NEURO-SURGERY IN THE RELIEF OF GYNÆCOLOGICAL PAIN.*

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Although neuro-surgical methods have been employed for some considerable time in the relief of pain generally, their application to gynæcological conditions is a comparatively recent advent. It is true that Jaboulay, so long ago as 1891, practised a crude form of sympathectomy, but his method was a primitive one, and it was not until Leriche extended his peri-arterial methods to the pelvic vessels in 1918 that the problem was approached in a reasonably scientific manner.

Since that time, increasing anatomical knowledge and clinical experience have evolved a variety of operative methods specifically designed for the relief of gynæcological pain. These have now been applied over a sufficiently long period to permit assessment of their relative value, and it is the purpose of this paper to describe these procedures, and to discuss the indications for their application and the results obtained.

ANATOMY AND PHYSIOLOGY.

I have elsewhere described the anatomy and physiology of the pelvic innervation in some detail, and it is unnecessary to give here anything but the briefest resumé.

The nerves of the pelvis may be divided, for descriptive purposes, into three groups, sympathetic, para-sympathetic, and cerebro-spinal. The *sympathetic* constituent represents the abdominal autonomic contribution, and consists of converging outflows from the solar plexus and the lumbar ganglia. These coalesce to form the inter-mesenteric nerves, fine parallel nerve-bundles lying alongside the aorta. Just above the bifurcation, the intermesenteric nerves unite to form the so-called "presacral nerve", a bundle of nerve fibres running vertically downwards on the aorta and left common iliac vein for approximately 3 cm., a little to the left of the mid-line.

The presacral nerve terminates at the level of the sacral promontory by spreading out into the isosceles-shaped middle hypogastric plexus, which in turn gives rise below to the inferior hypogastric plexuses, two long narrow plexiform strands which course around the rim of the true pelvis and terminate on each side in the corresponding pelvic plexus of Lee-Frankenhauser. This structure is a quadrilateral flattened mass of neuro-fibrous tissue containing micro-ganglia, lying on the side of the ampulla of the rectum and stretching forward towards the cervix uteri, to which structure most of its efferent fibres are supplied.

The *para-sympathetic* pelvic nerves are the nervi erigentes. These are long fine branches which emerge from the middle three sacral nerves near the foramina, and run in the utero-sacral folds to join the pelvic plexus, with the branches of which they are distributed to the pelvic viscera.

The *cerebro-spinal nerves* are adequately described in the standard anatomical text-books. The pudic nerve, however, requires special mention. It arises from the middle three sacral nerves, and after a very short intra-pelvic course, emerges through the lower division of the great sacro-sciatic foramen, lies for a short distance on the ischial spine, and then traverses the lesser foramen to enter Alcock's canal. It passes forwards in the ischio-rectal fossa, and distributes its terminal branches to the structures of the perineum.

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The *functions* of the *sympathetic* nerves are motor-inhibitory, vaso-constrictor, sensory, glandulo-motor and nutritional to the pelvic organs. The *para-sympathetics* are motor, vaso-dilator and sensory. Both systems are antagonistic and complementary, and it is probable that many neuro-vascular conditions owe their origin to an upset of this equilibrium.

The *cerebro-spinal* nerves are motor and sensory to the pelvic floor and parietes.

METHODS.

There exists a multiplicity of actual and suggested procedures designed to interfere with one part or another of the pelvic nervous system. It will be convenient first to enumerate the most important, and then to describe their individual indications, technique, and results. They are:—

1. Resection of the presacral nerve.
2. Resection of the ovarian plexus.
3. Resection of the pudic nerve.
4. Posterior root section.
5. Cordotomy.

Resection of the presacral nerve. The object of this operation is to permanently interrupt the sympathetic nerves to the uterus and other pelvic viscera at a point where the whole of this supply is concentrated into an accessible bundle, the presacral nerve. Numerous researches have shown, and the results of operation have proved, that these nerves are inhibitor and sensory to the uterus, bladder and rectum, functions which explain the value of their artificial interruption in such disorders as dysmenorrhœa, rectalgia, cystalgia, "cord-bladder", etc. These disorders, in fact, are the main indications for the operation, with the addition of some pelvic neuralgias due to carcinoma of the cervix, and occasional cases of pruritus vulvæ.

The technique of the operation consists in the exposure of the sacral promontory through a low abdominal incision, and the removal of an inch or so of the presacral nerve above this point. In the absence of adhesions and anatomical abnormalities, and if the relations of the underlying vital structures are kept in mind, the procedure is a safe and comparatively simple one, though it involves the definite, though small, risks of laparotomy.

The operation finds its chief application in the treatment of severe intractable dysmenorrhœa which has failed to respond to the usual medical and minor surgical procedures. The latter include repeated cervical dilatation, with or without alcohol injection or intubation, and I believe that these methods should be given a thorough trial before recourse is had to what is, after all, a major operation. The results are, as a rule, satisfactory, the most complete relief being obtained in those cases where the pain is of the intermittent spasmodic type, and where the element of neurosis is at a minimum.

A typical example is summarised in the following case history:—

A.B., a governess, æt 26. Severe dysmenorrhœa of the spasmodic type since æt 16, i.e., 2 years after the menarche. Pain getting worse, in spite of prolonged medical treatment and two dilatations. On examination robust, healthy girl, no local or general abnormality detected. Operation 16/9/34. Resection of presacral nerve. Result. Practically no pain since.

The average cure-rate calculated for all cases published is about 50 per cent., but with increasing selectivity this has been increased to more nearly 75 per cent., a percentage approximating to that obtained in my own more recent figures. These are naturally small, for the number of patients upon whom this operation

is justified is necessarily very limited, but they are sufficient to indicate the value of what is often one of the most beneficial of gynecological operations.

In some cases of carcinoma of the cervix, where the pain is preponderantly uterine in origin, resection of the presacral nerve is beneficial. In many of these patients it is impossible to control the pain medicinally, but as the operation will only relieve the sympathetic pain, it is contra-indicated where there is sacral (spinal) nerve involvement. The results are good—of my six cases five were almost completely relieved—and they render the last months of these patients at least tolerable.

In certain patients, X-ray and radium therapy for cervical carcinoma causes a permanent and intractable pelvic neuralgia, often so severe as to make the patient regret having submitted to treatment, even though the original disease may have been cured. The pain is the result of peri-neural fibrosis of the pelvic sympathetics, caused by the deep irradiation, and is immediately and permanently relieved by resecting the presacral nerve.

Resection of the ovarian plexus. This may be done either by removal of a piece of the infundibulo-pelvic ligament, which contains the plexus, or by individual dissection of its constituents as they enter the hilum of the ovary. The latter is the more difficult procedure, but it is preferable to the former, which necessarily involves the removal of the main blood supply to the organ, with the consequent possibility of pathological ovulation. It is indicated principally in "primary ovulalgia", i.e., intermenstrual pain caused by ovulation which, normally unconscious, has become painful as the result of local or general sympathetic hypersensitivity.

Resection of the pudic nerve. The nerve may be divided either upon the ischial spine or more peripherally in the perineum. The latter procedure, though less certain, is the safer, for it avoids section of the sphincteric branches.

The operation is useful in some cases of intractable pruritus where medical measures have failed and local injection is impracticable on account of advanced local changes. It is contra-indicated in the presence of atrophic degenerative changes in the vulval integument.

Posterior root section. This somewhat formidable operation consists in the division of the particular spinal roots which convey sensory impulses from the pelvis. It is technically difficult, and results in ataxia, but it has a certain limited application in some cases of pelvic carcinoma with sacral nerve involvement.

Cordotomy. The object of this operation is to cut off all pain-sensory impulses from the lower part of the body by division of the spino-thalamic tracts in the spinal cord. Exposure of this tract involves a tedious and extensive laminectomy, and it is, in addition, extremely difficult to limit the section to the required area, with the result that the operative mortality is extremely high. In spite of this, the operation is useful in those cases of carcinoma where the nerve-involvement is too extensive to allow of root section, and where intra-theal alcoholisation has failed to relieve the pain.

CONCLUSION.

The operative procedures described above are comparatively new, but they have been applied over a sufficiently long period to allow of an assessment of their ultimate value. It may be said at once that the results, in carefully selected cases, are very good, and it appears certain that increasing experience will still further emphasize the value of neurectomy in the treatment of a number of hitherto intractably painful gynecological affections.