A NEW OPERATION FOR THE RELIEF OF PAIN IN ANGINA PECTORIS

JOHN T. ROBSON, M.D.*
Tacoma, Washington

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Several years ago the writer became interested in the problems of surgical relief of pain in angina pectoris, and devised a new operative method. This was the subject of a preliminary report in 1948 and subsequently has proven to be of lasting benefit.

All operations for this condition now in use are based on the knowledge that pain-bearing afferent fibers from the heart have their cells of origin in the posterior root ganglia of the upper five thoracic spinal nerves, and the fibers may be interrupted at the posterior nerve roots or corresponding thoracic sympathetic ganglia. No operation so far devised relieves pain referred to the head and neck and, in fact, the pain pathways to these areas are not known.

Sympathectomy for cardiac pain was first suggested by François-Franck, and first carried out by Jonnesco. The modern operation consists of sympathetic ganglionectomy of the first three or five thoracic sympathetic ganglia and intervening trunks. White recommends removing only the first three thoracic sympathetic ganglia, but because it has been shown that in some individuals the fourth and fifth ganglia also contain cardiac afferent fibers, and their removal adds little to the difficulty of the operation, most surgeons prefer to remove all five ganglia. Sympathectomy in this manner is effective in abolishing precordial and arm pain homolaterally, and may be used bilaterally when indicated. When pain on the minor side (usually right) is not too extreme it is my practice to operate on one side only as some degree of pain with effort may serve some useful purpose in warning the patient to curtail activity. When the bilateral operation is done, however, patients still retain a sensation of constriction of the pharynx, or flushing of the head and neck as an anginal equivalent, and this sensation may be explained to them as a sign demanding cessation of activities.

Section of the posterior spinal roots of the upper thoracic region was suggested and carried out by Haven and King. The operation is effective in relieving cardiac pain, but results in a band of anesthesia across the thorax and extending onto the medial surface of the arm. The operation requires laminectomy and in the words of White, "this is a more mutilating and dangerous procedure [than sympathectomy]. It is to be recommended only for the neurosurgeon who is well accustomed to spinal operations, but who has not had the necessary technical experience with paravertebral

*Medical Arts Building, Tacoma 2, Washington.
exposure and resection of the ganglia.” Formerly I was in agreement with this, but now, as will be discussed later, I consider posterior root section a useful operation.

For completeness it should be mentioned that total thyroidectomy,\textsuperscript{3} surgical myocardial revascularization, and so-called pericoronary neurectomy\textsuperscript{1} have been used in patients with cardiac pain, but without noteworthy success.

Sympathectomy and posterior spinal root section, while being uniformly effective in abolishing cardiac pain, are also accompanied by some undesirable changes. Denervation of the first five thoracic dermatomes by posterior root section is obviously not desirable in many instances. Sympathectomy, while producing no cutaneous denervation, results in cessation of sweating and in vasodilatation of the upper thorax, upper extremity, and head and neck, and ocular changes characterized as Horner’s syndrome. The ptosis, constricted pupil, and enophthalmos of Horner’s syndrome, while merely undesirable cosmetic effects, are frequently of great psychic discomfort to the patient. In addition to this, however, the ocular vascular engorgement accompanying Horner’s syndrome may precipitate glaucoma or light up an unrecognized chronic glaucoma. The recent interest in stellate blocks for cerebrovascular thrombosis has shown that increased intraocular tension is a constant accompaniment of this procedure, and clinical glaucoma is not uncommon.

DESCRIPTION OF OPERATION

The operation that is the subject of this paper was conceived to provide sensory denervation of the heart without Horner’s syndrome or cutaneous anesthesia.

The operation consists of resection of the 2nd, 3rd, 4th, and 5th thoracic sympathetic ganglia with careful preservation of the 1st thoracic or stellate ganglia, and the extraspinal section of the 1st thoracic posterior root. The 3rd, and, if desired, the 4th rib is approached by a muscle-splitting incision 5 cm. to one side of the corresponding spinous process, and 3 cm. of the vertebral end of the rib are resected as in the Smithwick operation. The transverse process of the vertebra is rongeured away and the sympathetic chain exposed extrapleurally. The chain is then resected from just above the 2nd thoracic ganglion to a point just below the 5th thoracic ganglion. Without further rib resection, the 1st thoracic nerve is identified and traced to where it emerges from the foramen. The nutrient spinal artery can frequently be identified and separated to one side. With gentle traction on the nerve the posterior root ganglia can be brought into view in the foramen, and with a blunt right-angle hook the anterior and posterior roots identified at their junction. With gentle traction still maintained a right-angle Adson ganglion knife can be slipped into this aperture, and the posterior root sectioned just proximal to the dorsal root ganglion. The operation is then completed with closure and aspiration of epipleural air. The operation in the upright position is not difficult but, in my experience, in the prone position it can be very time-consuming.
The patient who was the subject of the preliminary report, was a 51-year-old housewife with a 4-year history of angina and 6 months of angina decubitus. All medical efforts at pain control were without effect insofar as allowing return to any activity. Medical findings revealed no systemic disease other than hypertension, and EKG findings were those of left axis deviation and horizontal heart position only. It was felt that there was reasonable life expectancy and therefore surgery was recommended and carried out March 25, 1948. The patient has been observed over 3½ years and results are gratifying. She is able to be up and about and do minimal housework without precordial or extremity pain. Exertion and emotion, however, are accompanied by facial flushing and feeling of constriction in the pharynx, and serve to keep the patient's activities within bounds. There is no demonstrable cutaneous hypesthesia, ptosis or constriction of the pupils. The skin does not sweat over the left upper thorax, arm and head and neck.

The ocular changes of Horner’s syndrome are referable to resection of the first thoracic ganglia and this is avoided in the operation described. There is no clinical recognition of hypesthesia from the interruption of the first thoracic dorsal nerve root.

It is my practice in the surgery of angina pectoris to use the operation described in all cases in which there is predominantly unilateral pain. The operation is safe, rapid and effective. In patients with pain that is severe bilaterally, however, I use laminectomy and dorsal root section as I believe it is of less hazard than a two-stage paravertebral operation in patients with cardiac disease.

SUMMARY

A new operation for the pain of angina pectoris is described. It consists of resection of the second, third, fourth and fifth thoracic sympathetic ganglia and division extraspinally of the first thoracic dorsal nerve root. This operation is without the undesirable side-effects of other operations now in use.

REFERENCES