SURGICAL ASPECTS OF GRAVES'. DISEASE WITH REFERENCE TO THE PSYCHIC FACTOR.*

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WE may accept as proven the fundamental proposition that if a sufficient amount of the thyroid gland in Graves' disease be successfully excised relief or cure will follow. Whether the relief or cure be complete or incomplete is dependent upon the correct or incorrect judgment in estimating the amount of gland tissue to be removed. In my earlier cases I frequently erred on the side of removing too little. The relief that follows the removal of a sufficient amount of gland tissue is comparable to the relief from withholding drugs which cause excitation. The extraordinary subjective relief is expressed largely in psychic terms. It resembles most the phenomena of good news in contrast with bad. Buoyancy supplants gloomy depression. The objective signs of improvement follow later. The psychic and metabolic phenomena are closely interwoven.

The serious barrier to surgical treatment is the immediate operative risk. This risk is not shock, it is not hemorrhage, it is not infection, it is hyperthyroidism. What produces the hyperthyroidism? Operation upon parts of the body other than the thyroid gland in acute Graves' disease is quite as fatal as operation upon the gland itself. Simple accidents occurring in Graves' cases often prove fatal. In acute Graves' disease death may be precipitated by psychic excitation, but psychic excitation cannot be separated from accidents. From the literature, from the general phenomena, from certain experiments, and from the following specific cases, were derived the methods to be hereafter proposed in operation upon these cases.

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In the case of a young physician with acute Graves' disease not responding to the best available medical care an operation was performed. On the day of the operation the hyperthyroidism steadily increased as the hour for operation approached, it was accelerated on his way to the operating room, and culminated in a wild toxic delirium while passing through the first stage of anæsthesia. The operation was short and was technically satisfactory. The toxicity, however, was progressive and he died in the tenth postoperative hour. Temperature at the time of death was 110°.

A young woman with acute Graves' disease became delirious during the preparation for operation under cocaine. The hyperthyroidism rapidly rose, and she died three hours afterward. The temperature at the time of death was 107° and rose ¾° during the first hour after death.

Another case of acute Graves', during the preparation for operation and during the first stage of anæsthesia, became so toxic that no operation whatever was performed. The symptoms of thyroid poisoning were progressive and she died eight hours later. The temperature at the time of death was 109°, and it rose 1° after death.

These cases appeared to be chemically destroyed. They constitute a group of acute cases of the severest types—cases most urgently needing relief. They had resisted medical treatment. They had continuous elevation of temperature, the pulse rate varied from 120° to 160°, the heart was dilated, and all were acutely toxic at the time of operation.

We apparently had not the slightest control over their destiny. During this time we were operating with splendid success on subacute cases of Graves' disease,—old colloid goitre with added Graves' disease.

At this time we were fortunate in finding in our laboratories two dogs with unmistakable Graves' disease. They exhibited extreme nervousness, muscular weakness and tremor, a daily range of elevation of temperature, marked gastro-intestinal disturbances, diarrhœa and emaciation. The thyroids gave a distinct thrill and were large, soft and vascular. No exophthalmos was noted, but as this is not always a symptom

of Graves' disease in the human being it may not be a necessary symptom in dogs. These dogs, therefore, having tachycardia, temperature curve, loss in weight and muscular strength, an increased appetite and thirst, gave a good picture of Graves' disease. They furnished an unusual opportunity for carrying out a course of experiments. Each dog was observed for several days to determine as nearly as possible his daily phenomena. The animal was then subjected to various forms of psychic excitation, such as fear and anger. One animal was thrown into a state of marked excitement by fear. When he was frightened either with a whip or in various other ways, he would show, after about six hours, a marked rise of temperature, increased tachycardia, trembling, gastro-intestinal symptoms and even diarrhœa. The temperature then gradually fell, the mental symptoms subsided and the tachycardia diminished and the dog returned to his former condition. It was found that anger in the absence of fear also caused toxic symptoms. Following these forms of excitation the animal exhibited symptoms comparable to those occurring in the human being with Graves' disease. To make the parallel closer we planned anæsthetizing the dog, in the ordinary way, after first exciting him. Following this the dog showed very marked hyperthyroidism. After three days' rest the dog was given morphine half an hour before the anæsthetic, the latter was very gently administered and continued for the same period and under like conditions as in the former experiment. The dog showed no symptoms whatever of hyperthyroidism. In our judgment these experiments were parallel to the different methods of carrying out anæsthesia and operation upon human patients with Graves' disease. After repeating these experiments and performing similar ones on normal dogs, until it was obvious that we could produce a state of hyperthyroidism by psychic excitation, we then tried to produce similar symptoms by injecting in various doses the juice of thyroid glands which had been expressed by means of the Buchner press. This juice was given hypodermically at different times and in vary-

ing doses to the two Graves' dogs and to normal dogs, so that, in all, 10 dogs were injected. The effect upon the two groups of animals following the injection was very marked. In the dogs with Graves' disease the symptoms appeared earlier and lasted longer and with greater severity than in the normal dogs. In them an injection caused a rise of temperature, appearing after six hours and continuing from three to four days and in one case 10 days. The symptoms in all of the dogs following the injection were those of hyperthyroidism, but they were more marked in the dogs with Graves' disease than in the normal. As a control the juice from a number of other organs, namely, the kidneys, liver, etc., was administered in 20 times the dosage of that of the thyroid juice, but it was found that it produced no symptoms that could be confused with those of hyperthyroidism. The observations were carefully made, the laboratory was kept open day and night, every two hours observations were taken, and there was little chance for error.

These experiments in the laboratory corroborated clinical observations previously made and we formed the following hypothesis: that in Graves' disease the most powerful factor producing hyperthyroidism is psychic excitation: that in some way, either directly or indirectly, psychic excitation discharges into the circulation an excessive amount of thyroid secretion, which, in itself, may cause death; that the greatest factor in the mortality is not the operation *per se*, if well done, but what has occurred before the operation. In other words, at the time the surgeon makes his first incision the fate of the patient has been already sealed.

If, then, Graves' disease is surgically curable, and if one of the greatest factors in the surgical risk is psychic excitation, the operation should be performed without the patient's knowledge. Such an operation was accordingly planned and found to be readily accomplished by securing from the patient consent to enter the hospital to be treated either medically or surgically as I thought best, without further discussion. On entering the hospital a non-operative routine treatment is first

employed. The object of this treatment is that of minimizing the disease phenomena and studying the case. In addition to the routine, consisting of baths, diet, etc., every morning my trained anæsthetist, who is gentle and tactful, goes through the complete form of administering anæsthesia under the guise of inhalation treatment. On the ether mask are dropped solutions of volatile oils. The patient's friends are told that the date of operation would be determined by the patient's condition. The clinical phenomena in these cases run an uneven course. Within a few days or a week we usually recognize the cycles of the disease. In the optomum portion of this cycle operation is performed. The evening prior to operation the patient is given bromides; in early morning if the conditions are favorable for operation a hypodermic of morphia is given. The shades of her room are kept drawn and absolute quiet maintained. In this manner the patient is brought as nearly as possible to a negative psychic state. The operation is done at an early morning hour. At this time the anæsthetist repeats the so-called inhalation treatment. The volatile oils are again dropped on the cone and the patient is told that this inhalation will be stronger, and that possibly a sore throat may result, but that the doctors say that this will be the last inhalation required. Gradually the ether is added drop by drop and imperceptibly the patient passes into the second stage of anæsthesia. She is then promptly sent to the operating room, and the operation is performed in the usual way. The only change recently made in the technic is that of securing the blood vessels by means of a long needle threaded with catgut, at the four poles of the gland tissue near the posterior capsule, leaving a portion of the gland. After tying these four ligatures the principal blood supply of the gland is controlled. The gland tissue is then cut away leaving only portions of each lobe. After this the raw surface is treated with very hot water, almost boiling, to control and destroy the superficial secretion and minimize oozing. The operation is performed with the least possible trauma upon the gland. The results are best appreciated by placing them in contrast

with those of other methods and with those following operations for other affections of the gland.

Among 225 operations upon the thyroid gland 142 were for benign tumors or hypertrophies. Among these there was but one death. Among 28 cases of Graves' disease operated prior to the adoption of the present method the mortality rate was four. In the 13 cases operated by the new method, all of which were of a fair or a high degree of intelligence, and nine of which were of the severe toxic type, we succeeded in every instance in performing the operation without the patient's knowledge. The pulse rates prior to and during the anæsthesia and operation showed but little change. Sometimes the pulse rose a little, at other times it fell. The usual abrupt circulatory changes attending operations for this disease did not appear. Four of these cases were of the bed-ridden type, manifesting a running fever, a pulse rate from 120 to 170, acute dilatation of the heart, acute gastro-intestinal disturbances, and violent psychic storms. They were no less severe than the four fatal cases previously mentioned. There was the usual post-operation goitre rise in temperature and in pulse rate, but all of the cases made good recoveries.

Summary.—There is evidence to show that the thyroid gland may discharge a pathological amount of its secretion in response to psychic excitation. This does not imply an explanation of the etiology. The symptoms of Graves' disease partially or entirely disappear after the removal of a sufficient amount of the thyroid gland. The psychic factor is the most important in the surgical risk. This factor may be eliminated by "stealing" the gland. When eliminated the operative risk seems to be greatly reduced.