THE CAUSES AND DIAGNOSTIC IMPORTANCE OF HÆMATURIA IN SURGICAL CONDITIONS.

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The early recognition and consequent appropriate treatment of the causes of hæmaturia is of the greatest importance and will, it is hoped, be facilitated by the following article.

Blood which is of renal origin is, as a rule, uniformly distributed throughout the urine. *Terminal hæmaturia*, i.e., blood passed mainly at the end of micturition, is usually due to a lesion of the bladder or prostate, while *initial hæmaturia*, i.e., blood appearing at the beginning of urination, usually originates from some part of the urethra. Blood issuing from the meatus independently of micturition as a rule has its source anterior to the compressor urethræ muscle.

The surgical causes of hæmaturia may be classified as follows:—

RENAL AND URETERIC.

1. Growths of the kidney or ureter.
2. Renal tuberculosis.
3. Pyelonephritis.
4. Renal or ureteric calculus.
5. Renal hæmorrhage after emptying a distended bladder.
6. Injury to the kidney or ureter.
7. Movable kidney.
8. Polycystic kidney.
9. Hydronephrosis and Pyonephrosis.
10. Renal Abscess.

VESICAL.

11. Papilloma of the bladder.
12. Carcinoma of the bladder.
13. Infection of the bladder.
14. Vesical calculus.
15. After emptying a distended bladder.

PROSTATIC AND VESICULAR.

16. Acute prostatitis.
17. Spermatocystitis.
18. Cancer or senile enlargement of the prostate.
19. Tuberculosis of the prostate or seminal vesicles.
20. Prostatic calculi.

URETHRAL.

21. Malignant growth.
22. Calculus or foreign body.

1. **Growths of the Kidney or Ureter.** Hæmaturia due to kidney tumour is less frequent and begins later in children than in adults; consequently, in children the tumour is likely to be noticed before the hæmaturia, while in adults the hæmaturia usually precedes the recognition of the tumour. The hæmorrhage is intermittent and often unaccompanied by pain. Hæmaturia is usually the first sign of papilloma or epithelioma of the kidney pelvis, both rare conditions. Pain in the renal or ureteric regions will suggest that the kidney or ureter is the cause of the hæmorrhage, but the possibility of a vesical growth blocking the ureter

must be borne in mind. A cystoscopic examination should be done to exclude bladder abnormalities, and may show blood issuing from the ureter of the affected side. The condition is diagnosed by ascending or excretion pyelography, preferably the former. The pyelogram may show various deformities of the renal pelvis and calyces.

2. Renal Tuberculosis. This condition is a most important cause of frequency of micturition which may be accompanied by some intermittent hæmaturia. In a small percentage of cases a severe hæmorrhage is the first signal of the disease and is, of course, much more likely to occur as the condition progresses. Terminal hæmaturia is often noticed when the bladder becomes affected. The condition is diagnosed by the bacteriological examination of the urine and by cystoscopy which may show cystitis in patches, while the remainder of the bladder appears unaffected. Opaque yellow tubercles, and ulcers with undermined edges may be present in the inflamed parts. A guinea-pig should be inoculated in doubtful cases.

3. In Non-Tubercular Pyelonephritis or Pyelitis slight hæmaturia may be one of the earliest symptoms and one of the last to disappear.

4. Renal or Ureteric Calculus. A certain degree of hæmaturia is a common feature of calculus; in cases of colic the hæmaturia is often obvious, and may be preceded by nausea, vomiting, and collapse. The amount of blood may be increased by jolting, walking, or renal palpation. The patient as a rule enjoys long periods of immunity from hæmorrhage which is usually relieved by rest, an amelioration which does not occur in new growth, tuberculosis, or non-tubercular pyelonephritis. Examination by X-rays and excretion or instrumental pyelography, is the most important means of arriving at a diagnosis, though cystoscopy is very useful. If the stone is descending the cystoscope may show œdema with hæmorrhagic patches round the ureteric orifice of the affected side; occasionally the stone is seen to be actually engaged in the opening.

5. Renal Hæmorrhage after emptying a Distended Bladder. If a distended bladder with back pressure on the kidneys is quickly and entirely emptied the renal pressure is suddenly reduced with the not infrequent result of hæmorrhage into the tissues of the organ and from the walls of the kidney pelvis.

6. Injury to the Kidney or Ureter. Blood soon appears in the urine in most cases of ruptured kidney; but there need be no hæmaturia if the injury is confined to the cortex and does not affect the renal pelvis, or if the ureter is torn across or blocked by blood clot. Other prominent features of injury are a diffuse swelling, pain radiating along the line of the ureter, and variations in the amount of urine passed.

7. In Movable Kidney slight hæmaturia sometimes occurs owing to intermittent kinking of the blood vessels.

8. In Polycystic Kidney the hæmaturia is intermittent and usually so inconsiderable that it can be detected only on microscopic examination. The condition is almost always bilateral and the blood may come first from one kidney and then from the other.

9. Hydronephrosis and Pyonephrosis may be the cause of slight hæmaturia.

10. Renal Abscess is sometimes accompanied by a certain amount of hæmaturia. The onset of suppuration is usually indicated by a rigor and a rise of temperature, and may be accompanied by renal pain, and by tenderness and rigidity of the abdomen in the kidney region.

11. Papilloma of the Bladder is characterised by painless hæmaturia which usually starts suddenly without any apparent cause, continues for a day or two, and then as suddenly ceases. The hæmorrhage may be profuse even though the papilloma is small, and rest has but little effect on the condition. The blood is uniformly diffused throughout the urine. The cystoscope is the most important means of arriving at a diagnosis.

12. Carcinoma of the Bladder. It may be difficult, indeed almost impossible, to say whether a growth of the bladder is malignant or not. The growth is likely to be malignant if it is sessile rather than pedunculated, and if the patient is over fifty years old. Hæmaturia is one of the earliest features of malignant cases, the bleeding, which appears at the end of micturition, being as a rule slight at first, but recurring in increasing amounts. Cystoscopy is the most important means of diagnosis, but in doubtful cases the bladder should be opened supra-pubically.

13. Infection of the Bladder. The vesical mucous membrane is so vascular and so readily becomes engorged in the case of infection that slight, and in some cases, even severe terminal hæmaturia is likely to result.

14. Vesical Calculus. The hæmaturia is terminal and the bleeding is usually small in amount, but may be more profuse if the bladder becomes infected and consequently engorged. The effect of rest upon hæmorrhage due to stone in the bladder is so great that it becomes an important diagnostic sign. Cystoscopy clinches the diagnosis.

15. Vesical Hæmorrhage after Emptying a Distended Bladder. Sudden reduction of pressure by rapidly emptying a distended bladder may cause copious vesical bleeding.

16. Acute Prostatitis and Posterior Urethritis not infrequently cause slight terminal hæmaturia or a constant oozing of blood which trickles back into the bladder and is passed mixed with the urine at the next micturition.

17. In Spermatocystitis there may be slight terminal hæmaturia and blood-stained seminal emissions.

18. Cancer or Senile Enlargement of the Prostate. In cancer, hæmaturia is usually found only in advanced cases as a result of ulceration into the bladder or urethra. In senile enlargement, hæmorrhage may be spontaneous, but usually only follows the passage of a catheter. It mostly consists of a slight ooze at the end of micturition, but in some cases may be copious.

19. Tuberculosis of the Prostate or Seminal Vesicles. Hæmaturia may occur early in prostatic cases. Tuberculosis of the seminal vesicles gives rise to blood-stained seminal emissions which may be associated with terminal hæmaturia.

20. Prostatic Calculi may cause a small amount of either initial or terminal hæmaturia.

21. Malignant Growth of the Urethra. Hæmorrhage is one of the principal features of the disease. The blood may issue from the meatus unassociated with micturition, or may occur as hæmaturia, especially of the initial variety. Examination with the urethroscope is essential.

22. Calculus or Foreign Body in the Urethra. Hæmaturia, if present, will be of the initial type. Blood may be found issuing from the meatus entirely unassociated with micturition.