

the Rourke-Ernstene chart.¹ The final report includes the uncorrected and the corrected sedimentation rate in millimeters per minute and the hematocrit reading.

SUMMARY

1. The Rourke-Ernstene sedimentation rate method is made more practical and, under conditions where multiple tests have to be performed simultaneously, more accurate by the following modifications now used at the Cleveland Clinic:

- a. Substitution for heparin of the dry potassium and ammonium oxalate mixture of Heller and Paul.
- b. Estimation of the sedimentation rate from readings at 15 minute intervals rather than from graphs of time-distance readings or from direct calculations made from 2 mm.-time readings.
- c. Use of an illuminated rack for suspending Rourke-Ernstene tubes.

2. When 54 duplicate specimens of blood from unselected clinic patients were examined, the sedimentation rate calculated from readings at 15 minute intervals and corrected for anemia checked within 0.4 mm. a minute.

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PRIAPISM IN LEUKEMIA

Report of Two Cases

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True priapism is a pathologic erection of the penis characterized by persistence, pain, and absence of libido. It has been recognized as an occasional symptom and complication of leukemia since Jadioux¹ reported the first case in 1845. Additional reports appeared sporadically, and by carefully reviewing the literature up to 1914, Hinman² collected a total of 45 cases with a definite relation to leukemia.

INCIDENCE

Approximately 25 per cent of the total cases of priapism are associated with leukemia. This association occurs in both the acute and the chronic form of myelogenous and lymphogenous leukemia, but appears much more frequently in the myelogenous.³ The reported incidence of priapism in leukemia varies widely. Whereas Warthin⁴ stated that he obtained a history of priapism in about one-fourth of his cases, Cabot⁵ did not find a single instance of priapism in his series of 89 cases of leukemia. Craver⁶ reported 1 case in 100 men with leukemia.

ETIOLOGY AND PATHOLOGY

The etiology of priapism in leukemia is nervous and mechanical. Kunst,⁷ in support of nervous etiology, described a patient with hyperesthesia of the anal region, scrotum, and penis in whom priapism was relieved by supporting the spleen with an abdominal binder. He attributed priapism to compression of the sympathetics by the enlarged spleen. Ruh⁸ suggested that a thrombus forming in the cord and disturbing the third, the fourth, and the fifth sacral segment might cause priapism. Barney⁹ reported a case complicating leukemia in which priapism occurred after normal coitus. Postmortem studies by Warthin⁴ and Ruh,⁸ however, demonstrated that whatever the exciting cause, the persistence of priapism was due to a mechanical factor, which proved to be a leukemic thrombosis in the corpora cavernosa and dorsal veins of the penis. The glans was seldom involved in the process.

TREATMENT

For many years surgical treatment was advised. Either the congested blood was aspirated through a large needle, or the corpora were incised and the thrombi evacuated. Now, priapism persisting for forty-eight hours or longer and associated with leukemia is treated by deep x-ray therapy, which has been recommended by Kaplan,¹⁰ Barney,⁸ Archard,¹¹ Craver,⁶ and others. When irradiation therapy is used, the leukemia is treated systemically, and additional radiation is directed to the penis.

CASE REPORTS

Case 1—A white man, aged 20, came to the clinic on June 10, 1942, complaining of abdominal pain and erection of the penis of ten days' duration. In October 1941 he had an attack of painful swelling of the ankles lasting one week. This condition, treated at home by bedrest, subsided spontaneously. After this he had frequent head colds throughout the winter. In May 1942 he had an attack of priapism, which disappeared twenty-four hours after administration of nembutal, gr. 1½. Ten days before admission to the clinic he had a severe, sharp pain in the left lower abdominal quadrant, which

radiated into the penis, the left side of the scrotum, and upper left thigh. This pain subsided in about three hours, but the next day the priapism recurred and was accompanied by painful swelling of the ankles. He entered the local hospital, and when the priapism failed to subside by the following day, the penis was incised without affording relief. Routine blood studies revealed an abnormal white blood cell count, and he was referred to this clinic for further treatment. The systemic history revealed anorexia and lassitude for three to four months, a weight loss of 8 pounds in one month, and diminished hearing in the left ear of seven days' duration.

The patient was a pale white man, well developed and well nourished, with normal temperature, pulse, and blood pressure. He had diminished hearing of the conduction type in the left ear. The teeth were carious. Firm, enlarged, but nontender lymph nodes were palpable in the cervical, inguinal, and left axillary regions. A large mass was palpable in the left upper abdominal quadrant and extended downward to the level of the umbilicus and medially to the midline. This mass was smooth with a sharp edge and indefinite tenderness. The penis was erect and very edematous and had a wound over each of the two lateral corpora cavernosa.

LABORATORY DATA

Urinalysis

Specific gravity—1.027

pH—7.5

No sugar, albumin, casts, red blood cells, or white blood cells

Blood analysis

Blood urea—51 mg. per 100 ml.

Fasting blood sugar—143 mg. per 100 ml.

Wassermann and Kahn—negative

Hemoglobin—9 Gm. per 100 ml.

Erythrocytes—3,200,000 per cu. mm.

Leukocytes—450,000 per cu. mm.

Color index—0.91

Differential

Neutrophils—53 per cent

Eosinophils—5 per cent

Basophils—2 per cent

Myelocytes—39 per cent

Myeloblasts—1 per cent

A diagnosis of myelogenous leukemia was made. The patient was admitted to the hospital immediately for deep x-ray therapy. In ten days he received a total of 400 r over the splenic area, 250 r over the penis and inguinal regions, and 175 r diffusely over the entire body. He was discharged on the eleventh hospital day. When seen one month later he was much improved, the penile erection had subsided, the spleen was no longer palpable, his appetite and strength had returned, and he was gaining in weight. The hemoglobin at this time was 10.5 Gm. per 100 ml., and leukocyte count was 11,950 with a differential of 77 per cent neutrophils, 1 per cent eosinophils, 4 per cent basophils, 11 per cent lymphocytes, 5 per cent monocytes, and 2 per cent myelocytes. He died December 1, 1943.

In addition to priapism this patient exhibited two other comparatively rare pathologic complications of leukemia, i.e., leukemic deafness and leukemic arthritis.

Case 2—A white man, aged 29, was first seen in the clinic on February 1, 1945, complaining of persistent, painful erection for three days. He was a toolmaker, worked at night, and for the past nine months was frequently awakened during the day by a sharp pain in his rectum. This pain was always followed by an erection of the penis, which was unaccompanied by any erotic sensation, persisted from three to ten hours, and then gradually subsided. Accompanying the erection he had a "bunched up" feeling in his rectum, and until he lost this sensation, he was unable to reduce the erection.

He attributed the erections to a hemorrhoidectomy performed in July 1943. The last attack of priapism persisted for three days, and when he came to the clinic, he carefully protected the erect organ from contact with his clothing. Systemic history was entirely negative except for moderate malaise and anorexia for two months. He had worked daily on a twelve hour shift until three days before admission.

Physical examination revealed a poorly nourished white man with a temperature of 100.4 F., pulse rate 116 per minute, and blood pressure measured in millimeters of mercury 144 systolic and 98 diastolic. The skin was hot, moist, and rather gray in color. Pupils reacted to light and in accommodation, but the retinal veins were somewhat engorged, and there was a small hemorrhage in each retina. No lymphadenopathy was noted. A large mass was palpable in the left upper quadrant of the abdomen, which extended downward to the umbilicus and medially to the midline and descended downward on inspiration. The edge was rounded, and the surface was smooth. The edge of the liver descended 2 cm. below the costal margin on deep inspiration. The penis was in a state of erection. The corpora cavernosa were very firm and quite tender. The prepuce was partially retracted exposing most of the glans, which was quite soft.

LABORATORY DATA

Urinalysis

Specific gravity—1.020

pH—5.3

Heavy trace of albumin

No sugar, casts, red blood cells, or white blood cells

Blood analysis

Blood urea—33 mg. per 100 ml.

Fasting blood sugar—88 mg. per 100 ml.

Wassermann and Kahn reactions—negative

Hemoglobin—10.5 Gm. per 100 ml.

Erythrocytes—4,670,000 per cu. mm. with a few nucleated red cells

Leukocytes—317,500 per cu. mm.

Color index—0.74

Differential

Neutrophils—64 per cent

Eosinophils—3 per cent

Basophils—4 per cent

Lymphocytes—1 per cent

Monocytes—1 per cent

Myelocytes—26 per cent

Myeloblasts—1 per cent

A diagnosis of chronic myelogenous leukemia was made. The patient was admitted to the hospital immediately for deep x-ray therapy. In a seven day period he received 100 r over the splenic area, 200 r over the penis and inguinal regions, and 200 r as an anterior body spray. He was discharged on his tenth hospital day with the penis somewhat reduced in size. When seen one month later he was greatly improved. The penis was flaccid, though somewhat tender, and perhaps slightly larger and somewhat firmer in consistency than normal. His appetite and strength had improved, and he was anxious to return to work. The spleen was just palpable. Hemoglobin was 12.5 Gm. per 100 ml., erythrocytes 5,040,000, and leukocytes 11,550 with a differential of 75 per cent neutrophils, 1 per cent eosinophils, 21 per cent lymphocytes, and 3 per cent monocytes.

COMMENT

Of the 309 men with leukemia seen in the clinic since 1930, only the two reported in this article had priapism as a complicating factor. This is an incidence of only 0.65 per cent. Both cases occurred in chronic myelogenous leukemia and represented an incidence of 3.2 per cent in the 62 cases of chronic myelogenous leukemia in men seen in this clinic.

The cause of the erection in both cases appeared to be nervous in origin. This view is supported by the presence of sharp pain radiating into the penis and scrotum and preceding the erection in case 1, and by the pain in the rectum preceding the erection in case 2. In both cases, however, there was thrombus formation in the corpora cavernosa, which resulted in persistence of the erection and pain.

In case 1 incision was attempted without success, whereas irradiation therapy resulted in relief of symptoms. In case 2 a satisfactory result was obtained by treating the leukemia systemically and the penis locally with deep x-ray therapy.

SUMMARY

1. In persistent priapism the presence of leukemia must be considered.

2. Priapism occurred as a complication of leukemia in only 0.65 per cent of the 309 cases in men seen in this clinic. However, it occurred in 3.2 per cent of men with chronic myelogenous leukemia.

3. The cause of priapism may be nervous in origin, but the persistence is undoubtedly due to thrombosis in the venous spaces of the corpora cavernosa.

4. Deep x-ray therapy given systemically for treatment of the leukemia and locally for the treatment of the priapism is the therapy of choice.

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