

# PREFRONTAL LOBOTOMY FOR THE RELIEF OF INTRACTABLE PAIN; VALUE AND LIMITATIONS

## *Report of Five Cases*

GUY H. WILLIAMS, JR., M.D.

Department of Neuropsychiatry

THE relief of pain has been one of the chief concerns of physicians since time immemorial. Medical history reveals the use of a wide variety of mechanical procedures, administration of substances such as herbs and drugs, as well as the employment of incantations and witchcraft to relieve discomfort. Fortunately, through the "growth process" of medicine, scientifically sound medications and surgical procedures have been developed to achieve the relief of pain. In the majority of painful conditions mitigation is achieved by the present day routine surgical and medical armamentarium. However, in certain cases of advanced diseases, as well as in some of the more severe disorders of the nervous and emotional systems, the usual measures of pain alleviation are inadequate.

Surgical methods, both conservative and radical, have been employed for the relief of pain with varying degrees of success. Within the past several years psychosurgery, originated in the modern sense by Moniz and Lima<sup>1</sup> in 1935 and pioneered in America by Freeman and Watts,<sup>2</sup> have afforded the neurosurgeon a new and more potent weapon to be used in cases where intractable pain, extreme anxiety and depression and accompanying drug dependence have become issues of paramount importance.

Numerous articles on prefrontal lobotomy have appeared in the medical literature. This discussion will not attempt to evaluate the procedure. The following case reports merely demonstrate that prefrontal lobotomy serves a useful purpose in the present day therapy.

### Case Reports

#### Case 1. Intractable Pain from Carcinoma of the Mastoid

A 58-year-old white woman came to the Cleveland Clinic with a discharging right ear which had troubled her for four months. Originally she was treated for a chronic otitis media and otitis externa. However, inasmuch as the condition failed to improve within three to four weeks' time on the usual methods of treatment, a mastoidectomy was recommended.

Radical mastoidectomy revealed a partially differentiated squamous cell carcinoma of the right ear. Deep x-ray therapy, radon packs and radon capsules were ineffective in impeding the spread of the malignancy.

Approximately three months following her initial visit the patient complained of such severe shooting pain in the right ear and temporomandibular joint, as well as radiation of the pain to the head that the Department of Neurosurgery was called in consultation regarding measures to relieve this discomfort. At this time x-ray examination demonstrated involvement of the right temporomandibular joint as well as erosion of the cranial vault.

Associated with the pain was an increasing degree of anxiety and tension. These factors necessitated larger doses of sedation, so that neuropsychiatric consultation was also requested relative to the feasibility of prefrontal lobotomy. The extensive involvement of the malignant process created certain technical problems that rendered nerve section or intracranial tractotomy extremely difficult. Because of these complications and symptoms, a decision was reached after thorough discussion of the problem with the patient's family, to carry out lobotomy.

Bilateral prefrontal lobotomy was performed (W. James Gardner, M.D.) through burr holes located 3 cm. behind the outer canthus and 6 cm. above the zygoma.

The day following operation, the patient was apathetic, incontinent, manifested no anxiety or concern over her condition and although she admitted awareness of pain when questioned directly, did not ask for sedatives. This basic pattern existed at the time of hospital discharge sixteen days postoperatively.

Six weeks after bilateral lobotomy she was still apathetic (however, less so than immediately after operation), responded only when spoken to, expressed no complaints and when questioned directly concerning pain, acknowledged none. The anxiety and tension present prior to lobotomy were entirely absent.

The patient's daughter believed that the procedure had been justified even though the nursing problem was intensified. Clinically this operation was considered successful.

### Case 2. Contralateral Postherpetic Neuralgia

A 65-year-old white man was first seen at the Cleveland Clinic on July 16, 1945 with the complaint of "terrific pain in, behind, and above the right eye" which had first caused him distress on February 9, 1945 and was described as severe, constant, sharp and burning. The next day his physician advised hot applications which were followed by blisters on the right side of the face in the distribution of the ophthalmic branch of the fifth cranial nerve. Four days after the diagnosis of glaucoma was made an operation was performed on the right eye. He was disoriented and confused for three days, postoperatively. On February 22, the right eye was removed. After enucleation the patient immediately experienced pain in the right orbit, as well as in the right forehead up to the hairline. The forehead was also described as feeling numb. The pain was paroxysmal in nature and often lasted as long as ten days. He was never free of pain for more than two to three days at a time. There was no visual disturbance preceding the onset of symptoms.

Physical examination on July 16, 1945 demonstrated a questionable hypalgesia in the first and third divisions of the right trigeminal nerve. A procaine hydrochloride injection of the right supraorbital nerve gave relief from pain for a week.

A subsequent alcohol injection of the supraorbital nerve did not relieve the pain but did anesthetize the forehead. A trial on x-ray therapy and the administration of sodium cacodylate was also valueless.

On September 21, 1945, the right greater superficial petrosal nerve was sectioned and at the same time the middle meningeal artery was ligated. These procedures failed to relieve the pain as did section of the sensory root of the right trigeminal nerve five days later. Subsequent stellate ganglion injections and excision failed to alleviate his discomfort.

Doctors Gardner and Karnosh were of the opinion that the patient's pain was probably due to preherpetic tension which finally broke out in a true herpetic crisis in August or September 1945. In view of the history outlined, the premise was accepted that discomfort was central in origin.

A unilateral prefrontal left lobotomy (W. James Gardner, M.D.) was carried out on October 28, 1946. This operation was performed under direct observation through an opening 2.5 cm. in diameter located one inch anterior to the coronal suture in the pupillary line to the left of the sagittal suture. The wound was covered with a tantalum plate 4 cm. square. For four to five days the patient was relatively free of pain but was confused, disoriented, and manifested a mild pyrexia.

One month later he was experiencing less pain and using less sedation. Five months following unilateral lobotomy the pain was again as severe as ever. The only favorable com-

ment was that he was slightly less depressed. The patient and his family refused right prefrontal lobotomy.

The case demonstrates a failure from unilateral prefrontal lobotomy. Unilateral prefrontal lobotomy, however, has proved to be effective in some instances.

### Case 3. Neuralgia, Chronic Depression and Drug Dependence

A white woman, 52 years of age, had been seen at the Cleveland Clinic on numerous occasions throughout the past twenty-three years for a variety of disorders. The chief problems were hyperthyroidism, for which she had undergone a thyroidectomy in 1924, hypochromic anemia, postherpetic neuralgia involving the left trigeminal nerve with subsequent intracranial section of the sensory root of the 5th cranial nerve, and a mixed depression of long standing.

Although complete anesthesia in the area of the left trigeminal nerve had existed since the section in January, 1944, she continued to complain of "misery" and pressure in the head, with severe intractable pain in the left temple.

In September 1944, she was given electroshock therapy without any permanent relief.

At the time of the last admission to the Clinic Hospital on April 1, 1947, she proffered the same complaints as recorded previously, and in addition, was found to be emaciated with evidence of deficiency disease. The patient's husband stated that she had been taking increasing amounts of barbituates for the past several years.

A bilateral prefrontal lobotomy was performed on April 10, 1947 (A. T. Bunts, M.D.). Under local anesthesia a short scalp incision was made 1.5 inches to either side of the midline, and the middle of each incision was located about 3.5 inches posterior to the supra-orbital ridge. The periosteum was elevated from the frontal bone on the right side, and a drill-hole made through the skull at a point 3.5 inches behind the supraorbital ridge. The bony drill-hole was enlarged with rongeurs to the size of a quarter. The dura was opened with stellate incisions. The surface of the brain was treated with the electrocoagulator, and an incision about 1 inch long made through the cortex. By using the aspirator, the septum elevator, and flat, narrow retractors, the white matter of the frontal lobe was divided transversely in a direction parallel with the coronal suture. The anterior horn of the right ventricle was entered, and the operation then carried somewhat anterior to the ventricle.

At the end of the procedure the patient stated that she was free from her former pain. On the left side a similar operation was performed. In this instance the operation was carried down to the floor of the anterior fossa of the skull, the ventricle was not entered on the left side. It is probable that the upper inner quadrant and upper outer quadrant were not completely sectioned on either side. The patient asserted that she was undisturbed by the postherpetic neuralgia formerly present in the left frontotemporal area. It was not possible to evaluate her response accurately at the immediate postoperative period because she had received  $\frac{1}{4}$  gr. of morphine and 3 gr. of nembutal several hours previously. Her response to questions was accurate, and she seemed to show no definite psychologic change except for a certain loquacity which had not been present before.

For several hours after the operation she was quiet, responded only when spoken to, and although there was some pain present, she appeared to suffer no discomfort and requested no medication. (Prior to operation she had made frequent requests for sedatives.)

The patient was next seen in June 1947 and appeared to have improved physically. Her appetite had improved, she had gained weight and no longer relied upon sedative drugs. She admitted that pain persisted but did not trouble her.

In November 1948 she was re-examined and appeared to have acquired poise and good spirits. She proffered no complaints. She had gained 25 pounds and normal appetite and sleep rhythm had been restored. Anesthesia in the area of the left trigeminal nerve was still present but the patient no longer complained of pain and the necessity for sedatives.

Psychometric studies done on the patient, November 11, 1948 revealed a full scale I. Q. of 81. Her education had stopped at the eighth grade and the vocabulary score was consistent with her initial limited endowment.

Verbal tests revealed that the patient's thought faculty functioned in extremely low, concrete terms, but that she was attempting to use her knowledge effectively in dealing with

reality problems. Although she was able to maintain voluntary attention, she had difficulty in concentrating for any length of time. On two of three performance items requiring visual-motor coordination, the patient received her highest scores. In the third, a test of both writing and ocular shifts as well as a learning situation, the patient evidenced psychomotor retardation. She was lethargically cooperative and recognized her failure without sensitivity.

The electroencephalographic report done on November 11, 1948 showed an abnormal organic type of record with maximum changes in the frontal and right parietal regions.

The case described represents the most satisfactory result in the current series. It is entirely possible that her greatest difficulty was in the psychogenic sphere. Repeated references have been made regarding the encouraging results obtained in situations where anxiety and depression predominate.

#### Case 4. Pain from Recurrent Osteochondromas

A white man, age 44, was first seen at the Cleveland Clinic in March 1938. He had a mass above the right hip (above the right ilium on the anterolateral aspect) of one month's duration. Except for slight pain in the right groin and area about the tumor and mild stiffness of the right leg and thigh, the present illness was uneventful.

Physical examination revealed an atrophic left testis (post mumps), and a firm, non-movable, non-tender mass measuring approximately 9 by 6 cm. running parallel to the right iliac crest and attached to the inner aspect of the flare of the ilium above the spine. X-ray of the right ilium at the time of the first visit revealed a large tumor. Considerable bone production with some bone destruction was noted.

On March 30, 1938 the tumor mass was removed from the inner surface of the right ilium. The pathologic diagnosis was osteochondroma of the right ilium. The postoperative course was uneventful and in the ensuing months the patient gained weight and expressed few complaints.

Because of recurrence of the tumor a second operation was performed on April 22, 1940. At this time he complained of pain radiating from the ilium into the lateral aspect of the right thigh. Subsequent removals were performed in August 1942, December 1943, July 1944 and June 1945.

In September 1946, the patient returned complaining of severe pain in the right leg. At this time Dr. Gardner, advised unilateral cordotomy and this was carried out at the level of D-1 on the left, on October 14, 1946. This procedure relieved the discomfort to a great extent in the right leg but shortly thereafter he experienced dull aching pain in the left sacroiliac region which grew progressively worse, was aggravated by heat and when lying down, but was relieved by cold. By October 26, 1946 there was analgesia up to the level of D-10 on the right, but in spite of this there was some discomfort during manipulation of the right leg.

By the summer of 1947, the patient was taking increasing amounts of morphine sulphate, codeine and dilaudid to relieve the discomfort. He was readmitted to the Clinic Hospital on August 17, 1947 because of shooting pains down the anterior aspects of both thighs, accentuated on the right. There was also pain in the left hip. At this time the question of bilateral cordotomy versus bilateral prefrontal lobotomy was discussed. Inasmuch as the patient was addicted to drugs, was experiencing increasing amounts of pain, swelling of both feet due to mechanical factors, and faced the prospect of increasing anxiety and apprehension, bilateral prefrontal lobotomy was chosen to relieve his discomfort.

Lobotomy was performed on August 20, 1947 (W. James Gardner, M.D.). The following day he was calm, denied having pain and voided in bed without requesting a urinal. By August 25, 1947 it was noted that (1) he no longer smoked or asked for cigarettes, whereas previously he had been a heavy smoker; (2) he would eat any amount of food given him; (3) he was disoriented as to time and place, but did recognize his wife and (4) he expressed no complaints whatsoever. At the time of his discharge from the hospital on August 30, 1947 there had been definite improvement in bowel and bladder control and the patient had begun to shave himself. The pain was almost completely relieved but he obviously lacked his accustomed drive and ambition.

Unfortunately this patient was never re-examined, but excerpts from his wife's letters describe the results of this form of therapy:

## LOBOTOMY

October 1, 1947: "He has gained six pounds, appetite is good and he sleeps well. He is taking NO medicine.

There has been progress in his mental condition. His memory is not too accurate about some things, yet, about others is exceptionally good. He is able to converse as well as he ever did and his reasoning powers are good. For example, he plays a difficult game of solitaire and can figure a mathematical problem rapidly. (These are things he excelled in prior to the operation.) He is not interested in reading as he once was and seldom discusses business matters or current events. His attitude is relaxed about all problems.

These are the good things and, as they outnumber the bad, I am deeply grateful and am convinced that this operation was helpful.

On the other hand, he has experienced pain, constipation, bed wetting and procrastination. Three weeks ago he became conscious of pain and there has been much of it. However, he does not seem to have any bad effect from it. Some days are worse than others in this respect.

Concerning the bed wetting, he is not aware of it as it only happens while he is sleeping and, when he awakens and realizes what has happened, it is a source of unhappy concern to him. He performs toilet functions normally during the daytime. I think this is because of this new and bad habit of putting things off. He has the most advanced case of "I'll do it in a minute" that I have ever seen. For example, he will plan to do some chore, then will sit for hours without starting. I have seen him sit in his room for a half day with his shaving kit in his hand, then walk into the bathroom and remain three hours. Or, he will plan to go someplace, perhaps invite a guest, then fail to be ready for the appointment for hours. My husband was always a punctual and conscientious person and I sincerely hope this is a temporary phase of his recovery.

He enjoys going out and we have visited friends, gone to the movies and attended several sports events. He is able to walk better than he could prior to the operation and his foot and ankle swell but slightly each day."

October 14, 1947. "You asked if he mentions his pain spontaneously. For three weeks after the operation he complained of none, but suddenly he became aware of pain and since that time has mentioned it. In fact, he talks about it a great deal. One of your associates told me that he might speak of his pain but I had the impression that it would not really bother him. I believe that it does bother him for he can sleep in only one position and, when he is up, he moves from chair to chair and changes his position frequently which he says gives him relief.

His appearance is greatly improved. His appetite is excellent and he sleeps well in spite of the pain which he says bothers him during his waking hours. Altogether, there is a remarkable improvement."

January 8, 1948. "For the past three months he has been fair. He has recovered completely from the effects of the last operation.

The tumor has increased greatly in size and he has become lame. In addition to this he is in pain most of the time. This causes him to lose sleep and to accomplish little work.

Some time ago he began taking a drink of whiskey which he found relaxed the nerves "jumping in his leg." As time went on he drank more and more, until now, he drinks a fifth of whiskey in twenty-four hours. The amazing thing to me is that this whiskey does not make him drunk. He simply drinks it by the glassful and there is no apparent effect except that he can sleep after so long a time. So far, it has not affected his appetite, which remains good. He does not particularly like whiskey and could and would stop drinking immediately if relieved of the pain."

On January 20, 1948, his attending physician wrote the following comments: "He has had some recurrence of his discomfort, although he states that it is not at all severe and not the same as prior to his lobotomy. He describes this as "nerve twitching" and pain which lasts momentarily and is referred down over the right thigh. This comes on particularly after he retires. He is accustomed to drinking approximately a fifth of whiskey, which he states helps him to go to sleep but he does not believe that it actually diminishes his pain. He states that he has consumed considerably more alcohol since his lobotomy than prior to

it and has not noticed any particular effect of the alcohol. He believes that his tolerance is as good for alcohol now as it was prior to his operation.

On examination I find further encroachment of the tumor into the tissues of the right thigh as well as the right lower quadrant of his abdomen."

A second letter from the attending physician said, "I have seen the patient on several occasions recently. He is failing rapidly and although not having a great deal of pain is apparently approaching the terminal stages of his condition. For a time he exhibited evidences of an intestinal obstruction. However, this has not been evident recently. He is gradually growing weaker and has had several attacks not unlike the petit mal of epileptic seizures."

The patient died on March 15, 1948.

While the results of lobotomy were not altogether satisfactory in this case a moderate degree of success was achieved in alleviating his pain. The relief of anxiety and apprehension and lack of necessity for sedatives were most satisfactory.

#### Case 5. Malignancy of the Kidney with Metastases

A 62-year-old white woman was first observed in December 1948, because of severe pain in the left hip, thigh, and abdomen, of approximately eight to ten months' duration. The patient was bedridden because of the extreme pain and weakness and required large doses of morphine sulphate, empirin compound and codeine to gain relief.

The diagnosis of carcinoma of the left kidney with metastasis to the left ilium and spine was made elsewhere.

In view of the apparent involvement of the spine with root irritation, cordotomy was decided against because of the likelihood of producing paralysis.

Bilateral transorbital prefrontal lobotomy (W. James Gardner, M.D.) was performed and immediately postoperatively the patient stated that she had much less pain. However, within four or five days it was apparent that this procedure was not effective since the patient complained of excruciating pain in the left leg and epigastrium. By this time there was also definite evidence of involvement of the spine, an increasing demand for sedation, a moderate degree of depression and considerable fear and anxiety.

Subsequently, standard prefrontal lobotomy (W. James Gardner, M.D.) was performed in two stages. The operations were carried out through openings in the line of the coronal sutures placed approximately 2 cm. laterally from the midline of the skull. Both openings were covered by a tantalum plate.

Although sufficient time has not elapsed to accurately evaluate the results, the immediate postoperative course definitely revealed less anxiety and depression and decrease in the amount of pain.

This case demonstrates that the more minimal procedure of transorbital lobotomy was insufficient to produce the desired effect. It has been estimated that this method is effective in approximately 30 per cent of cases.

#### Summary

Standard lobotomy was found to be satisfactory in 2 cases (case 1, for intractable pain from carcinoma of the mastoid, and case 3, for postherpetic neuralgia, chronic depression and drug dependence). The same procedure was moderately successful in relieving the pain in two instances (case 4, for pain from recurrent osteochondroma and case 5, for pain from malignancy of the kidney with metastases).

Transorbital lobotomy was ineffective for the relief of pain in 1 case (case 5, although the patient was subsequently relieved by standard lobotomy).

Unilateral lobotomy was unsuccessful in relieving the discomfort of contralateral postherpetic neuralgia in 1 case (case 2).

### Conclusions

Prefrontal lobotomy is a valuable therapeutic procedure in selected cases. It is our opinion that it should not be employed until other more conservative methods of treatment have failed to produce the desired results. Lobotomy is frequently more desirable than the traumatizing technics of cordotomy and tractotomy especially when the basic condition is complicated by extreme anxiety and excessive dependence on drugs.

Lobotomy will not eliminate pain but it will alter the individual's reaction to discomfort. Watts and Freeman have aptly concluded that "pain may be present but when divorced from its implications—the threat to the patient's security and fear of disability and death—it then becomes bearable and may be accepted with fortitude."

### References

1. Moniz and Lima, cited by Watts and Freeman.<sup>2</sup>
2. Watts, J. W., and Freeman, W.: Psychosurgery for relief of unbearable pain. *J. Internat. Coll. Surgeons* 9:679-683 (Nov.-Dec.) 1946.