Tetany as a Complication of Hemorrhoidectomy*

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TETANIC SPASM induced by hyperventilation is fairly common in hysterical subjects, but is rarely seen postoperatively. After many operations, hyperventilation sufficient to induce tetany is virtually impossible due to restriction of ventilatory movements, but after hemorrhoidectomy, there is no such limitation. In the two cases described in this report, severe attacks of tetany occurred several days after hemorrhoidectomy. In one of these cases, hysterical manifestations might reasonably have been expected, but in the other there was no reason to anticipate anything other than normal recovery. A notable feature of both cases was the marked reduction in the plasma phosphate level during the attack.

Report of Cases

Case 1: A 35-year-old man was admitted to The London Hospital on April 22, 1961. He gave a 12-year history of piles which prolapsed and bled on defecation. The symptoms were gradually increasing in severity. Apart from this, his health was very good, and the only possible relevant feature in the past history was an episode of alopecia areata in 1955. The only abnormal finding was hemorrhoids which did not prolapse on straining, but which were easily visible on proctoscopic examination. On April 24, 1961, sigmoidoscopy having proved negative, hemorrhoidectomy was performed using the standard dissection ligature technic. Morphine, 1/8 grain, was prescribed postoperatively and in April 28, 1961, emulsified liquid paraffin, 1/2 fluid ounce, three times a day, was begun. Progress was uneventful until April 29, 1961, when the patient had a sudden desire to defecate and, after considerable effort, a loose motion was passed. A great deal of pain was experienced both during and after this episode. Ten minutes later he complained of severe tingling in the face, hands and arms, rapidly followed by painful spasms of the muscles of the abdomen, upper limbs and face. He was breathing heavily, the pulse rate was 100 and the respiration rate was more than 30 per minute. He was sweating and his muscles were fasciculating. The facial muscles were in spasm, giving a waxing and waning carpopedal spasm was present. Blood was taken for estimation of blood calcium and, at the same time, 20 cc. of 10 per cent calcium gluconate was given. He also received 1,500 units of antitetanus serum and 100 mg. of pethidine. Fifteen minutes later the spasms and paresthesia had ceased, but the Chvostek and Trousseau signs were positive. The blood taken during the attack showed a calcium level of 9.2 mg. per cent and a phosphate of 1.6 mg. per cent. Later bowel actions were less painful and there was no recurrence of tetany. He was discharged on May 4, 1961. When seen in the outpatient department on May 19, 1962, his bowels were open daily, with only a slight degree of pain. At this time, the serum calcium was 9.7 mg. per cent and the phosphate was 3.2 mg. per cent. He was seen again in January 1963, at which time he was free of symptoms.

Case 2: A 32-year-old woman was admitted to The London Hospital on November 19, 1962. She gave a ten-year history of prolapsing piles with symptoms of steadily increasing severity and recent bleeding on defecation. Her general health was good, but she gave a past history of episodes of loss of consciousness. The duration of these attacks was as much as ten minutes and they occurred at intervals of from two to six weeks. The first attack followed an incident in which she had been badly frightened. Investigations were performed at The London Hospital in 1955, and it was believed that she was suffering from a form of left temporal lobe epilepsy. She was given phenobarbital, 1/2 grain, twice a day, and phenytoin (diphenylhydantoin sodium), 1/4 grains, twice a day, after which the frequency of the attacks gradually diminished. They ceased altogether in 1956 when she became pregnant, and therapy was discontinued. On examination (November 19, 1962) she was found to be nervous, but in good general health. She had large, prolapsed piles. An operation was performed on November 20, 1962, when sigmoidoscopy had proved negative; hemorrhoidectomy was performed, using the dissection ligature technic. Liquid paraffin, 1/2 fluid ounce, three times a day, was started on the first postoperative day, together with pheno-

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barbital, 1/2 grain, three times a day. Morphine, 1/4 grain, was given as necessary to relieve pain. Progress was uneventful until November 22, 1962, when, soon after routine physiotherapy breathing exercises, she complained of paresthesia in the legs. On examination, she was found to have the facial and carpopedal spasm typical of tetany. She was very distressed and her respiratory rate was over 30 per minute. The patient was made to rebreathe from a paper bag, and the tetany subsided after a period of about ten minutes. Blood taken during the attack showed a calcium level of 9.8 mg. per cent and a phosphate of 0.8 mg. per cent. This latter estimation was checked and the examination gave the same result. This attack was not associated with defecation but, when questioned afterward, the patient said that the anal pain had been extremely severe at that time. Three days later, another slight attack of tetany occurred, this time after painful defecation. Again rebreathing into a paper bag relieved the symptoms. In view of these attacks and the unusually low phosphate level, extensive investigations into her calcium and phosphate metabolism were undertaken. These were all normal, as were the renal function tests. Several further phosphate estimations were in the range of from 3.1 to 3.6 mg. per cent. The magnesium was 1.6 mEq./l. She was discharged on December 8, 1962, but readmission was necessary on December 12, 1962, following another attack of tetany. Healing of the anal wound was satisfactory. She was taught to use an anal dilator and was discharged on December 19, 1962, taking 1/2 grain of sodium amytal four times a day. When seen on February 11, 1963, she was still complaining of anal pain, but had not experienced any further attacks of tetany.

Discussion
Tetanic spasm due to hyperventilation is a well-recognized entity. In many cases, an element of hysteria is present. The causes of tetany can be classified as 1) a fall in plasma calcium concentration; 2) a rise in plasma pH; 3) less commonly, a rise in plasma potassium concentration; and 4) rarely, a low serum magnesium level. These factors may act singly or in combination to produce tetany. The critical level of calcium is usually regarded as being about 6 mg. per cent, but in fact, the development of tetany depends on the level of ionized calcium rather than on the total calcium value. Shock and Hastings 5 showed that a 20-minute spell of hyperventilation causes the plasma pH to rise from 7.32 to 7.69, and it is reasonable to assume that such a rise would result in a decrease in the concentration of ionized calcium without altering its total concentration. However, Cecil and Loeb 5 state that although the neuromuscular effects of alkalosis are indistinguishable from those of hypocalcemia, there is no clear evidence that the effects of alkalosis are exerted indirectly through hypocalcemia. The fall in plasma phosphate concentration, which was such a prominent feature in the cases described, was found to occur in experimental hyperventilation by Stanbury and Thomson. 5 These authors carried out investigations into the renal response during periods of hyperventilation continued to the point of tetany. They found significant falls in the plasma bicarbonate, phosphate and potassium levels, accompanied by a rise in pH. The fall in plasma bicarbonate was accompanied by an increase in the urinary excretion of bicarbonate, whereas in the case of phosphate, the fall in the plasma level was paralleled by a fall in urinary excretion of this substance. They postulated that the initial defense of plasma pH is largely dependent on cellular buffering, with organic acids diffusing into the extracellular fluids. This results in changes in cellular metabolism with resultant uptake of phosphate and potassium by the cell, and a fall in the plasma levels of these substances. The phosphate level returns to normal over a period of about two hours; the return to normal plasma potassium values takes rather longer.

The amount of pain which is experienced after hemorrhoidectomy is very variable. Some patients appear to suffer little more than after other minor surgical procedures, while interrogation of others, even of a phlegmatic disposition, reveals that they have experienced pain of extreme degree. Variation in technic or in the severity of the pre-existing condition does not seem to affect the issue in any predictable fashion. As a result, the less traumatic and