scurvy was made. In addition to increasing the fruit and fruit juices in the diet, 2 tablets of cevitamic acid, 100 mg. were prescribed after meals. Satisfactory results were obtained from this treatment.

In this case, aside from red cells in the specimens of urine from the kidneys, the urologic examination revealed nothing abnormal; complete studies of the blood failed to show any blood dyscrasia. The final diagnosis was scurvy, and the symptoms disappeared following dietary adjustment.

**Case 4.** A man, 51 years of age, entered the Clinic complaining of hematuria and an aching pain in the right renal area. Two years previously he had passed a small calculus; hematuria had been present at the time. Two weeks before admittance he had observed blood intermittently in the urine, and a few days later developed an aching pain in his back.

A roentgenogram of the renal areas failed to disclose a calculus. The retrograde pyelogram revealed a round filling defect in the pelvis of the right kidney. The diagnosis of a nonopaque stone in the pelvis of the right kidney was confirmed at the time of operation.

**Case 5.** A woman, 31 years of age, entered the Clinic with the complaint of blood in the urine which was first noted 2 months previously and had been present intermittently since. There were no other urinary symptoms. The retrograde pyelogram revealed the presence of tuberculosis of the right kidney and acid fast organisms were isolated from the urine collected from this kidney.

The diagnosis was confirmed by operation.

**Case 6.** A man, 66 years of age, entered the hospital complaining of difficulty in voiding and the presence of blood in the urine. The patient had been aware of nocturia and frequency and decrease in the force of the urinary stream for 2 years. For a period of 3 weeks blood had accompanied urination, often profuse, and clots were passed. He experienced no pain or other urinary symptoms.

Cystoscopic examination revealed the presence of prostatic varices. Fulguration of the varices was accompanied by complete relief from symptoms.

**Case 7.** A 33-year-old woman entered the Clinic complaining of blood in the urine and swelling of the feet. These symptoms followed an episode of sore throat which had been treated by sulfadiazine and injections of penicillin. A diagnosis of hemorrhagic Bright's disease had been made elsewhere and a dietary regime was instituted and medication prescribed. The edema subsequently subsided but intermittent hematuria persisted for more than a year.

At the time of examination at the Clinic the blood urea was 39 mg. per cent. Addis counts, urine studies and the urea clearance test confirmed the diagnosis. In view of the hematuria a cystoscopic examination was performed which revealed a grade 1 papillary carcinoma of the bladder, later removed by transurethral resection.

In this instance there were co-existing pathologic lesions and the carcinoma of the bladder had been overlooked for a period of a year.

**Case 8.** A woman patient was registered at the Clinic in 1933 at which time a diagnosis of rheumatoid arthritis was made. She returned in 1942, at the age of 33, with the chief complaint of severe weakness. General physical examination was essentially negative except for pronounced pallor. The spleen was not palpable, nor was there lymphadenopathy.

Blood studies showed a hemoglobin of 35 per cent; the red blood count was 1,780,000. Urinalysis showed many red blood corpuscles.

On undertaking further blood studies, fragility tests showed increased hemolysis; the smear revealed spherocytosis, and auto-agglutination of the red cells; the white blood count and differential study were normal; red cell volume was 40 per cent of normal; reticulocytes were 25.8 per cent; icterus index was 38; sternal puncture showed a hyperplastic marrow. The final diagnosis was acquired hemolytic anemia. A splenectomy was performed.

This patient presented a pronounced microscopic hematuria. Urologic investigation failed to reveal a lesion in the urinary tract. Laboratory tests disclosed the cause of bleeding from the urinary tract, and the hematuria subsided following splenectomy.

**Case 9.** A 56-year-old farmer entered the Clinic complaining of blood in the urine. Six months previously, following an afternoon of pitching hay, he first observed hematuria. Blood was present in the urine on 2 occasions and then subsided spontaneously. A few days later he consulted a physician and medication was prescribed. He remained free of symptoms until 1 week before admittance when blood again appeared in the urine. There were no other symptoms.

Cystoscopic examination revealed an extensive malignant growth in the bladder. This was treated by transurethral resection and implantation of radon seeds.

If a cystoscopic examination had been made at the time of the first attack of hematuria *the patient could have had* the benefit of early treatment.

These case reports are included to illustrate the futility of attempting to diagnose the cause of hematuria without cystoscopic examination and complete laboratory study. Delay in performing such studies endangers the outcome of the disease, inasmuch as serious lesions may be overlooked.

### Conclusions

Hematuria is neither a disease nor a clinical entity; it is a serious symptom that requires complete urologic investigation.

The physician assumes the responsibility and obligation of proving beyond a doubt that a serious lesion is not present in the genito-urinary tract.

In a series of 798 consecutive cases of hematuria in the records of the Department of Urology at the Cleveland Clinic, 59 per cent of the patients were suffering from tumors in the urinary tract, renal tuberculosis or calculus disease.

The presence of minimal or profuse bleeding, which may be persistent or intermittent in character and with or without accompanying pain, is usually of grave significance. An early determination of the causative factor is necessary in rendering a favorable prognosis.

### References

1. Kretschmer, H. L.: Hematuria; a clinical study based on 933 consecutive cases. *Surg. Gynec. and Obst.* **40**:683 (May) 1925.
2. Higgins, C. C.: Clinical significance of hematuria with illustrative case reports. *Cleveland Clin. Quart.* **5**:4 (Jan.) 1938.
3. Debenham, R. K.: Investigation of 742 cases of hematuria. *Brit. J. Surg.* **21**:44 (July) 1933.
4. MacKenzie, D. W.: Hematuria. *Canad. M. A. J.* **27**:405 (Oct.) 1932.
5. Cahill, G. F.: Hematuria; its clinical significance. *J. Urol.* **47**:221 (Mar.) 1942.
6. Van Duzen, R. E.: Review of 500 cases of hematuria. *Texas State J. Med.* **23**:577 (Jan.) 1928.