Onset of paroxysmal myoglobinuria after tonsillectomy and adenoidectomy

Report of a Case

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IDIOPATHIC paroxysmal myoglobinuria, a syndrome consisting of the acute onset of muscle pain, weakness, and the passing of dark urine in the absence of anemia or hemolysis, was described by Meyer-Betz[1] in 1910. Now known as the Meyer-Betz syndrome, and formerly considered a rare disease, it has been more frequently reported since the advent of an electrophoretic method for the identification of myoglobin,[2] and is now a well-documented entity the origin of which remains obscure. In most reported cases in the pediatric age group the patients have had a prior or an associated minor infection, or have undergone recent increased muscular exertion, but in at least two patients paroxysmal myoglobinuria occurred after operations.[3, 4]

The following case report is of an eight and one-half year old boy in whom idiopathic paroxysmal myoglobinuria developed after tonsillectomy and adenoidectomy.

Report of a Case

An eight and one-half year old Caucasian boy was transferred to Cleveland Clinic Hospital on May 12, 1966, when it was noted that the urine was dark red after he had undergone tonsillectomy and adenoidectomy. The operation was performed the previous day at another hospital, after meperidine hydrochloride and atropine medication, and with nitrous oxide-oxygen-fluothane anesthesia, and succinyl dicholine administered before intubation. The duration of operation was 55 minutes. Thirty minutes later, as the child awakened, a red flush was noted to spread over his entire body; respirations became rapid and shallow; the heart rate was 108; and rectal temperature was 103.4 F. There was no apparent bleeding. One hour later the rectal temperature was 102 F, heart rate 148, respirations 56, and he began to complain of pain in the right leg. A roentgenogram of the chest was normal. Eight hours postoperatively he voided a large amount of dark-brown urine. Blood pressure recorded at that time was 160/120 mm Hg, and an hour later, 240/160 mm Hg. (Blood pressure at the time of admission to the hospital was 115/58 mm Hg.) It then returned to normal levels. He continued to have pain in the right calf muscles.

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Routine analysis of the dark urine revealed: 300 mg of albumin per 100 ml; from 5 to 14 leukocytes; from 3 to 5 erythrocytes; from 4 to 8 coarse granular casts, from 0 to 3 leukocyte casts, and from 0 to 2 hyaline casts per high-power field. (Initial urinalysis at the time of admission showed a pH of 6.0; specific gravity, 1.013; and no albumin or sugar; negative Hemastix test; from 0 to 3 leukocytes; no erythrocytes, no casts reported.) Pain in the leg and the passing of dark urine persisted, and he was transferred to Cleveland Clinic Hospital early the next day.

The patient's medical history included three previous hospitalizations: at the age of three months with pneumonia; at ten months with anemia that responded to iron administered parenterally; and at the age of six years with cervical lymphadenitis. There had been many throat and ear infections, and a slight loss of hearing. There was no previous history of dark urine, and no history of muscle weakness, although the child had frequently complained of pain in the calves during his sixth and seventh years. The family history was noncontributory.

Physical examination revealed a thin but well-developed eight and one-half year old boy, normotensive and afebrile. The pharynx had a typical 24-hour post tonsillectomy-and-adenoidectomy appearance with no bleeding. The calf muscles were exquisitely tender to palpation, and the patient was unable to walk because of pain and weakness in the legs. There was no unusual warmth or visible swelling of the calves. Other results of the examination were normal.

Laboratory studies disclosed: blood hemoglobin content, 13.7 gm per 100 ml; hematocrit value, 41; leukocyte count, 22,000 per cubic millimeter, with 84 segmented cells, 13 lymphocytes, and 3 monocytes; serum bilirubin content, direct, 0; total, 0.4 mg per 100 ml; direct Coombs' test, negative; bleeding time, 4 minutes (normal); coagulation time, 20 minutes (normal); platelet count, 430,000 per cubic millimeter. The urine was dark brown, with a pH of 5.5; specific gravity, 1.008; protein, 2+; no sugar; an occasional erythrocyte; and strongly benzidine positive. Paper electrophoretic protein pattern, using the method described by Whisnant and associates,[2] showed the pigment in the urine to be myoglobin.

In the expectation that other substances besides myoglobin would be released into circulation if muscle had been destroyed, the following serum enzymes were measured and found to be increased: creatine phosphokinase, 369.4 units per milliliter (normal, 0 to 12); lactic acid dehydrogenase, 7,100 units (normal, 200 to 700); glutamic-oxalacetic transaminase (Babson), 210 (normal, less than 40); aldolase, 200 S-L units per milliliter (normal, 3 to 8).

The color of the urine became normal after the second day in the hospital. Pain and tenderness in the calf disappeared. Gait limitation due to weakness persisted for several days, after which the patient was able to walk without difficulty. No specific therapy other than bed rest was prescribed. He was discharged from the hospital on the sixth day. At a progress examination, two weeks later, recovery appeared complete. No muscle weakness or tenderness could be elicited. All serum enzyme values were within normal limits: creatine phosphokinase, 7.1 units per milliliter; lactic acid dehydrogenase, 410 units; glutamic-oxalacetic transaminase, 37; and aldolase, 8 S-L units per milliliter. There was no evidence of protein or myoglobin in the urine.

COMMENT

Because of the low renal threshold for myoglobin, gross myoglobinuria develops when large amounts of muscle are rapidly destroyed, as occurs after crushing injuries, ischemia due to electric shock or arterial occlusion, or even after severe status epilepticus.[5] Primary myoglobinuria, the Meyer-Betz syndrome, occurring without prior trauma or other overt cause of muscle destruction, remains unexplained. There is some evidence that supports a familial form,[6, 7] and a defect in muscle glycolysis has been reported.[8, 9] Histologically, myoglobinuria does not resemble muscular dys-

trophy,[10] although it has been claimed to be a manifestation of that disease,[11] and in the case reported by Meyer-Betz the 13-year-old child had retardation of growth, atrophy of shoulder muscles, and pseudohypertrophy of the calf muscle. Various degrees of persistent muscle weakness and frank atrophy have been noted with recurrences.[10] It is more often reported to develop after physical exertion, but the severity of the episode does not correlate with the amount of exertion, and an attack does not always follow exertion in the affected patient.

The Meyer-Betz syndrome can be completely benign in its course, as in the case reported here, or it can proceed to paralysis, sometimes affecting the respiratory muscles and requiring temporarily supported respiration. A significant number of patients have suffered renal failure due to an acute tubular necrosis that does not appear to be caused directly by myoglobin.[1, 10]

The Meyer-Betz syndrome should be suspected if clear serum is found in conjunction with discolored, benzidine-positive urine that is free of erythrocytes. Conclusive proof is the demonstration of the urinary pigment as myoglobin,[12] together with the temporary elevation of muscle enzyme concentrations in the serum during the episode. There is at present no specific therapy for this disease, and treatment should be supportive, with careful observation of renal output and respiratory competence in order that appropriate measures can be taken if these systems become involved. Recurrence is to be expected.

SUMMARY

A case is reported of paroxysmal myoglobinuria that developed in an eight and one-half year old boy after he underwent tonsillectomy and adenoidectomy. The syndrome is characterized by acute onset of muscle pain, weakness, and the passing of dark urine, in the absence of hemolysis. With supportive therapy the child recovered; however recurrence is a feature of the syndrome.

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