

Clinical Department.

A CASE OF AMMONIA-POISONING, WITH UNUSUAL FEATURES.¹

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PATRICK G., a gang-boss, or foreman of a gang of laborers, white, forty-six years of age, was brought to the accident-ward of the Pennsylvania Hospital a little after midnight on the morning of November 24th, with the statement that about two hours previously, he had swallowed, by mistake, a quantity of a strong solution of ammonia, of the kind used for cleaning grease from clothing, known as "household ammonia." It was uncertain how much passed into the œsophagus, as he claimed that he took a gulp and, finding that he had made a mistake, immediately spat it out again. A physician administered vinegar, and subsequently milk in considerable quantity. He had been in excellent general health up to the time of the accident. Upon admission, his mind was clear, his skin natural, his pulse 110, regular and of good volume. He had not vomited. The respirations were labored and somewhat stertorous, 28 to the minute. His voice was muffled and husky, apparently the result of some œdema of the glottis. The lips, gums and tongue were swollen; the latter has its epithelium entirely taken off, leaving exposed a red, raw surface. Two days later, when the swelling of the tongue had subsided sufficiently to make a digital examination, it was discovered that the tonsils were very much enlarged, nearly meeting in the middle, and the uvula was elongated and œdematous. Under the treatment instituted upon admission — ice-compresses to the neck, applications of oil and demulcents to the tongue and throat, and a milk diet — he improved markedly upon the day after entering the hospital; but, on the second night, he complained of headache, and was delirious. This condition only existed for the one night, however, and these were the only nervous symptoms presented during the time he was under treatment. Soon after admission, the stertorous breathing disappeared; but it was followed by a slight cough with considerable blood-streaked expectoration, which may have come principally from his mouth where there was extensive excoriation. He also complained of pain in the left side of his chest; but physical examination failed to detect any abnormality in the lung. It should be stated, in connection with the swelling of the tonsils two days after the accident, that there was also enlargement of the lymphatic glands under the angle of the jaw on each side of the neck. His temperature was 99.5° upon admission, and the next morning it was 100.5°; subsequently it remained between 99° and 100°.

There was one feature in the case which demands special consideration. On the day after admission, it was noted that his urine was diminished in quantity, not more than twenty-six ounces in twenty-four hours. It was turbid and high colored, specific gravity 1.024, slightly alkaline in reaction and heavily albuminous, about sixty per cent., estimated by bulk of conglulum after boiling in a test-tube. The examination with the microscope revealed red-blood disks and leucocytes, also numerous epithelial, hyaline and slightly granular casts. This was coincident with the headache and delirium already mentioned.

On the 26th, it was recorded that the urine showed merely a small amount of albumen, with only a few epithelial and hyaline casts. The following day the urine was found to be entirely free from albumen; but, on the morning of the 28th, a trace was detected. For this condition of acute Bright's disease of the kidneys, he was given infusion of digitalis, commencing with a dessertspoonful dose, at first, afterwards increasing to a tablespoonful, so that he took about two ounces daily.

Under the use of glycerine and water to the tongue and diluent drinks, the mouth was restored to a healthy condition and the œdema of the uvula passed away; his voice also regained its natural tone. It was considered advisable to retain him in the ward for a few days as a matter of precaution, but he was convalescent when presented to the class.

This case affords an illustration of the effects of swallowing a strong solution of ammonia by a man, who, up to the time of this accident, was in excellent health. The first point to which I will call attention is the local effect of the strong alkali upon the mouth and throat. Swelling of the tonsils and tongue occurred almost immediately, with œdema of the uvula, and in this acute inflammation the larynx participated, so that death by suffocation, appeared imminent. After the subsidence of the acute swelling, the epithelium came off, making it difficult for the patient to take any nourishment. By the local use of glycerine and water by demulcent drinks and a strict milk diet, he was enabled to keep up until the severe symptoms subsided. With the local inflammation just mentioned, there was slight fever; but the most interesting point in connection with this case is the kidney disorder. This was characterized at first by evidence of congestion or hyperemia, which must have rapidly passed into acute tubal nephritis. The large amount of albumen at the beginning was partly due to hæmorrhage from the parenchyma of the kidneys. This was followed by the free desquamation of renal epithelium, in the form of epithelial casts, associated with exudation casts, some of which were granular. Not the least interesting point was the rapid subsidence of the kidney affection under the influence of the digitalis and the milk-diet. The casts all disappeared, and of the albumen an occasional trace only remained. It is natural to ask what gave rise to the acute Bright's disease in this case. Of course, it could be suggested that it was due directly to the ammonia, which, after being swallowed, entered the blood and passed out again by the kidneys. While that might be partly true, it occurred to me that the kidney affection might be likened to that which happens in cases of burns of the skin. In such cases, as I pointed out a number of years ago, we have an acute parenchymatous nephritis developed, when the skin is burned to any considerable extent. Why should we not have a similar state of affairs resulting when the mucous membrane is extensively burned, as it was in this case with ammonia? However, whatever be the exact cause of the kidney disorder, the inflammation was most manifest; it was not simply a case of congestion, but a typical case of acute parenchymatous inflammation, as the tube-casts proved. In connection with this, we might ask, "Would the condition of the kidneys not account for the headache and the delirium?" Furthermore, might not this kidney lesion be the cause of what has been noticed in some instances of ammonia-poisoning, the convulsions? These have been thought by Lange to be due to direct stimulation

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of the motor function of the spinal cord, but they may well be uræmic in character; the delirium and headache in this case certainly bear this interpretation.

As regards treatment of this case, in point of fact, it was the immediate administration of the vinegar and the milk, and the local application to the burnt parts, by the physician who sent him to the hospital, that was of the greatest service to the patient. There is always great risk of the rapid development of œdema of the glottis in these cases, where a powerful irritant has been swallowed, and the resident very properly prepared everything for the prompt performance of tracheotomy, which fortunately was not rendered necessary by increase of the swelling. The importance of examination of the urine, in these cases of ammonia-poisoning, was well illustrated in this case. The condition was met here by the administration of digitalis, a milk-diet and an occasional laxative. The recognition, early in the course of the case, of the disease of the kidneys, and the prompt resort to appropriate treatment, might serve to avert lesions which would perhaps be of more danger than the primary effects of the ammonia, in the mouth, throat and surrounding parts.

The urine, in this case was found to be slightly alkaline, which was probably due to the presence of blood in the urine, or to the increased alkalinity of the blood from the absorption of the ammonia. It has been stated that, in some cases of ammonia-poisoning, the urine has been found to be acid; and this has been attributed to oxidation, by which the ammonia is converted in the blood into nitric acid. We have no evidence here that any such change took place.

In conclusion, I will remark that it is always of importance in cases of ammonia-poisoning which may be attended by acute inflammation of the kidneys, to keep the urine well-diluted, by the administration of such bland liquids as the patient can swallow. The question of the amount of influence which the perturbation of the nervous system, incident upon the fright and the shock had in the production of the disease of the kidneys, we cannot at present solve. The nervous system certainly governs the functions of the kidneys, and undoubtedly congestion of these organs might have such a cause as has just been suggested, yet we are scarcely prepared to assume that the inflammation may be attributed to a nervous cause alone.

RECOVERY IN A DESPERATE CASE OF ACONITE POISONING.

BY G. H. TUTTLE, M.D., EAST CAMBRIDGE, MASS.

Two cases of aconite poisoning have occurred in Cambridge during one week recently. The first resulted fatally, the second recovered. In the first case five and one-half drachms of the tincture were ingested, in the second, seven and one-half drachms. Medical assistance was obtained within ten minutes in the first case, and not until forty-five minutes had elapsed in the second. The treatment used in the first instance I am unable to state, but of the second case I can speak as an eye-witness.

The victim of the second poisoning was a large and strong person of decidedly alcoholic habits; and at the time of the accident he was on the verge of *mania a potu*. The man had been in the habit of taking

bromide at such times and in this case he confused it with the aconite. The quantity of the official tincture taken was within ten drops of an ounce. The man, at the time, had been drinking, but his condition was not noticeable. The aconite was taken at 10.30 A. M. At 10.50 he complained of feeling sick; but no attention was paid to this on account of his known alcoholic habits. At 11.15 he first vomited, and from this time on he continued to have nausea and frequent ejections of small amounts of yellowish fluid. A little mustard water was given him by the family, but his resistance was so great that only a small amount entered his stomach and no effect was produced. At 11.30 two doctors arrived. They stayed an hour, and during that time injected three syringefuls of brandy with a little tincture of digitalis under the skin. Only once during the whole hour could the pulse be felt at the wrist. The priest was called and a fatal prognosis given to the family.

At the request of the doctor in charge of the case, I consented to stay with the man and continue the treatment of brandy and digitalis with any other additional means which should occur to me. All three doctors considered the man moribund. At this time — one hour and a half after the poisoning — the patient was lying upon his back on the floor. The face was flushed from repeated vomiting; the respiration very slow and noiseless, being barely recognizable. Muscular relaxation was great, the arms and legs, when raised, dropping helplessly. The pupils were insensible to light. The pulse at the wrist could not be detected. The arms and legs were quite cold as far as the trunk. No convulsions had occurred. The man was entirely unconscious.

I concluded that nothing but heroic measures would avail to save him. I injected as fast as possible three syringefuls of brandy, and twenty drops of digitalis under the skin. Twenty drops each of tincture of digitalis and nux vomica plus brandy and a little molasses were injected into the rectum. Mustard water was poured down the throat freely; and ether and ammonia given by the nose as fast as possible. Hot jugs and blankets were used to retain the body heat. In about twenty minutes the arms became warm as far as the elbows, and the pulse became perceptible at the wrist. Free vomiting had followed the exhibition of mustard water and this, too, seemed to rouse him somewhat. Ten drops more of digitalis and two syringefuls of brandy were now injected. The pulse strengthened somewhat, the man opened his eyes and spoke incoherently. In another half-hour he was able to roll over upon his side and vomit intelligently into a basin. Hypodermics of brandy and five-drop doses of digitalis were injected every twenty or thirty minutes. Later brandy and carbonate of ammonia were given by the mouth, not at first retained in the stomach, but finally kept down for twenty or thirty minutes.

As he recovered, he complained of his head feeling swollen and of pins and needles sticking into him everywhere, also of great numbness. In four hours' time — five and one-half hours from the time of ingestion — he seemed perfectly conscious and spoke intelligently to members of the family. About this time he complained of burning pain in the stomach and begged every minute or two for water. Mucilage of acacia with bismuth and soda was then given him and continued for several hours; also small pieces of ice and brandy by the stomach.