CONTROLLED TRANSORBITAL LEUKOTOMY

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(Received for publication May 19, 1954)

In view of the large numbers of transorbital leukotomies being performed it is apparent that this operation is gaining in recognition, and may well account for approximately one-third of the lobotomies performed, according to Freeman and Watts. In his appraisal of this procedure, which he has used in 300 cases, Moore was of the opinion that it possesses a great advantage over other methods of lobotomy in that there are no untoward psychological effects, there is an ease of performance, the hospitalization period is short and nursing care is minimal, the morbidity is insignificant, the mortality rate is low (1.8 per cent), and the results are as favorable as those obtained with other more extensive operations. Moore urged a greater utilization of this operation in suitable cases. Wilson and Pittman, after their study of 200 cases, recommended transorbital leukotomy for all chronically disturbed patients when less strenuous forms of treatment have failed after 1 year's trial. It is apparent also from an abundant literature that prefrontal lobotomy has certain ameliorating tendencies in the care of the patient with intractable severe pain, whether or not the procedure is done through a trephine in one of various positions, or through the transorbital route.

In discussing transorbital lobotomy Williams and Freeman felt that the morbidity and mortality statistics of this operation are encouraging. Fifteen brains were studied up to 1 year after such an operation. These authors concluded that from a pathological standpoint, the operation is a clean-cut, selective procedure for severing the thalamofrontal radiations. Fulton, on the other hand, believed that the operation of lobotomy removes large numbers of visceral pain projections from the sphere of consciousness, which accounts for the patient's change in attitude towards his pain. Balakrishna Rao claimed that lobotomy is more effective in patients with marked psychic pain, which favors the opinion of most writers that the benefits of psychosurgery result largely from relief of the anxiety and fear of the future and from the euphoria produced. Fulton believed that radical lobotomy should be abandoned in favor of a more restricted lesion. Several more limited procedures have been recorded in the literature. Grantham, for example, stated that good results were obtained in a series of patients with severe pain when the pathways in the lower mesial quadrants were interrupted. It appears that the present trend is toward a more selective or restricted operation.

This discussion does not concern itself with the pros or cons of prefrontal lobotomy either in psychosurgery or the pain problem. Neither is it a discus-

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sion claiming greater effectiveness in the solution of either of these problems by surgical methods. Rather, it is concerned with the presentation of another method of attacking the same problem with more regard for the patient's safety, yet achieving the desired clinical result. The leukotomy is converted to a more precisely controlled operation which leaves a set of data in each case available for future study and analysis. An attempt has been made to make this particular operation less of a blind procedure than it has been heretofore. A specially designed transorbital leukotome, under x-ray control in its positioning and manipulation, was used. This leukotome (Fig. 1) consists of a hollow steel rod with a blunted tip, having within its lumen a steel wire capable of being extruded through a slot to expand into a cutting loop of a predetermined variable size, and controllable at the gripping end of the tool. The tip of the leukotome is deliberately left blunt so that, while capable of penetrating the orbital plate, it would tend to push aside any vessel encountered in its course without lacerating it. A lateral cutting of the white substance is done with a thin wire loop which is easily deflected by any vessel encountered. This inner cutting wire is replaceable. Should a vessel be inadvertently encountered and ruptured, the operator would be immediately apprised of this fact by the flow of blood down the lumen of the instrument. This has not been encountered to date. The lateral extension of the expanding loop is measurable in centimeters upon the handle of the instrument.

PROCEDURE

This operation is considered only after x-ray study of the head and orbit has been made to eliminate those factors that could be complications in the use of the transorbital approach. As summarized by Fiamberti\(^2\) they are: (1) aberrant ethmoid cells with infection, (2) malformations or thickening of the orbital plate, (3) osteomas of the orbital plate, and (4) intraorbital tumors. Having determined that none of these situations exists, the patient is prepared for surgery in the usual manner, though obviously no special head preparation is necessary. The operation is carried out in the operating room if a
good portable or stationary x-ray unit is available in the room. However, the procedure can be equally well done on the regular x-ray table.

A general anesthetic is used, usually pentothal, and these successive steps are followed:

(1) The patient is draped under sterile conditions, leaving only the eyes exposed.
(2) The eyelid is elevated and the leukotome is placed somewhat posteriorly against the floor of the orbit in a position corresponding to the approximate center of the pupil.
(3) With an assistant steadying the head and aiming the instrument toward the coronal suture the orbital plate is penetrated with several sharp blows of a surgical mallet.
(4) During these procedures the wire is, of course, left flat in its canal and the leukotome is driven in until, in the operator’s opinion, it rests approximately 2 cm. below the inner table of the skull. Because of the variability of the soft tissue about the orbit no definite measurements can be given as to the exact penetration necessary to accomplish this since it varies from person to person.
(5) At this point lateral and AP views are made with the roentgen unit, the wet films being returned as promptly as possible, and the position of the leukotome is adjusted according to the degree of error made in its placement. The relation of the leukotome to the medial plane and to the lateral and anterior inner tables of the skull is noted and measured.
(6) When a coronal section is desired the handle of the instrument is rotated nasally until the slot is directed along the desired coronal plane. The small knob on the butt of the instrument is then pushed forward 2 or 3 cm., noted on the handle, to expand the loop to a corresponding degree, thereby cutting the white matter. Should the measurements of the skull reveal that complete cutting cannot be done in this fashion, the instrument can, of course, be angled over toward the medial plane as desired. An AP roentgen film is taken as a permanent record of the exact location of the extent and position of the medial transection and the instrument is returned to the midline.
(7) To complete the lateral wing of the coronal section the slot which had been directed medially is now rotated through 180 degrees to point directly laterally without changing the angle of entrance through the orbit. The loop is again expanded to the desired extent and another AP roentgen film is made to record the position and extent of the transection. This completes the section of the median-lateral superior quadrants.
(8) From the original films it is apparent that if a coronal section of the inferior mesial or lateral quadrants is desired or an undercutting, as for example, of the frontal region, the leukotome must be withdrawn until the lower edge of the slot is approximately 2 cm. from the floor of the orbit. This done, the same procedure is followed as was enumerated above, though in some instances it may be necessary to expand the loop farther. Films are made in these positions as previously mentioned so that an accurate record may be obtained of the areas traversed by the wire.
(9) The loop is then returned to its initial position and retracted into the tube.
(10) The leukotome is then returned to its initial position. Should it be desired to undercut the frontal surface anteriorly, the loop is expanded to the desired number of centimeters obtained from the measurements made on the films and a lateral exposure is made to record the position of the instrument. If this is satisfactorily placed the loop is then swung nasally through a 90-degree arc, then back to its
initial midline undercutting position. A lateral swing through 90 degrees is made to complete the frontal undercutting.

(11) When two leukotomes are available it is apparent that the time of this procedure could be shortened by virtue of doing both sides at once, thereby obviating the necessity of another set of x-ray films. Should only one be available, the same procedure as outlined above is carried out on the opposite side.

(12) On completion of the procedure the loop is, of course, retracted and the leukotome is removed from the orbit. Firm pressure is kept at the penetration site for several minutes to minimize the ecchymoses noted in some patients.

(13) Pressure dressings of elastic type are placed over the orbit and removed in several hours. Antibiotics are usually given and the patient is returned to bed with the head in an elevated position. Lumbar puncture has been done immediately postoperatively in most of the patients to obtain a definite record of the immediate postoperative situation with regard to the pressure, the color of the fluid, etc. The patient is permitted to be ambulatory the following day and returned to a routine diet.

DISCUSSION

Most neurological surgeons of any experience are somewhat fearful of a so-called “blind” surgical procedure wherein the operative field is not under direct vision—a view that is wholeheartedly endorsed here. However, it is likewise recognized that even as a blind operation, transorbital lobotomy is apparently increasing in popularity—particularly since the morbidity and mortality statistics compare favorably with those of other similar procedures and because of those advantages mentioned earlier in this paper. In order to gain such advantages as this particular procedure may have over others, the effort has been made here to give the operator better control of the surgical situation. While the mortality is low, it is believed that by more adequate control it can be reduced still further without detracting from any of the desirable features of the operation. By using a special leukotome it is apparent that a finer incision line with less local destruction of tissue can be made than that produced by a coarse tip which tears a relatively wide pathway through the brain. It is also evident that this incision line can be projected much farther than by the ordinary leukotome even when it is swung through the arcs described by Freeman. In certain orbitofacial configurations it is virtually impossible to swing the ordinary leukotome far enough medially or laterally to effectivley section any but a relatively small arc of tissue without fracturing the orbital plate which would be, of course, a somewhat primitive way of attaining a desired result.

Radiographic control, not only of the placement but of the manipulation of the leukotome, is felt to be of great importance. It is interesting to note how, when the ordinary landmarks are followed, a surprising degree of adjustment of the leukotome is often necessary before it is properly located. Should the lobotomy have been carried out in some of the positions noted, an effect far less than desirable would have resulted, and detracted considerably from future interpretations of the efficacy of such an operation. With the use of x-ray control the operator is left with a permanent record of the
tissue planes transected. In all, some 32 operations of this type were performed with no mortality that could in any way be attributed to the operative procedure. The method outlined was followed as described and has proved to be quite satisfactory. It is apparent, moreover, that this technic can likewise be applied to the standard lobotomy done through a trephine opening, with this leukotome being used in place of the standard leukotomy blade, much in the manner suggested by McKenzie. As mentioned before, should a vessel be inadvertently torn, it is believed that the most reasonable course would be to allow the leukotome to remain in place and permit the blood to drain through it until such drainage has stopped. Should the hemorrhage be of greater proportions the location of the leukotome (if left in place) would serve as an effective guide in finding the bleeding point from above.

When this operation of lesser proportion than the standard prefrontal lobotomy is proposed, using this particular technic, it is believed that a greater degree of safety is afforded the patient. It is likewise believed that a more restricted and selective lesion may be effected to gain the desired clinical result.

CONCLUSIONS

(1) A method of transorbital leukotomy is described, wherein a specially designed leukotome is used to produce a selective and more restricted lesion under x-ray control.

(2) In contrast to the previously used "blind" approach, it is believed that greater accuracy and safety can be assured the patient in the production of the surgical lesion.

(3) A more accurate permanent record can be obtained to aid in future correlation studies between the size and position of the lesion produced and the result obtained.

(4) If the transorbital operation is selected as the operation of choice in a given case, the controlled procedure is considered more desirable than the "blind" one.

REFERENCES