A MODIFICATION OF THE CHEMOPALLIDECTOMY GUIDE*

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(Received for publication November 13, 1958)

Our neurosurgical treatment of hyperkinetic diseases involves placing chemical lesions not only in the mesial globus pallidus, and ansa lenticularis, but also in the ventrolateral area of the thalamus.

Operations upon these anatomical targets are currently performed with the help of the chemopallidectomy guide originally devised for the transtemporal approach and modified later for the transfrontal technique. However, the gradual multiplicity of desirable locations has made necessary a more versatile instrument, since a variable degree of angulation is needed for the needle-holder in each operation. It has been our policy to modify our technique whenever the problem of achieving more successful alleviation of hyperkinetic symptoms required it. This report deals with one of the many successive modifications in surgical technique or instrumentation which have enabled us to have increasing success with achievement of relief of disorders of involuntary movement.

A modification of the needle-holder has been recently devised and is in use on our service. The design of this needle-holder has been made according to the basic features of simplicity and surgical handiness of the chemopallidectomy guide but provides an easier and more independent aiming of the needle than was possible previously.

We have adopted, otherwise, some basic principles regarding the correct placement of the lesions. These principles have been followed in the development of this modification and will be defined with the help of a spatial representation of the operative relations between instrumental and anatomical points. This representation is shown in the geometrical schemes, Figs. 1, 2 and 3. A simplified needle-holder is illustrated there in relation to the head’s midsagittal plane (plane M–S) and to the transversal plane (plane α). Point O represents the common center of rotation of the needle-holder. The two independent rotations of the instrument are provided by two axes, these being identified to the lines O–O₂ and O–O₄. Both axes are perpendicular to the surfaces S and T, which represent the radiological projection planes (lateral and anteroposterior films, respectively). Point O is also theoretically coincidental, in the figures, with the cranial point of entrance for the needle. Lines A and B are the perpendiculars from points O₂ and O₄, both points being projections (in the lateral and anteroposterior films) of the center point O. Line A passes through the foramen of Monro and is determined in the preoperative pneumoencephalogram by means of a straight tantalum-wire landmark. Lines A and B originate planes α and β; the intersection of these planes defines the initial neutral (theoretical) position of the needle.

In Figs. 1 and 2 some above mentioned principles are exemplified. (1) For the

* Assisted by grant from Sister Elizabeth Kenny Foundation and Allen P. and Josephine B. Green Foundation.
accurate aiming of the needle, the play of its holder must be provided by two independent axes and restricted to them. (2) Since the aim of the needle has to be controlled by radiological means, those axes will be perpendicular to the roentgen-ray projection planes. (3) Both axes of rotation of the holder must intersect at a common point, as close as possible to the cranial opening. (4) The surfaces of revolution of the needle when rotating around each one of the axes, originate two planes (planes $\alpha$ and $\beta$ in the initial neutral position). Although both planes become gradually modified by the changes of angulation selected for the needle (thus becoming planes $\alpha'$ and $\beta'$), their original perpendicularity to the anatomic and radiological planes remains unchanged. This fact excludes the possibility of error by distortion and keeps the present scheme useful in any step of the operation.

In Figs. 1 and 2 the two main stages of the procedure have been illustrated, the first showing the correction in the sagittal plane and the second the subsequent correction in the transversal one. Fig. 3 is a combination of Figs. 1 and 2 and represents a condensation of the whole operation. According to this scheme, if a thalamic aim is intended, for instance, a proper point will be chosen in the sagittal plane (information supplied by S) along the foramen of Monro-pineal line (F.M.-P.). This point originates line $A'$ which changes plane $\alpha$ into $\alpha'$ (Fig. 1). The next step (Fig. 2) will be the choice of laterality, in the transversal plane, according to the proper landmarks in the radiological projection T. This will be accomplished by rotation around the second axis always inside of plane $\alpha'$. Plane $\beta'$ is subsequently originated by the new direction, line $B'$. At the end of the operation, the intersection between planes $\alpha'$ and $\beta'$ illustrates the correct aiming of the needle (Fig. 3). The depth has to be chosen preferentially in the lateral roentgen-ray film, its coincidence with the anteroposterior landmarks being easily determined beforehand by proper measurements and by the length markings of the needle.

As pointed out before, these theoretical principles have been kept in mind in the present modification of the chemosurgical guide. The instrument features, also, transversal and longitudinal slides for the easier approach of the needle-holder to the cranial opening and for eventual adjustments, once the guide has been fixed to the patient’s head. For practical purposes (good visualization of the cortex and control of possible bleeding, etc.) the cranial end of the needle-holder is usually kept some 3 cm. from the burr hole. Since the changes of angulation described before are considered as centered in the skull opening, the instrument must be